Building Industrial Research & Development And Common Research Facilities (BIRD-Crf)

1: Creation of Common Research and Technology Development Hubs (CRTDH)

2: Industrial R&D Promotion Programme.

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Building Industrial Research & Development and Common Research Facilities (BIRD-Crf)

1. Creation of Common Research and Technology Development Hubs (CRTDH)

Innovation is the key for successful entrepreneurship. However, there are challenges in bringing innovative ideas to the markets. There are Start ups/MSEs with innovative ideas that may face difficulties in translation in to a marketable product/ process due to lack of an ecosystem for innovation including the sophisticated testing facilities, equipment/ infrastructure, intellectual support etc.

The Common Research and Technology Development Hubs (CRTDHs) have been established by the Department of Scientific and Industrial Research (DSIR) with an objective to foster industry-institution interaction and address the above problems faced in translational research by the MSEs thereby providing an eco-system for research and innovation in the country. The hubs would provide technical support, infrastructure and sophisticated analytical as well advanced research equipment facility to the MSEs for carrying out competitive technological research to translate new ideas into marketable products as well as utilize the already developed technologies available in the institutes/laboratories for taking them to market.

Three such hubs have been established under the scheme, two at CSIR-CCMB, Hyderabad and CSIR-IHBT, Palampur in the sector of Affordable Healthcare and the third at CSIR-NIIST, Thiruvanthapuram in the sector of Environmental Interventions. The CRTDHs are National Facilities operated on a non-commercial cost-plus basis for the benefit of MSEs as well as start-ups/innovators.

Aims and Objective

The DSIR-CRTDH programme is aimed at creation of hubs to facilitate and encourage MSEs/start-ups to undertake research and technology development activities and concurrently accelerate translational research activities by R&D institutions. Partial financial support is provided to eligible institutions as grant-in-aid to establish DSIR-CRTDHs to conduct industrial R&D and innovation activities.

The DSIR-CRTDHs enable industries have access to state-of-the art equipment, research facilities and expertise available in R&D institutions to facilitate undertaking new/improved product/process development and skill enhancement activities, and also help in converting research outputs into products.

Achievements

During the current year, the Department is in the process of setting up of following three hubs under the scheme:-

i. Centre for Cellular and Molecular Biology (CCMB), Hyderabad

The focus of DSIR-CRTDHs at CCMB is support and nurture product development projects in the field of health care and modern biology covering inter alia Diagnostics, Bio-pharma and Medical devices. In particular, the products and technologies that are targeted relate to development of DNA based diagnostic kits for screening of eye infections, Acute Encephalitis, Septicaemia, antibiotic resistance, and others.

ii. Institute of Himalayan Bioresource Technology (IHBT), Palampur

The DSIR-CRTDH at IHBT is being setup to take advantage of the institute's expertise in development of value added products such as thermo-stable enzymes, zero-calorie sugar substitutes etc. The hub aims to catalyse development of bio-pharmaceutical ingredients such as black carrot anthocyanin, beetroot betaine, mango peel carotenoids etc. by industries located in its vicinity.

iii. National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram

The objective of the DSIR-CRTDH at NIIST is towards development of products and technologies addressing environmental issues. The institute's experience in technologies related to odour control, anaerobic treatment, nitrification treatment, water quality analysis and others shall be used to provide interventional R&D solution for a particular sector of MSMEs and is expected to be used by them to improve their environmental performance.

The facilities available under the hubs for use by the MSEs/Innovators have been uploaded on the websites of the respective institutes and call for proposals from MSEs to work in the CRTDH have been made. The centres shall be operated on a cost plus non-commercial basis and are evolving a business model for self-sustainability.

2. INDUSTRIAL R&D PROMOTION PROGRAMME

2.1. Objectives

The broad objectives of the Industrial Research and Development Promotion Programme are to:

- Bring in-house R&D into sharper focus;
- Strengthen R&D infrastructure in industry and Scientific and Industrial Research Organisations (SIROs);
- Promote R&D initiatives of the industry and SIROs;
- Ensure that the contributions made by the in-house R&D centres and SIROs dovetail adequately in the overall context of technological and industrial development.

