

IV. PUBLIC SECTOR ENTERPRISES

IV - A. NATIONAL RESEARCH DEVELOPMENT CORPORATION

1. INTRODUCTION

The National Research Development Corporation (NRDC) is a premier organisation, under the Department of Scientific & Industrial Research (DSIR), Ministry of Science & Technology, engaged in the development, promotion and commercialisation of the R&D results/ technologies emanating from Research Institutes/ Universities/ Industries, etc. The Corporation provides comprehensive technology transfer services and acts as a catalyst for transforming innovative research into marketable industrial products. NRDC is a unique organisation because it is the only public enterprise wholly dedicated to transfer of technologies from R&D laboratories to industry covering the entire spectrum of industrial technologies ranging from chemicals to metallurgy, mechanical engineering, electrical engineering, electronics, biotechnology and so on.

The Corporation continued to maintain its good overall performance in all areas of its operations during the year 2005-06. During the year, the corporation's income from its principal source of revenue i.e. Lumpsum Premia and Royalty on the licensing of technologies to industry was Rs.380.40 lakhs, as compared to Rs.326.24 lakhs in the previous year.

2. PROFIT

Due to the sustained, hard and dedicated work of its executives and the staff, the Corporation continued to earn profits. During the year the corporation earned a gross profit of Rs.26.05 lakhs against Rs.12.60 lakhs in the previous

year. The Gross Income of the Corporation from all sources, including premia and royalties, excluding Grants-in-Aid, was Rs.501.59 lakhs as compared to Rs.413.27 lakhs in the previous year. The Department of Public Enterprises has given the 'GOOD' rating to the corporation for its MOU Performance during the year 2004-05.

3. PROCESSES ASSIGNED AND LICENCE AGREEMENTS CONCLUDED

The Corporation with its objective of building up of a large depository of technologies and to compete in the global environment with new technologies, continued its efforts to widen its resource base so as to increase the inflow of the processes not only from various R&D laboratories but also from Industry, Universities, Individual Inventors etc. During the year 2005-06, the corporation entered into Memorandum of Understanding/Agreement with the following organisations for assignment of technologies developed by them:

- C-DAC, Thiruvananthapuram for assignment of 4 new technologies.
- Central Silk Board, renewal of MOU for further 5 years.
- M/s Andhra Pradesh State Sericulture Research & Development Institute, Hindupur signed MOU for four new technologies.
- With Prof. Upendra Rawal, Gujarat University for Cataral – A remedy for restoration of vision in Cataract

- Shri Lakshman Prasad (individual) - Voting compartment (voting chamber)
- M/s Tata Steel Ltd., Bombay for assignment of technologies
- M/s Industrial Greenfields Project Consultancy, Kolhapur for assignment of technologies.

As a result, 30 new processes were assigned to the Corporation for commercialisation as compared to 42 processes during the previous year. Some of the processes assigned to the Corporation during the year are: Antiglare Coating on Sheet Glasses, Antireflective Coating on Ophthalmic & other circular lenses, DHWANI – The digital audio workstation, Motorized Cum hand operated silk cocoon cleaning machine, Chawki Leaf Chopper, Mulberry Leaf Health Drink (Spoorthi), Herbal Ghee, Process for the manufacture of Bio-release fertilizers of zinc-iron-manganese, Iron-manganese copper & zinc-iron-manganese-copper etc.

4. MAJOR TECHNOLOGIES LICENSED

The Corporation signed 39 licence agreements during the year. Some of the major technologies licensed by the Corporation during the year are: Area specific mineral mixture to increase productivity of bovines; Vaccine for viral disease caused by pests des petits ruminants (PPR) incorporating vaccine strain; Foot and mouth disease vaccine for cattle; Coco lawn; Long shelf life paneer; Herbal ghee; A new silkworm bed disinfectant - ANKUSH; Process for the manufacture of bio-release fertilizers of zinc-iron-manganese, iron-manganese copper and zinc-iron-manganese-copper.

5. TECHNOLOGY TRADE FACILITATION CENTRE (TTFC)

The Corporation under the support from DSIR, has been successfully running the TTFC, at the Corporation's registered office, to facilitate the exports of technology intensive products, technologies, services and projects. TTFC is truly helping SMEs to identify potential importers, in the international market for their products. During the year 2005-06, several foreign dignitaries and business delegations visited the centre and a large number of enquiries have been generated from them. Further one of the industry participant at the Centre has signed MOU with Vietnamese Company for marketing its telecom equipments in Vietnam, Laos & Cambodia and another participant has exported a soap making plant to Madagascar.

