I. AN OVERVIEW

1. INTRODUCTION

The Department of Scientific and Industrial Research (DSIR), one of the departments of the Ministry of Science and Technology, was set up through a Presidential Notification, dated 4th January, 1985 (74/2/1/8 Cab.). The mandate of DSIR includes promotion of industrial research for indigenous technology promotion, development, utilization and transfer. Shri Prithviraj Chavan has taken over on 28th May, 2009 as the Hon'ble Minister of State (Independent Charge) of the Ministry of Science and Technology from Shri Kapil Sibal who was holding the charge until then as Union Minister. Shri Chavan is also the Hon'ble Minister of State (Independent Charge) Ministry of Earth Sciences; Hon'ble Minister of State in Prime Minister's Office; Ministry of Personnel, Public Grievances and Pensions; and Ministry of Parliamentary Affairs.

The Allocation of Business for the Department is as follows:

- All matters concerning the Council of Scientific and Industrial Research.
- All matters relating to National Research Development Corporation.
- All matters relating to Central Electronics Limited.
- Registration and Recognition of R&D Units.
- Technical matters relating to UNCTAD and WIPO.
- National register for foreign collaborations.
- Matters relating to creation of a pool for temporary placement of Indian Scientists and Technologists.

The primary endeavour of DSIR is to promote R&D by the industries; support industrial units to develop state-of-the-art globally competitive technologies of high commercial potential; catalyze faster commercialization of laboratory-scale R&D; augment technology transfer and management capabilities; enhance the share of technology intensive exports in overall exports; strengthen industrial consultancy and establish a user-friendly information network to facilitate scientific and industrial research in the country. The DSIR has two public sector undertakings viz. National Research Development Corporation (NRDC) and Central Electronics Ltd (CEL) and two autonomous organizations viz. Council for Scientific and Industrial Research (CSIR) and Consultancy Development Centre (CDC). The Department also provides host facilities and assistance to Asian and Pacific Centre for Transfer of Technology (APCTT).

2. TECHNOLOGY PROMOTION, DEVELOPMENT AND UTILIZATION SCHEME

The Technology Promotion, Development and Utilization (TPDU) Scheme is aimed at promoting technology development and industrial research in the country and encouraging its utilization by various sections of economy including industry, academic/research/scientific institutions and the society at large. The components of the TPDU programme are:

- Industrial R&D Promotion Programme (IRDPP)

- Technology Development and Innovation Programme (TDIP)
  - Technology Development and Demonstration Programme (TDDP)
  - Technopreneur Promotion Programme (TePP)
- Technology Management Programme (TMP)
- International Technology Transfer Programme (ITTP)
- Consultancy Promotion Programme (CPP)
- Technology Information Facilitation Programme (TIFP)
- Information Technology and e-Governance (IT-eG)
- Technology Development Utilization Programme for Women (TDUPW)

2.1 Major Achievements

The major achievements of the various programmes of the Department during the period under report (from April to December 2009) are as under:

Industrial R&D Promotion Programme

DSIR is the nodal Department for granting recognition to in-house Research and Development centres of industry. As on 31st December, 2009, there were 1,313 in-house R&D centres with DSIR recognition. Of these centres, 151 incurred an annual expenditure of over Rs. 5 crores each and 296 incurred an annual expenditure in the range of Rs. 1 crore to Rs. 5 crores.

During the period under report, 92 in-house R&D centres were accorded fresh recognition and recognition of 446 centres was renewed.

Scientific research foundations in the areas of medicine; agriculture; natural and applied sciences; and social sciences seek DSIR approval as Scientific and Industrial Research Organisations (SIROs) under the programme granting recognition to SIROs. The approved SIROs are eligible for availing customs duty exemption on imports and central excise duty exemption on indigenous purchase of essential scientific and technical instruments, apparatus, equipment (including computers), accessories, spare parts thereof and consumables, required for R&D activities. During the period under report, 16 SIROs have been accorded fresh recognition.

DSIR is the nodal Department for registration of public funded research institutions (PFRI), universities, IITs, IISc and NITs, for availing customs duty exemption and central excise duty exemptions under notifications 51/96-Customs and 10/97-Central Excise. During the period under report, 25 such institutions were registered with DSIR; and 76 institutions were granted renewal of registration.