2.2 Areas of coverage

The specific areas covered under the component scheme are:

- In-house R&D in Industry,
- Scientific and Industrial Research Organisations (SIROs), and
- Fiscal Incentives for Scientific Research

Activities and achievements in each of above areas are presented below:

2.3. In-House R&D in Industry

2.3.1 Recognition of In-house R&D Units

A strong S&T infrastructure has been created in the country. This covers a chain of national laboratories, specialised R&D centres, various academic

institutions and training centres, which continuously provide expertise, technically trained manpower and technological support to the industry. Various policy measures have been introduced from time to time, to meet the changing industrial and technological requirements of the industry. The Government has been giving special attention to promotion and support to industrial research in industry. Several tax incentives have also been provided which encourage and make it financially attractive for industrial units to establish their own in-house R&D units.

A scheme for granting recognition to in-house R&D units in industry is operated by the DSIR. A number of incentives and support measures are made available to in-house R&D units. Ministry of Finance has issued notification amending the basic notifications under customs and central excise. As per the amendments, all DSIR recognized in-house R&D units other than hospitals can avail customs and central excise duty exemption on their procurements for research purposes.

The in-house R&D units qualifying for recognition are expected to be engaged in research and development activities related to the line of business of the firm, such as, development of new technologies, design and engineering, process/ product/design improvements, developing new methods of analysis and testing; research for increased efficiency in use of resources such as capital equipment, materials and energy; pollution control, effluent treatment and recycling of waste products.

The R&D activities are expected to be separate from routine activities of the firm, such as production and quality control. The in-house R&D units should have staff exclusively engaged in R&D and headed by a full-time R&D manager who would have direct access to the chief executive or to the board of directors depending upon the size of the unit. The in-house R&D units are also expected to maintain separate identifiable infrastructure and R&D accounts.

Number of in-house R&D units recognised by DSIR increased steadily from about 100 in 1973 to about 275 by 1975, to over 700 by 1980, around 925 by 1985, over 1100 in 1990 over 1200 in 1995 and thereafter hovering between 1200 to 1250; 1361 in March 2010; 1618 in December 2011, 1767 in December 2012, 1797 in December 2013, 1820 in March, 2014, 1762 in December 2014 and 1800 in December 2015. Of these nearly 1650 are in the private sector and the remaining units are in public/ joint sector. The last updated 'Directory of Recognised in-house R&D Units' was brought out in December, 2015. This Directory lists 1800 recognised in-house R&D units, giving registration number, name and mailing address of the company, location of the in-house R&D unit(s) and validity of DSIR recognition. From January, 2012 the scheme has become totally online.

Under the e-governance initiative of DSIR, the application system has been made completely online through the department website (http://www.dsir.gov.in) for recognition and registration of in-house R&D units (RDI), Scientific & Industrial Research Organisations (SIRO) and Public Funded Research Institutions (PFRI). With the objective of Minimum Government and Maximum Governance the new portal has reduced the time and increased the transparency of operation within the DSIR. Department upload the barcode generated certificates for recognition, registration and its renewal of in-house R&D units of industries, Scientific & Industrial Research Organizations and Public Funded Research Institutions. Department is making efforts to make this programme paper less in future.

To promote Entrepreneurship in Biotechnology sector, DSIR has announced relaxation in 3 years of existence for granting short term fresh recognition to Biotech start-ups established in Incubation Centre or Technology Parks with effect from July 2015. DSIR refers applications received from biotech start ups to Department of Biotechnology (DBT), being nodal department promoting biotechnology for their

views and comments. Based on the recommendation of DBT and keeping the guideline relaxation in view, the applications are considered for recognition.