6. STRATEGIC PLAN FOR THE CORPORATION

The Corporation had engaged M/s. International Management Institute (IMI), New Delhi to prepare a strategic plan for the corporation. The strategic plan envisages expansion of the commercial activities mainly in two directions: firstly, through value addition to technologies by enhancement & up-gradation and subsequent augmentation in license revenue, and secondly, through the domain of project consultancy.

7. INTELLECTUAL PROPERTY RIGHTS (IPR) CONSULTANCY SERVICES

The collaborative efforts of the corporation with patent Offices, in the field of IPR consultancy have gained momentum and resulted in enhanced demand by various R&D organizations for organizing IPR Awareness and Training Programmes. Accordingly,

during the year, the Corporation has collaborated with various Patent Offices in the country and organized eight IPR Awareness Seminars on "Patents' Protection, Valuation & Commercialisation". Two Training Programmes on "Patent's Protection" for the benefit of Small & Medium Enterprises at Bhubaneswar & Lucknow have also been organized in collaboration with the Office of the Development Commissioner, Small Scale Industries, and Govt. of India. The Directorate of Extramural Research and Intellectual Property Rights, Defence Research & Development Organisation, Ministry of Defence has also collaborated with the Corporation for a Training Programme on "Patents' Protection" at Bangalore. The Corporation, in its endeavour to spread the knowledge on various issues of IPR across the country, has picked up especially North-Eastern States with the support of Department of Biotechnology, Govt. of India, and New Delhi and organized an IPR Training Programme at Institute of Bioresources & Sustainable Development (IBSD) at Imphal.

The Corporation in collaboration with Federation of Indian Export Organisations (FIEO) organized a WIPO Seminar in December, 2005 at New Delhi. A new initiative with the support of Geographical Indications Registry, Chennai has been undertaken by Corporation for organizing a Sensitization Workshop on "How to protect traditional Agricultural and Industrial Products" through the Registration of Geographical Indications for the benefit of Chikenkari Industries at Lucknow and for Diamond Industries at Surat.

The Corporation in its pursuit to protect inventions and technologies has filed 74 patent applications in India. While filing International application, the Corporation has identified one major invention on "A process

for producing modified reconstituted viral envelope for drug" developed by University of Delhi, South Campus, New Delhi, which has been assigned to the Corporation for commercialization for international marketing.

8. PROJECTS SUPPORTED BY DSIR

DSIR has been supporting technology development projects under its "Technology Development and Demonstration Programme" (earlier known as Programme Aimed at Technological Self Reliance) involving industry, research institutes and consultants. The Corporation has been entrusted to manage all matters connected with the intellectual property rights generated in these projects, as also to collect the royalty revenues accruing from the utilisation of the technology by the collaborating Company and also from third party licensing.

The major projects undertaken during the year were :

Development of higher dimension (19 mm dia) aluminium granules cored wire along with compatible high speed wire feeder; Development of learning content management system; Development of manufacturing process for a new product for the treatment of thalassemia; Development of tactical digital radio relay; Technology development and evaluation of design methodology of manufacture anti effluent pumps; Technology for polymorph form-I of clopidogrel bisulphate; Design & development of 6 DoF electrical motion platform ; Development of toxicity prediction module and integration with cellulite—a computer aided drug design tool; Development of telemetry receivers; Development of implants for joints; Technology development of polymeric fat liquor for upholstery leather etc.

9. MARKET SURVEYS

Market surveys are of considerable significance to the process of technology transfer. Market information along with the technical know-how not only makes the techno-commercial package more complete and attractive but also helps in assessing the realistic price of the technology for licensing. Accordingly, during the year, market survey agencies were commissioned for conducting market survey on the subjects like Non-metallic battery grids, Sol-gel application of anti reflective coatings on ophthalmic and other circular glass lenses, Sol-gel application anti glare coating, Schizont cell culture vaccine for theileriosis, Salmonella toxoid – a novel vaccine, Pro-biotic food products, Silkworm bed disinfectant, Ecdysones (Moulting Hormones), Personnel hygiene products used in sericulture, Biofertilizers used in sericulture, Machines used in sericulture (chawki leaf chopper, battery operated powder duster, flame gun and electric sprayer).