Secretary, DSIR is designated as the Prescribed Authority under section 35(2AB) of Income-tax Act, 1961. Fresh approvals were accorded to 20 companies by the prescribed authority. Agreements of co-operation for R&D were also signed with these companies. The detailed R&D expenditure of the approved companies have also been examined by DSIR and 70 reports valued at Rs. 2018.75 crore have been forwarded to DGIT (E) in Form 3CL, as required under the IT Act.

Technology Development and Innovation Programme

The programme has two sub components:

(i) Technology Development and Demonstration (TDDP) to support technology development efforts of industry R&D system and

(ii) Technopreneur Promotion Programme (TePP) to nurture the innovative spirit of individuals.

The Technology Development and Demonstration Programme aims at catalyzing and supporting activities relating to technology absorption, adaptation and demonstration including capital goods development, involving industry and R&D organizations. Under the programme, research,

development, design and engineering projects for absorption and up-gradation of imported technology, as well as development and demonstration of new and improved technologies are supported. While the DSIR support is catalytic and partial, the bulk of the financial contribution in any project is from the industry.

The Department, under this programme, has so far supported about 200 R&D projects from industrial units. These projects cover products and processes in various important industries such as metallurgy, electrical, electronics, instrumentation, mechanical engineering, earth-moving and industrial machinery, chemicals and explosives and others. Around 50 technologies developed under the programme have been commercialized or are under commercialization. During the period under report, more than 40 projects supported under the programme were reviewed and carried forward. More than 30 new proposals received against open advertisements in leading daily newspapers are under process.

Technology development projects have strengthened industry-institute linkages with more than 25 national research laboratories/ institutions such as NAL, Bengaluru; NIIST, Thiruvananthapuram; IICT, Hyderabad; CIMFR, Dhanbad; IIP, Dehradun; C-DAC, Pune; Institute of Plasma Research, Ahmedabad; ER&DC, Thiruvananthapuram; Dalmia Centre for Biotechnology, Coimbatore and CMTI, Bengaluru. These have been collaborating with industry in the specific research, design, development and engineering (RDDE) projects having high techno-socio-commercial impact. The programme has hence been successful in synergizing the R&D efforts of industry and national research organizations.

The Technopreneur Promotion Programme (TePP) is India's largest network program supporting independent innovators and start-up firms. The network has been operating through 29 outreach centres and 100 innovation managers who provide grants, pre-seed funds, technical guidance, incubation facilities and assistance in the formulation of a sound business plan. The support is provided in two distinct phases - *innovation incubation* in first phase, limited to a maximum support of Rs. 15 lakh and towards *enterprise incubation* in second phase in which the maximum financial support is limited to Rs. 45 lakh. Since the time of inception, 419 innovations of independent innovators have been supported. Out of these, 323 were supported by DSIR and remaining by Technology Information Forecasting Assessment Council (TIFAC). Some of the successfully completed TePP projects during the period under report include 'Synthesis of nano-crystalline anatase phase titanium di-oxide', 'Low cost automatic cash depositor', 'Mobile crime and accident reporting platform', 'Laboratory scale process development of environment friendly printing ink', 'Intelligent ground vehicle; Prototype development of heating/cooling apparel', 'Hybrid system for solar distillation and drying applications', 'Geometrical instruments', 'Worm composting to treat medical waste', 'Pedestal wet grinder' and so on.

Technology Management Programme

The major objective of the Technology Management Programme is to provide technical inputs and support mechanisms for efficient transfer and management of technology. A number of technology and management related studies were taken up/carried out under the programme during the year. The reports/findings of completed studies were disseminated to the concerned. These included 'Study on development of beel fisheries and various species of bamboos in North Eastern States', 'Study on status of technology in castor oil and its derivatives in India', 'Potential of e-waste management in India', 'Technology audit of fish processing industry in the coastal districts of Karnataka', 'Study on managing strategic transformation of hi-tech firms in India', 'Case study on industrial clusters of Uttar Pradesh'.

The Centres for Technology and Innovation Management established under the programme carried out several activities and generated useful outputs. Newsletters are being brought out on specific technology management aspects in association with Madhya Predesh Council of Science and Technology (MPCST) Bhopal and Institute of Entrepreneurship Development (IED), Patna, Bihar.