Detailed guidelines about the schemes are available on department website.The applications received are scrutinised for their completeness in the DSIR and are then circulated for comments to various other departments/agencies, concerned administrative ministries, MSME, CSIR, ICAR, ICMR, CCRAS, DBT, DC & PC, DoT, DRDO, DIT, DoP and NRDC. The applicant industries seeking recognition are invited for presentation and discussion in DSIR and may be visited by a team of experts and DSIR representatives. The applications along with comments from outside agencies, visit reports, and the Department's own evaluation are considered by an Inter-Departmental Screening Committee constituted by the Secretary, DSIR. The Committee meeting is scheduled every month to consider the applications and makes recommendations to the Secretary, DSIR.

R&D recognition by DSIR is considered as the basic requirement to avail fiscal incentives focused towards R&D and separation of R&D activities from commercial production/service activities of the company is considered important.

During the period under report, the Screening Committee met 12 times. Of the 292 applications received for recognition, the screening committee considered 270 applications. 161 R&D units were granted fresh recognition based on their satisfactory R&D Infrastructure, Qualified Manpower and Programmes; 119 applications were rejected and 22 applications are under process at the end of 31st December, 2015. A statement giving month-wise receipt, disposal and pendency of applications for recognition of in-house R&D units is given at **Annexure-3**.

During the period under report, more than **200** discussions/meetings were held with heads/ representatives of in-house R&D units. Also, expert teams visited a number of in-house R&D units.

2.3.2 Renewal of Recognition

Recognition to R&D units is granted for a period ranging from 2 to 5 years. The R&D units are advised to apply for renewal of recognition well in advance (3 months prior to the date of expiry of the recognition). The department calls for online submission of applications for renewal of recognition. The applications are examined in DSIR taking into account the inputs received from other agencies for taking suitable decision on their renewal. As of 1st April 2015, 653 in-house R&D units were due for renewal of recognition out of which 564 applications were received. Based on the evaluation of the performance of the R&D units, renewal of recognition was granted to 554 R&D units. Recognition granted to 87 companies could not be renewed because of the reason that either their application was not received or the R&D performance was not up to the mark. A statement showing month-wise receipt, disposal and pendency of the cases of renewal of recognition of the R&D units is given in **Annexure-4**.

2.3.3 R&D Expenditure

The expenditure incurred by in-house R&D units in industry has steadily increased. During 1980-81 it was of the order of Rs. 300 crores. In 1985-86, it was of the order of Rs. 500 crores. It is estimated that the present R&D expenditure of the 1800 recognised in house R&D units is of the order of about Rs.30,000 crores per annum. The share of public and joint sector is about 20 per cent and that of private sector about 80 per cent. Of these 1800 recognized in-house R&D units 99 units spent over Rs. 5000 lakhs each on R&D while 488 spent between Rs. 500 lakhs to Rs. 5000 lakhs each per annum on R&D and 435 spent between Rs. 200 lakhs to Rs. 500 lakhs each per annum on R&D The list of these R&D units is given in **Annexure-5, 6 and 7** respectively.

2.3.4 R&D Infrastructure

The in-house R&D centres have created excellent infrastructural facilities for R&D including

sophisticated testing facilities, laboratory equipment and pilot plant facilities. Analytical facilities such as NMR spectrometers, Electron microscopes, Particle size analyzers, Portable particle counting systems; Vibration test equipment, Calorimeter, Ultra filtration equipment, Sonicator, Spectro fluorimeter, Protein purification set up, Digital viscometer, High temperature test and evaluation facilities, HPLCs, HPTLC, FTIR, GCMS, Polymerase Chain Reaction (PCR) equipment, Hydrogenator, Stability Chamber, Aflotoxin analyzer, X-ray defractometer, Salt Spray test chamber, Vickers hardness tester, IR/UV-VIS spectrophotometers, CAD-CAM facilities, rapid prototype building machines, greenhouse and tissue culture laboratory facilities are available with many in-house R&D units.