10. INVENTION PROMOTION PROGRAMME

To promote and encourage the spirit of inventiveness amongst scientists, workers, students and inventors, the Corporation continued its programme of awarding prizes upto Rs.2 lakhs for the development of novel processes/products/inventions. During the year 2005-06, the Corporation has awarded various innovations in the key areas in the field of Agriculture, Biotechnology, Chemical & Allied, Electrical, Electronics, Mechanical, etc. The Corporation announced cash awards amounting to Rs.11.65 lakhs for the following inventions on the occasion of Technology Day i.e. 11th May 2005:

- An area specific mineral mixture to increase productivity of bovines of Uttaranchal and Uttar Pradesh

- Laser mapping & planning of rough diamond
- Oil zapper eliminates crude oil spills, manage oily sludge
- Blood glucose digital analyzer
- Process for the production of porous ocular implant from synthetic calcium hydroxyapatite
- Development of process knowhow for the manufacture of abrasive silica which is used in gel toothpaste formulations
- Treatment of industrial alkaline waste water (sodic condensate) for removal of aluminum ions from condensate containing trace amount of sodium aluminate by ion exchange method for boiler use
- Enhancement of short circuit level of low tension air circuit breaker by optimizing contact dynamics
- Low sidelobe microstrip antenna array for man-portable radars
- Bicycle saddle unisex model, incorporating unique feature capsulated air column
- Design and development of tractor operated paddy straw chopper-cum-spreader
- A need based user friendly low cost device banana fibre extractor
- New varieties of ornamental crossandra

The Corporation also announced one WIPO Gold Medal for the best invention "An area specific mineral mixture to increase productivity of bovines of Uttaranchal and Uttar Pradesh" to Dr. M.C. Sharma & Associates.

11. DEVELOPMENT & PROMOTION OF RURAL & HOUSEHOLD TECHNOLOGY

The Corporation continued to pursue its programme of Development and Promotion of Rural & Household Technology to use modern science and technology to improve the living conditions of people in rural areas. The methodology adopted by the Corporation is to demonstrate the utility of its rural technologies and ensure their faster dissemination by setting up RTDT Centres in collaboration with voluntary agencies in various regions of the country. Pursuant to following this approach, the Corporation has strengthened, 5 Centres at Faridabad (Haryana), Tirupathi (AP), Ghazipur (UP), Nainital (Uttaranchal) and Brijrajnagar (Orissa) with new emerging technologies in the area of bio-fuels, herbal and food processing and building materials as per the need of the specific area. The Corporation has also initiated action for setting up of a Production cum Demonstration Centre for Coir Retting with the help of a leading NGO-Farmers Development Agency, Chickballapur, Karnataka. Further, the Corporation has participated in various exhibitions/rural fairs/Pashu Kisan Melas, etc. It is noteworthy to mention that RTDT Centre at Brijrajnagar is at present implementing a project on "Application of Information Technologies for the Sustainable Management of the Extractive (mineral based) Industry" supported by European Union and Centre at Ghazipur has approached ISRO for setting up "Resource Centre on Satellite based Technical Information System".

12. TECHNOLOGY AND PROJECT EXPORT

The Indian technologies are appropriate to the needs of many other developing countries.

The Corporation, therefore, considers it an important part of its charter to seek out and seize opportunities in those countries for technology and project exports. The Corporation could evince interest in its technologies in several African nations. During the year several delegations from other developing countries were received and the Corporation signed the following major agreements for services / technology transfer:

- Ivonian de Technology Tropicale, Ivory Coast
- Cassava Agro Industries Services Ltd., Abuja Nigeria
- The Ministry of Trade & Industry, Republic of Sierra Leone
- Small & Medium Enterprises, Development Agency of Nigeria (Smedan)
- Le Comite de Development Integse de, Lambaye, Senegal
- M/s Checkmark Consultants, Suit-7, 3rd Floor, Tower-D, City Centre, Saudi Arabia to appoint a representative to assign the technologies in Saudi Arabia.
- M/s Liberty Associates Ltd., Bangladesh for propagating Indian waste management projects in Bangladesh – Mr. Khaled Abdullah

Demonstration Centre of Small & Micro Machineries in Ivory Coast

The Corporation has been projecting India as a source of technology typically suitable for small and micro entrepreneurs. In propagation of Indian technologies in West African Countries a concept was developed for setting up demonstration centers, for exhibiting and

demonstrating agro based machineries, in various countries in that region under funding from appropriate agency. The Ministry of External Affairs (MEA) had agreed to provide financial assistance for meeting the expenditure for purchase of the machines and setting up the first demonstration centre in Senegal. The Corporation has signed Memorandum of Agreement with MEA in this regard. MEA has released the fund of Rs.2.5 crores in advance to the Corporation to meet the expenditure towards the cost of the machines, infrastructure and manpower.

The project in Senegal has been delayed due to non-registration of NGO and non-allocation of space. The Corporation had also signed an MOA with Ivoirienne De Technologie Tropicale (I2T) engaged in the manufacture of agricultural machines in Ivory Coast, for setting up a similar Demonstration Centre. The Corporation has also been propagating the concept of setting up of Demonstration Centres in other West African countries and has signed MOAs with various Ministries/organisations of countries such as Sierra Leone and Nigeria for setting up similar Demonstration Centres in their countries.