Seminars/workshops and training programmes on specific issues related to technology management have also been organized.

International Technology Transfer Programme

Under the International Technology Transfer Programme (ITTP), major activities completed or in progress during the period under report include: bringing out the ninth volume of 'Compendium on Technology Exports' in association with Indian Institute of Foreign Trade giving data on technology intensive exports of 367 organizations; continued support to Technical Exports Development Organisation (TEDO) for a project on 'Capability building to enhance export competitiveness and facilitating market access for Indian technologies and technology intensive products' under which 27 consultants and 6 project coordinators from CII were trained and 65 SME's were made capable of accessing the EU market for exports; continued support to the Centre for International Trade in Technology at Indian Institute of Foreign Trade, set up with the support of DSIR and compilation of 'Study on technology branding of SMEs' bringing out a detailed analysis of two sectors, viz. auto component and textiles. All these efforts seem to have catalyzed technology intensive and high value added exports and the percentage of such exports in the overall exports has steadily increased over the years.

International Cooperation

DSIR continues to play the role of being the focal point for the APCTT, an agency under United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) facilitating the establishment of networks of technology transfer inter-mediaries in the region to promote cross-border business cooperation among SMEs.

Other than the institutional support extended by the Government of India and other administrative support extended as per the host country agreement, DSIR has also extended support to APCTT to implement the project 'Promotion of National Innovation Systems (NIS) in Countries of the Asia Pacific Region Phase I' and initiated to support the project, 'National Innovation System Phase II'. As part of the effort, the Centre has established an NIS Online Resource Centre.

The Renewable Energy Co-operation Network for Asia and the Pacific (RECAP) was developed by APCTT to promote renewable energy. APCTT engaged consultants from 12 countries and national focal points to prepare the country report and training materials etc. under this project. It has also organized a training programme titled 'Renewable Energy Technology Resource Assessment and Planning' from 26th to 28th October, 2009 at New Delhi.

APCTT received 303 technology offers and 187 technology requests from SMEs and entrepreneurs across the Asia-Pacific region. The Centre's technology transfer portal, www.technology4sme.net, served as an active platform for information exchange between APCTT, SMEs and business firms in the Asia-Pacific region. This website was also used by business firms in Europe, Latin America and the United States of America.

Consultancy Promotion Programme

The Consultancy Promotion Programme (CPP) essentially aims to strengthen our consultancy capabilities for domestic and export markets. During the period under report, IT Consultancy Clinic for SMEs in NOIDA; three Consultancy Clinics for the hosiery industry at Kanpur; for jute and jute diversified products at Kolkata and for mould design used in Automotive and durable consumer goods with high surface finish at Coimbatore, were progressing satisfactorily. Consultancy export potential studies in eight African countries, four Latin American countries, three CIS countries and four European countries were reviewed. Also, technical inputs/support were provided to Consultancy Engineers Association of India (CEAI) and other consultancy promotion organizations.

Technology Information Facilitation Programme

Technology Information and Facilitation Programme (TIFP) has the broader objective of generating endogenous capacities for the

development and utilization of digital information resources for facilitation of accelerated S&T research. The strategy concentrates on facilitation of Indian content on S&T avoiding duplication of efforts to allow minimum overlap and maximum utilization of existing facilities. The specific achievements of the programme during the period of report include:

(i) Promotion of Content Development:

- Preparation of database on metallo-pharmaceuticals
- Indian wood insect database - a Database on diversity of indigenous and exotic wood insects/pests in India

(ii) National Websites/ Servers

- Science and Technology Portal
- Industrial R&D in India: A web portal

(iii) Documentation of traditional knowledge and folk wisdom

- Development of a portal and kiosk of Goldsmith's skill towards enhancement of entrepreneurship abilities among unemployed youth
- Folk wisdom of West Bengal
- Development of a multimedia database of traditional knowledge in Andhra Pradesh

(iv) Electronic Publishing of Selected Indian S&T Materials

- E-publishing of the journal of tropical agriculture

(v) Open Archives Initiative

- Establishing MOLTABLE- An open access initiative for molecular informatics
- Development of OAI based institutional research repository services in India
- Developing an institutional repository of science and technology