2.3.5 R&D Manpower

There has been a steady increase in R&D manpower employed by the in-house R&D units. By 1975-76, about 12,000 R&D personnel were employed by recognised in- house units and by 1981-82, the figure was over 30,000. The present estimated manpower for the 1800 in-house R&D units is over 1,57,000.

2.3.6 Achievements of In-house R&D Units

Some of the R&D achievements reported by the recognised in-house R&D units are listed below:

Agricultural Sciences:

- Development of Hybrid Cotton: TOP 505, Hybrid Castor: AgriTop 41 and Mustard Variety Dron.
- Development of Hybrids and pure-line varieties of different mandate crops like Castor Hybrid – Hira & Kohinoor; Wheat - Durga, Ganga & Uday; Mustard – Basant Bahaar & Arshi and Okra Hybrid – Nirogi & Anjali.
- Development of a PROM (Phospho Rich Organic Manure) out of the spent biogas slurry from a 6000 Cu.m semi solid waste biogas plant which is a DAP replacement, Superphosphate, organic, provides micronutrients; yield increased from 10-15% and is Eco friendly.
- Development of BRMH-1 and BRMH-3 Maize Hybrids in Medium maturity market segment, BRSSC-1 ,a High yielding Sunflower Hybrid with high oil content.
- Development of Hybrids namely - Chilli - Kiran (5748) Hot set, Chilli Kaveri (5725)- Hot set and Powdery Mildew tolerant, Chilli Nikhar(5401) - high pungency and colour, Tomato - variety Prabhav(1322) - Sour & flat type, Tomato Nirav (1193) - TYLCV Tolerant,. Tomato Mihir (5103) - Indeterminate type etc.

Biological / Biomedical Sciences:

- Development of Tribose, Ecotel which are combination drugs for diabetic and cardiac diseases respectively.
- Development of LFR guidewire to measure the internal diameter of vascular (Arteries and Veins).
- Development of DLS-Silver Dressing, DLS-Negative pressure wound therapy, DLS-Hydrogel, DLS-Hemostat and DLS-Multifunctional wound bed.
- Development of Caspofungin Acetate 50/70 mg, Doripenem 250/500 mg and Bivalirudin 250 mg which are drug for Antifungal, ultra-broad-spectrum injectable antibiotic and Anticogulant respectively.
- Development of technology of Non-Invasive Determination of Hemoglobin Concentration In Blood'' – A smartphone based portable diagnostic system.
- Development of Purified recombinant protein molecules like ATG3, Beclin, Prx-II; -IV; -VI, UCP1 for exports.

- Development of products namely- Enrofloxacin Injection, Milbemycin + Praziquantel Tablets (for Cats), Ivermectin Clorsulon Injection, Enrofloxacin Tablets, Check-o-tox Bioplus Non Medicated Feed Additives, Pathocef (Cepoferazone & Sulbactam IM/SQ inj), Synulogs-C (Amoxicillin & Clavulanic Acid IM/SQ inj), Ectogard (Amitraz 2% pour on solution), Tickogard (Fipronil 1% pour on solution), Zolidone (Piroxycam IM/SQ inj), Thelzon (Buparvaquone IM inj etc.

- Development of sperm chromatin integrity assay (SCIA), DNA based diagnostic test for Gilbert Syndrome.

- Development of an advanced novel therapy CIMIVIR-L™ for the treatment of Hepatitis C in India.

Chemical Sciences:

- Development of synergistic composition of polymeric emulsion suitable for water and oil emulsion.

- Development of speciality chemicals and formulations for use in textile, agro and other process industries.

- Development of Acetylated starch for yarn/ paper sizing, Starch based thickener for soup & sauces, High DS cationic starch for Wet-end application

- Development of Bio-AD, adhesive for plywood

- Development of Cool Pack (-21 deg C) for cooling applications

- Development of Phase change materials (PCM) for industrial and healthcare application.

Engineering / Information Technology Industries:

- Development of product for TOP ROLLER application of high speed spinning machine used in textile industry. This product is developed for 100% exports.