13. FOREIGN EXCHANGE EARNINGS

The foreign exchange earnings of the Corporation amounted to Rs.0.38 lakh in 2005-06 as compared to Rs.28.24 lakhs during the previous year.

14. PUBLICATIONS

An important activity of the Corporation is to disseminate information on new processes to industry, entrepreneurs and the general public for the promotion and commercialisation of technologies. One of the means of doing so is through publications of various types. During

the year, the Corporation continued to bring out its regular magazines and publications viz Awishkar (Monthly in Hindi) & Invention Intelligence (Bi-monthly in English). The Corporation has also brought out the publications: NRDC at your service, NRDC Brochure and Process Diary

15. EXHIBITIONS AND PUBLICITY

Participation in exhibitions, seminars, workshops, entrepreneurship development programmes etc. are of vital importance for the creation of awareness about the role of the corporation in technology transfer. With this end in view, the corporation participated in exhibitions, seminars and get-togethers in India and abroad organised by various agencies. Some of them are:

- Rural India Trade Expo, Shimla (19-22 October, 2005)
- Indian Science Congress, Hyderabad (3-7 January, 2006)
- Exhibition-cum-Fairs on Rural Technologies, Amethi (18-22 February, 2006)
- 14th Vietnam International Industrial Fair 2005, Vietnam (19-23 October, 2005)
- Cairo International Fair, Cairo (19-29 March, 2006)

Seminar on "NRDC-Industry Interface on Commercialization of Biotechnology"

The Corporation organised a Seminar on "NRDC-Industry Interface on Commercialization of Biotechnology" at Hyderabad on 20 March, 2006. Important issues pertaining to development and transfer of process/knowhow in the area of Diagnostics, Bio-pharmaceuticals, Nano-medicines, Veterinary and Agriculture Technologies, etc. was dealt with.

16. HUMAN RESOURCE DEVELOPMENT

Training and development of all levels of employees was given due priority by the Corporation to increase effectiveness. Special emphasis was given to organisation building and shaping right attitudes, team building and work culture besides preparing employees to understand the trends in fast changing technology/ switching over to latest technology for achieving higher results in productivity and profitability. During the year 28 executives and 6 staff of the Corporation were deputed to various training programmes to further develop their skill in various areas of management, communication, vigilance and advancement of technology.

The thrust for better utilisation of Human Resources and improvement in work practice continued during the year.

17. TECHNOLOGY ABSORPTION, ADAPTATION AND INNOVATION

While a major objective of the Corporation is the development and commercialisation of indigenous technology, the Corporation itself does not carry out any R&D. However, it promotes and finances R&D on a selective basis in both laboratories and industry.

18. IMPLEMENTATION OF OFFICIAL LANGUAGE

The Corporation continued to make efforts to fulfil the targets prescribed by Govt. of India in the Official Language Act and Rules framed there in with regard to increase the use of Hindi Rajbhasha in office during the year 2005-06. All the Standard Forms, Files etc. are made of bilingual. Significant progress has been made in the field of correspondence, noting and drafting in Hindi. All Hindi letters are being replied in Hindi only. The Annual Report of the Corporation is being published in diglot form in both Hindi & English since 1986-87. The Corporation also publishes a popular Science & Technology monthly magazine in Hindi, entitled 'Awishkar'. To popularise the use of Hindi, the Corporation celebrated the "Rajbhasha Pakhwara" (14-29 September, 2005). During the "Pakhwara" different types of competitions like Hindi essay writing, Hindi drafting & noting, Hindi typing, Short Speech, Hindi poetry and General Knowledge Quiz were organized. Certificate, cash award and mementoes were given to the winners. To enrich Hindi vocabulary of the employees of the Corporation as well as visitors, an English word with its Hindi meaning is written daily on a writing board as "Today's word" at the reception of the Corporation.



NRDC Scientists Explaining About the Technologies Displayed at TTFC to Vietnamese Minister of Industry, Vietnam.



Dr. (Mrs.) Kanika Trivedy of Central Sericulture Research & Training Institute, Mysore Receiving WIPO Gold Medal for Women Inventor from Shri P. Chidabaram, Finance Minister.



Cattle Lick Salt Technology Being Demonstrated at RTDT Centre



Mr. Yeo Guefala, Director General, Societe Ivoirienne De Technologie Tropicale (I2T) Signing MoA with NRDC for Setting Up of Demonstration Centre in Cote d' Ivoire



Hon'ble President of India Shri A.P.J. Abdul Kalam Discussing About Innovative Technologies with NRDC Officers in R&D Expo at Vigyan Bhavan



Shri Rahul Gandhi, M.P. Being Apprised at NRDC Stall in the Rural Technologies Exhibition at Badshapur (Amethi)