(vi) Surveys and R&D Studies

- Archiving Ethnomedicinal Knowledge and Local Health Care Systems (LHCS) through modern electronic gadgets: an explorative study

Technology Development Utilization Programme for Women

In pursuance of the recommendations of the Inter-Departmental Committee set up to consider issues regarding Gender Budgeting, the Department established a "Gender Budgeting Cell", initiated steps to enhance the share of women in respect of beneficiary oriented schemes, and designed a programme namely, Technology Development and Utilization Programme for Women (TDUPW) in 2005-06. The programme is aimed to meet specific needs of women and to enhance their contribution towards technology capability building. Department has supported several projects so far and twelve projects have been completed.

Information Technology and e-Governance

Information Technology and e-Governance has been initiated in the Department during the middle of the Tenth Plan by allocating a fixed percentage of the plan funds of the TPDU Scheme to create an IT environment in the Department in conformity with the National e-Governance Action Plan. IT Action Plan of DSIR was worked out in May 2003 and for its implementation, a separate IT Budget Head was created, which became operational in FY 2004-05.

Various applications like IntraDSIR, Instant Messaging System, Document Management Information System, Central Information System, Public Grievance Redress and Monitoring System, Procurement and Inventory Management system, Foreign Collaboration Approvals Information Management System, ExtraDSIR and Exchequer were operational during the period under report. IT-Security Policy has also been implemented in the department. Integrated Finance, DDO and Utilization Software (IFDUS) is being developed and

preparation of bills for Grant-in-Aid is under testing. The preparation of bills for Salary, Contingency, TA/DA and LTC Advance and Other Advances is under development. A Composite Pay Roll System, developed in-house has been installed, configured and is under testing in the department for preparation of bills for salary, all advances, arrears and allowances. The system is used for calculation of Income Tax and preparation of Form 16 and e-TDS (quarterly and annually). The system also has an interface for sending transactions to the bank.

3. AUTONOMOUS INSTITUTIONS

3.1 Council of Scientific and Industrial Research (CSIR)

CSIR, an ensemble of 37 national laboratories and 39 outreach centers, spread across the length and breadth of India, plays a very active role in majority of R&D and technology initiatives taken in India during the last six decades. Its achievements cover a wide science spectrum from aerospace, healthcare, sustainable energy and environment to advanced materials, complex engineering design and the like. It also continues to make impact in the global S&T arena through its cutting-edge fundamental research, covering both high science and innovation. Since its inception, CSIR has been a source of indigenous technologies for enhancing industrial competitiveness, the S&T base for the strategic sector, the generation of technology for the common masses and science for advancement of knowledge. Its recent programme namely **'CSIR-800'** presents a socialistic, yet commercially viable business model linked to the economic prosperity of a large section of the Indian population. Another programme, initiated by CSIR, the '**Open Source Drug Discovery'** (OSDD), has a vision to develop low cost health solutions for the masses by involving volunteer researchers through a global platform. In this forum, the best minds can collaborate and collectively endeavour to solve the complex problems associated with discovering novel therapies for neglected tropical diseases like Malaria, Tuberculosis, Leishmaniasis, etc.

Highlights of some contributions include:

Contribution to 'Chandrayaan': In October 2008 India launched Chandrayaan-I, India's first scientific mission to the moon. As many as seven CSIR laboratories have contributed in significant way to this prestigious mission. These include space weather information/alerts, zinc oxide-based microelectromechanical systems acoustic sensor, acoustic testing, wind tunnel tests, designing of various civil structures, etc.

In the area of Healthcare: One of the major initiatives is launching of OSDD. Modeled on development of 'www' and 'Linux', this programme was launched on September 15, 2008 and so far more than 1,300 registered participants are on the portal. To begin with, OSDD seeks to develop low cost molecules for the treatment of tuberculosis, an infectious disease widely prevalent in India. Another significant achievement is the development of Indian Genome Variation Database (IGVDB), which houses Single Nucleotide Polymorphism (SNP) frequency data in over 1,000 genes from disease and drug response candidates in a population representing the entire genetic diversity of India. CSIR has also developed hydroxyl patite-based artificial hip joint implants, a boon for patients, particularly of old age, suffering from broken hips. Even both the hip joints can be replaced simultaneously. Yet another significant achievement in this sector is the commercialization of nano-size synthetic hydroxypatite bone graft for dental surgery. It has also developed an ayurvedic formulation namely 'Prostalyn' for treatment of prostate cancer.