- Development of Carousel for cylindrical and panel filter, Clipping Machine - 350/42 and Pleat End Joining Machine and commercialised the products.

- Development of technologies like Idle-Start-Stop System (i3S), Integrated Braking System (IBS) in Pleasure scooter, Side Stand Switch actuated immobiliser in Xtreme etc.

- Development of Single Load-Current Feedback CT, Relay Outputs, 4, 8, 12 or 16 Output Channels and commercialised the products.

- Development of integrated panel tester for light combat aircraft (LCA), solid state flight data recorder to MIG 21/23 (IAF), Controller unit for T-90 battle tank etc.

- Development of Anti-submarine warfare (ASW 350) dipping sonar airborne winch system and sub-systems

- Development of Hydraulic cylinders with valves for mining, Rotary Actuator for batching plants, Under ground mining cylinders, hydraulic cylinders for jack applications, Rotary joints for crane applications, Telescopic cylinder for tilting/ lifting, Hydraulic cylinders for motor grader, Hydraulic Cylinders for TMC (Import substitute) etc.

- Development of Institutional PET Jar Packaging. (For New Packaging Customers), Wide range of Chopping Board with different folding concepts, Novel Casserole (Provision for Serving Spoon), Melamine Pani Poori Plate (Ergonomic Design), Electric Casserole/Easy Heat (For Reheating of Food), Slimtron (Electric Tiffin), Thermal Casserole/Insulated Melamine Casserol etc.

- Development of Audio Smart Amplifier IC for Speakerphone Application, High Performance Ultra Low Jitter Synthesizer IC etc.

- Development of Needle Roller Bearings for slide ways, Take up unit (YTU35), Take up unit (YTU50), Round flange four bolt cast-iron housed unit (YCM 45), Stud type cam follower, Stud type cam follower with special dimensions, Double row ball bearing with wider inner ring, Special type of cage guided needle roller bearing, Full complement cylindrical roller bearing, Profile Roller, Cage guided needle roller bearing, Square flanged cast iron housing unit, Square flanged cast iron housing unit .

- Development of solar water pump 1.5-10HP for rural areas in Rajasthan and Tamil Nadu.

- Development of Back Pressure/Extraction Back Pressure Steam Turbines., Geothermal & Solar Thermal Turbines, Topping / Bottoming Turbines. , Energy Recovery Turbines, Steam Turbine of 2500 KW straight condensing with top exhaust to reduce the civil construction cost.

- Development of mobile solution products for electrical utility, mobile application for field survey, open source GIS application.

2.3.7 Imports Made by In-house R&D Units

The recognised in-house R&D units have imported a variety of equipment, raw materials and samples for their R&D activities. These include: HPTLC, FTIR, GCMS, Polymerase Chain Reaction (PCR) equipment, Hydrogenator, Stability Chamber, Aflotoxin analyzer, X-ray defractometer, Salt Spray test chamber, Vickers hardness tester, Microplate reader, Medical photography equipment, Nitrogen generator, Abrasion loss testing machine, viscosity testing machine, Load cell, Universal testing machine, Ginning machine, Rota vapor chiller and extraction system, Polymer microscope etc.

2.3.8 Other Benefits Availed by the Recognised R&D Units

The Department provides assistance to recognised in-house R&D units in a number of ways, such as cases of industrial R&D units requiring allotment of special controlled materials for R&D, permission to export of specialised products reserved for small scale industries by medium scale industries for test marketing in other countries and disposal of imported R&D equipment/instruments and pilot plant produce are examined for making suitable recommendations to concerned agencies.

2.4 Scientific and Industrial Research Organisations (SIRO's)

2.4.1 Recognition of Scientific and Industrial Research Organisations (SIROs)

The DSIR had launched a scheme of granting recognition to SIROs in 1988. SIROs recognised by DSIR are eligible for Customs Duty Exemption and Excise Duty Waiver in terms of notification Nos. 51/96-Customs dated 23.7.1996 and 10/97-Central Excise dated 1.3.1997 respectively.

In order to simplify the processing of application and augment the transparency, DSIR has commissioned online filing of application for both fresh and renewal of recognition. The DSIR has brought out Guidelines for Recognition of SIROs, which gives procedural details and application proforma for seeking recognition under the SIRO Scheme. Functional SIROs having broad based governing council, research advisory committee, research personnel, infrastructural facilities for research, well defined, time bound research programmes and clearly stated objectives of undertaking scientific research, are considered eligible for recognition by DSIR. The investments of surplus funds not needed for immediate research should be in accordance with the Income-tax Act, 1961.

Applications for seeking recognition under the SIRO scheme are considered in DSIR by an Inter-departmental Screening Committee with members from Council of Scientific and Industrial Research (CSIR), Indian Council of Medical Research

(ICMR), Indian Council of Agricultural Research (ICAR), Indian Council of Social Sciences Research (ICSSR) and University Grants Commission (UGC). The recommendations of the Screening Committee are put up for approval of Secretary, DSIR. The recognition is effective from the date of approval of Secretary. Retrospective approval is not granted.

During the period, January 2015 to December 2015 the Screening Committee met 11 times and recommended 43 cases for recognition as SIROs. These include cases in the natural and applied sciences, agricultural, medical sciences and social sciences. List of these SIROs is furnished at **Annexure -8**.

Recognition granted to SIROs is for duration ranging from 1 to 3 years. The SIROs are advised to apply for renewal of recognition well in advance (3 months prior to the date of expiry of recognition). Such applications received for renewal of recognition are examined by Research Review Groups by involving representatives from ICAR, ICMR, CSIR and ICSSR depending on the area. Based on the evaluation made by the Research Review Groups, renewal of recognition is granted to SIROs. At present, there are 637 SIROs duly recognised by DSIR; of these, 270 are in the area of natural and applied sciences, 250 are in the area of medical sciences, 39 are in the area of agricultural sciences and 78 are in the area of social sciences.

The SIROs have employed qualified scientists and researchers and have also established good infrastructural facilities for research. They have developed new processes, procedures, techniques and technologies and also filed several patents. They have also organised seminars/ symposiums/ workshops and published research papers / reports / books.

2.5. Fiscal Incentives for Scientific Research

Government has evolved, from time to time, fiscal incentives and support measures to encourage R&D in industry and increased utilisation of locally available R&D options for industrial development. New incentives to encourage investments in R&D by industry are announced in the Union Budget.

Fiscal incentives and support measures presently available include:

- Income-tax relief on R&D expenditure (capital & revenue).
- Weighted tax deduction U/s 35(2AA) of IT Act 1961 for sponsored research programs in approved national laboratories, universities and IITs.
- Weighted tax deduction u/s 35(2AB) of IT Act, 1961 on in-house R&D expenditure for any company engaged in the business of biotechnology or in any business of manufacture or production of any article or thing not being an article or thing specified in the list of the eleventh schedule of IT Act, having R&D facility approved by Secretary, DSIR.
- Customs duty exemption on capital equipment, spares, accessories and consumables imported for R&D by approved institutions/SIROs;
- Customs duty exemption on specified goods (comprising of analytical and specialty equipment) for use in pharmaceutical and biotechnology sector;
- Central Excise duty waiver on items purchased from the domestic market by approved institutions/ SIROs for R&D;
- Ten year tax holiday for commercial R&D companies approved upto 31.03.2007
- Central Excise duty waiver for 3 years on goods produced based on indigenously developed technologies and duly patented in any two of the countries out of India, European Union (one country), USA and Japan;

- Accelerated depreciation allowance on plant and machinery set-up based on indigenous technology;
- Customs duty exemption on imports for R&D projects supported by Government.

Information on some of these fiscal incentives implemented by DSIR is given in the following paragraph.