CSIR-800: This programme has the mission of increasing the daily per capita income by Rs 15 of 800 million people of India said to be subsisting in the bottom half of the pyramid. The focus areas are 'affordable health', 'sustainable energy', 'waste to wealth', 'potable water', low-cost housing', and 'empowering masses'. In this new endeavour, CSIR has launched '**Soleckshaw',** an optimally designed, pedal-operated motor-assisted, zero carbon emission urban transport vehicle. It is expected to have four major societal effects, viz. conservation of natural petroleum resources, zero pollution (no exhaust fumes), increased self-employment for the urban and rural poor at grassroots level, enhancing the dignity of human labour and cutting down the drudgery and exhaustion of pulling/pedaling traditional rickshaws. To mitigate housing problems, particularly in

disaster-prone areas, CSIR has developed low-cost instant houses made of natural fibres and industrial wastes.

In the area of Sustainable Energy: CSIR has developed India's First Push-button type 300 W Self-supported Polymer Electrolyte Membrane Fuel Cell System. It has also developed solid oxide fuel system towards its commitment to sustainable energy. Taking forward the concept of 'waste to wealth', CSIR has developed a technology for conversion of bagasse to biofuel, which has already been transferred to the sugar industry. Augmenting its technology for conversion of jatropha to biodiesel, CSIR has installed 1TPD plant in collaboration with Defence R&D Organization. CSIR has made significant contributions in the area of solar energy research also. Technology for production of solar water heater 'Nalsun' has been developed and commercialized. In the area of solar photovoltaics, CSIR has developed materials for dye-sensitized solar cells. Further, CSIR has developed and installed small turbine to produce 5 kW power utilizing geothermal energy from a natural geyser in Himachal Pradesh. In addition, CSIR has developed and installed 300 kW and 500 kW wind mills. CSIR has joined hands with Research Institute for Sustainable Energy, a section 25 company registered under the Companies Act, to carry out collaborative research in the area of sustainable energy.

In the area of Ecology and Environment: CSIR has developed an eco-friendly and energy-efficient bioleaching process for low-grade uranium ores and installed a 2 tonne plant at one of the sites of Uranium Corporation of India Ltd. CSIR has developed bioceramic based composite adsorbent media for defluoridation of wastewater, which demonstrates excellent defluoridation properties as compared to activated alumina. This adsorbent media shows high fluoride uptake capacity and selectivity under a wide range of pH, which is of immense practical importance. CSIR has also set up a bench-scale Upflow Anaerobic Sludge Blanket Reactor for the biological treatment of wastes containing Hexachlorocyclohexane. Based on a two-dimensional hydrodynamic model, CSIR has proposed a storm surge disaster mitigation plan for the Andaman Islands. CSIR has come up with a first-ever long climate simulation with a global general circulation model, with a spatial resolution of 20-km. Another significant contribution of CSIR in this area is patenting a decentralized Secure Landfill System for sludge generated from the tannery sector alone, with Reinforced Cement Concrete (RCC) structure, which has a provision to collect leachate and treat and also to accommodate a larger quantity of sludge with better space integration.

In the area of Biology and Biotechnology: A traditionally strong area of research for CSIR, the laboratories working in this domain contribute through high quality of research output, including basic studies, industrial processes and products. CSIR has made a comparative biochemical analysis of purified protein, which suggests that *Leishmania* actin is an unconventional form of actin that could serve as an alternative target for designing novel anti-leishmanial drugs. CSIR has recently reported discovery of two spermicidal compounds (DSE-36 and DSE-37, disulphide esters of carbothioic acid) with extremely potent spermicidal action that killed 100 per cent human sperm at just 4 per cent of EC_{100} of N-9 while remaining practically inert to human cervical cells and Lactobacillus at spermicidal concentration. Another significant contribution is the development of 'FishMap', a unified and centralized resource for storage, retrieval, and display of genomic information of zebrafish. Yet another achievement is construction of Helical nanofibers by CSIR from suitable self-assembling pseudopeptide-based molecular building blocks, which are suitable templates for fabricating dipeptide-capped gold nanoparticles, indicating a possible use of these nanofibers in the construction of arrays of gold nanoparticles. Recently, CSIR has developed a non-recombinant membrane antigen and diagnostic kit thereof for detection of Visceral Leishmaniasis and post Kala-azar dermal leishmaniasis (PKDL).