2.5.1 Depreciation Allowance on Plant and Machinery Setup Based on Indigenous Technology

Secretary, DSIR, Ministry of Science and Technology, is the Prescribed Authority to certify expenditures where higher rate of depreciation is to be allowed for the plant and machinery installed for the manufacturing of products using indigenous know-how as per provisions of rule 5(2) of IT Rules. Guidelines have been issued for making application for obtaining the aforesaid certificate. All such applications received are examined in the department, and discussions and visits by experts to verify the claim are made to the plants by expert teams. Based on a detailed examination, certificates in deserving cases are issued for eligible expenditure.

During the year, one certificate involving Rs. 2593.44 lakhs during 2011-12, Rs. 1541.27 lakhs during 2012-13 and Rs. 2201.40 lakhs during 2013-14 on cost of plant and machinery was issued by DSIR. Details are given at **Annexure -9**.

2.5.2 Central Excise Duty Waiver for three years on patented products

Government of India, Department of Revenue, vide Notification No. 13/99-CE dated 28th February 1999 as amended by Notification No. 22/99 had exempted, all goods falling under the Schedule of the Central Excise, Tariff Act, 1985 (5 of 1986), from the whole of the duty of excise leviable thereon under the Central Excises (Goods of Special Importance) Act, 1957 (58 to 1957), subject to the following conditions:-

(a) such goods are manufactured by a wholly Indian owned company;

(b) such goods are designed and developed by such Indian company;

(c) the goods so designed and developed are patented by such Indian company in India and in any other or more of the countries of the European Union and in United States of America or Japan or in both;

(d) that the manufacturer before the commencement of commercial production, produces a certificate from an officer not below the rank of the Additional Secretary to the Government of India in the Department of Scientific and Industrial Research (DSIR) to the effect that the said goods are designed and developed by a wholly Indian owned company and patented in any two countries from amongst India, USA, Japan and any one of the European Union to the jurisdictional Commissioner of Central Excise, and

(e) the procedure as prescribed by the jurisdictional Commissioner of Central Excise, is followed.

In order to operationalise the scheme department has evolved guidelines and application form for screening and issuance of certificate. These guidelines and application form is available on DSIR website. During the year, department had received 5 applications. 3 applications were evaluated by the technical expert committee. The process for review and obtaining necessary approval for other 2 applications is under process. Certificate was issued to one company by DSIR. Details are given at **Annexure -10**.

2.5.3 Reference on expenditure on scientific research under Section 35 (3) of Income-Tax Act, 1961

Section 35(3) of Income-tax Act, 1961 provides that if a question arises as to whether and, if so, to what

extent any activity constitutes or constituted or any asset is or was being used for scientific research, the Central Board of Direct Taxes would refer the question to the Prescribed Authority. Director General Income-tax (Exemptions) in concurrence with Secretary, DSIR is the Prescribed Authority for deciding such cases.

During the period under report, department had received one reference from Department of Revenue (CBDT) for M/s Kansara Bearings Ltd., Jodhpur. This case is under examination.

2.5.4 Approval of Commercial R&D Companies

In order to promote research and development activities in the commercial research and development companies, the Finance Act, 2000 provided for a ten-year tax holiday from income-tax under section 80-IB (8A) of the Income-tax Act, 1961, to approved companies, whose main objective is undertaking scientific and industrial research, Secretary, DSIR is the Prescribed Authority vide Gazette notification no. S.O. 85(E) dated 31 January, 2001, issued by Department of Revenue, Ministry of Finance for granting approval under section 80-IB (8A) of the IT Act. The notification was valid upto 31st March, 2007 and this scheme was not extended further by the Government.

The approval to commercial R&D companies is given initially for a period of 3 years, which can be extended up to 10 years based on evaluation of its performance. The tax exemption is available to a company, which is accorded approval by the Prescribed Authority at any time after the 31st day of March 2000 but before the 1st day of April 2007.

Out of 45 companies approved till 31st March 2007, six companies are availing benefit under the section at present. The list of 6 companies is given at **Annexure -11**.