In the area of Chemical Technology: CSIR has a direct impact in respect of industrial development in the area of chemical technology. It has established a 20,000 tpa plant at Digboi Refinery Plant, the oldest refinery of the country, for recovery of value added products from 'tank bottoms'. It has also developed a catalytic process for manufacturing epichlorohydrin from Allyl Chloride and commissioned a 3,000 tpa plant for

Aditya Birla Group at Rayong, Thailand. Based on CSIR technology, a plant has been established in Chennai for the production of Sulfur of Potash using green method. Continuing its endeavour in transferring technology, CSIR has transferred an eco-friendly technology for manufacturing synthetic rutile, titanium feedstock for titanium-di-oxide, from ilmenite.

In the area of Earth System Science: In a collaborative effort with Geological Survey of India, Survey of India and Oil and Natural Gas Commission, CSIR has prepared and released Gravity Map series of India-2006. Acquisition and analysis of the data by CSIR led to a gain of ~6,40,000 sq. km in the eastern segment covering the Bay of Bengal and Andaman regions in Legal Continental Shelf. CSIR also studied lower crustal and mantle xenoliths from kimberlite clusters, combining geo-thermobarometry, age and petro-physical properties and subsequently mapped 4-D lithospheric of the eastern Dharwar craton. Another significant achievement is delineation of a major conductive zone buried at a depth of 2.0/ 2.5 km in Puga region related to geothermal reservoir. This has opened up a new front in the energy sector in Jammu and Kashmir. Newer techniques have been developed for accurate prediction, undertaking of surveys and exploration for delineating promising reserves of hydrocarbons covering approx. 40,000 sq km.

In the area of Engineering Design and Structure: CSIR has re-engineered the Navigational Span of Pamban railway bridge from metre gauge to broad gauge. Another achievement is the setting up of an excellent tower testing facility at Chennai, which ranks among the best in the world for testing towers upto a height of 65 m and a base dimension of 22.5m x 22.5m and cross-arm width up to 36m using electro-hydraulic servo system. For carrying out advanced R&D in the area of earthquake engineering, CSIR has set up an advanced seismic test facility, comprising of a triaxial shake table of capacity 30 tonne, a biaxial shake table of capacity 5 tonne and multi axis pseudo dynamic testing system. Towards its commitment to society, CSIR has developed low-cost instant house utilizing industrial waste, sisal fibre and natural fibre. These can be assembled and deployed in about half-an-hour should there be an urgent need in times of disaster.

In the area of Information: CSIR continued its efforts towards dissemination of science and technology information in the form of three well-circulated popular science magazines, *Science Reporter* (English monthly), *Vigyan Pragati* (Hindi monthly) and *Science ki Duniya* (Urdu quarterly), number of popular science books, and 16 scholarly science journals.

In the area of Materials and Engineering: CSIR has developed a special variety of photonic crystal fiber having very high nonlinearity and demonstrated its operation in generating wide-band super-continuum source required for various applications, e.g. optical coherence tomography, spectroscopy, metrology etc. CSIR has also made innovative use of globular/fibrous proteins to treat implant surfaces at room temperature. The proteinaceous content of a mineral coating play a major role in determining its biocompatibility and bio-resorption. Another significant development is the fabrication of carbon fibre reinforced silicon carbide advanced composite ceramic friction plate for automotive brake and clutch applications.

Intellectual Property: CSIR has positioned itself from reactive to proactive IP protection, by changing its strategy from random patenting to planned patenting and designing patent portfolios based on business plans with commercial and strategic considerations. In respect of number of patent filings, it has filed 183 patents in India and 404 patents abroad during 2008-09. It has a portfolio of 1,910 patents in India and 2,689 patents abroad. Besides, CSIR has published 4114 research papers in SCI journals during 2008 with Average Impact Factor per paper (AVIF) of 2.14.

3.2 Consultancy Development Centre

The Consultancy Development Centre (CDC) came into being as a registered society in January 1986, and is functioning from its office at India Habitat Centre Complex since May 1994. The CDC was approved as an Autonomous institution of DSIR in December 2004. The Centre is managed and guided by a Governing Council headed by Secretary, DSIR. The Governing Council consists

of representatives of government, industry and academia. The activities of CDC pertain to educational programmes in consultancy management, competency enhancement through training and skill building programmes, development of young professionals and women who opt for consulting as a career option and studies/projects relating to development of the consultancy profession.

During the period under report, specific programmes/ activities in line with the following thrust areas decided by the Governing Council of CDC were drawn up for implementation.

- Development of Education and Capacity Building for Competency Enhancement of Consultancy Skills in the Country and Asia Pacific Region
- Consultancy Support for Projects/Activities for Developmental Programmes including North East and J&K
- Projects/ Activities for Priority Sectors including SMEs
- Projects/ Activities for Development of Consultancy

For carrying out specific projects/activities in line with the above thrust areas, a plan budget of Rs. 450 lakh has been allocated to CDC. Based on the recommendations of the Project Advisory Committee constituted for the purpose, specific projects/activities/schemes were framed for implementation during the year.

All the programmes/activities/schemes are in line with the mandate of development and promotion of consultancy capabilities in the country. The expected outcome/benefits of the activities would include.

- Development of Professionals/experts
- Creating a large pool of trained manpower/ work force in consulting
- Facilitating career options in consulting
- Awareness and exposure/benefits on use of consultancy services amongst various stakeholders including government
- Creation of a knowledge centre on Consulting
- Enhancing quality in consulting
- Development and promotion of consultancy as a profession

4. PUBLIC SECTOR ENTERPRISES

4.1 National Research Development Corporation (NRDC)

National Research Development Corporation (NRDC) is a Section 25 Company, established to promote, develop and commercialise technologies, knowhow, inventions, patents and or processes emanating from various National R&D institutions. The Corporation offers its services throughout the country in improving the manufacturing base in India with innovative technologies specially suitable for Indian entrepreneurs and acts as an effective catalyst in translating research into marketable industrial products. During the several years of its existence, the Corporation has forged strong links with various R&D organizations, both within the country and abroad, and pursued the worthy cause of bringing inventions to market. Equipped with a vast number of technologies, the corporation is now recognized as a repository of wide-ranging technologies spread over many industry verticals, viz. Chemicals, Drugs and Pharmaceuticals, BioTechnology, Metallurgy, Building Materials, Mechanical, Electrical and Electronics.

Besides technology licensing, the Corporation has also been providing services for the promotion of technologies by way of rendering technical and financial assistance for prototype development and protection of the inventions for filing patents in India and abroad, pre-investment studies and feasibility reports, basic engineering design packages, training in operation of plants, raw material and product testing.

The Corporation has also initiated a major thrust for export of those technologies which have become a success in India to other developing countries. It has already supplied a number of technologies and services to entrepreneurs both in developed and developing countries.

The broad based expertise within the Corporation along with the extensive network of national and international contacts in scientific bodies, technology transfer agencies, industrial and engineering concerns ensures the entrepreneurs in receiving the very best in technology and other services.

4.2 Central Electronics Limited (CEL)

Central Electronics Limited (CEL) has been the pioneer in India in Solar Photovoltaics, Railway Signaling and Safety Equipment and Strategic Electronics (PCM and Piezo ceramics). CEL has upgraded and up-scaled its Solar Photovoltaics operations from 2 MW to 10 MW during 2006-07 and has modern state of the art solar cell process technology to meet domestic and international competition. CEL has successfully developed Digital Axle Counters and 40 Detection Points Multi Section Digital Axle Counters conforming to European Standard CENELEC SIL-4 for Indian railways.

CEL has achieved the production and turnover of Rs. 155.26 crores and Rs 146.06 crores respectively, during the year 2008-09 and earned gross margin of Rs. 9.06 crores. The Company has continued to perform profitably for the fourth successive year in spite of stiff competition and recession in the global market.

Further, CEL is diversifying in other areas of operations to achieve higher projected turnover in the next 2-3 years.