2.5.5 Customs Duty Exemption to Recognised SIROs

All SIROs recognised by DSIR other than hospitals are eligible for Customs Duty Exemption on the import of scientific equipment, instruments, spares, accessories as well as consumables for research and development activities and programmes.

The department was issuing the essentiality certificates to SIROs for obtaining the customs duty exemptions. As per the notification No. 24 /2007 dated 1st March, 2007 the Director or Head of the institute/organization is empowered to sign the essentiality certificate.

2.5.6 Central Excise Duty Exemption to Recognised SIROs

All SIROs recognised by DSIR other than hospitals are eligible for Excise Duty Exemption on purchase of scientific and technical instruments, apparatus, equipment (including computers); accessories and spare parts thereof and consumables; computer software, Compact Disc - Read Only Memory (CD-ROM), recorded magnetic tapes, micro films, microfiches; and prototypes for research and development activities and programmes.

This provision was introduced by Ministry of Finance (Department of Revenue) vide notification No. 10/97-Central Excise dated 1st March, 1997. The department was issuing the essentiality certificates to SIROs for obtaining the central excise duty exemptions. As per the notification No.10/ 2007 dated 1st March, 2007 the Director or Head of the institute/organization is empowered to sign the essentiality certificate.

2.5.7 Customs and central excise duty exemption to Recognised in-house R&D units

Ministry of Finance has issued notification no. 24/ 2007 – Customs dated 01/03/2007 and 16/2007 – Central Excise dated 01/03/2007 amending the basic notifications under customs and excise. As per the above amendments all DSIR recognized in-house R&D units other than hospitals can avail customs and central excise duty exemption on their procurements for research purposes. All the eligible

in-house R&D units recognized by DSIR have been issued the certificates of registration.

2.5.8 *Registration of Public Funded Research Institutions (PFRI), Universities etc*

Public funded research institutions, universities, IITs, IISc., Bangalore; Regional Engineering Colleges (other than a hospital) are eligible for availing customs duty exemption on import of equipment, spares and accessories and consumables for research purposes through a simple registration with the DSIR. The heads of the public funded research institutions / organisations duly registered with DSIR can certify the R&D goods for duty free import as per the notification No. 51/96-Customs dated 23 July 1996. As per the Government notification No. 10/97-Central Excise dated 1.3.1997, the above Public Funded Research Institutions registered with DSIR are also eligible for Central Excise Duty Waiver on purchase of indigenously manufactured items for scientific research purposes.

Coinciding with the presentation of Union Budget for the year 2004, Ministry of Finance amended the notification No. 51/96-customs vide notification No. 28/2003-Customs dt. 1.3.2003. As per the amendment, departments & laboratories of central government and state governments (other than a hospital) are not required to register with DSIR for availing the customs duty exemption. They can clear the consignments by producing a certificate from the Head of the institution certifying that the said goods are required for research purposes only. Another significant change in the notification is that Regional Cancer Centres have been included in the list of institutions eligible for DSIR registration for importing goods for research purposes at a concessional rate of customs duty.

Under the e-governance initiative of DSIR, department has started online application submission facility for greater accessibility and transparency of the department programmes/schemes. For the purpose of registration / renewal of registration of Public Funded Research Institutions (PFRIs) and others, submission of online application facility started in the year 2012 through the department website (www.dsir.gov.in). Details about the schemes are available on department website. So far about 200 institutions have applied online. The complete applications are considered by an Inter-departmental Screening Committee constituted by the department for considering the requests from various institutions. Presently the committee is chaired by a former Secretary of DSIR.

The Screening Committee met once during the period under report and considered 15 applications received from various public funded research institutions. During the period under report, 9 registration certificates were issued to such public funded research institutions for availing customs duty exemption on import of scientific equipment, spares and accessories, consumable items and Central Excise Duty exemption on indigenous purchases for Scientific Research Purposes. There are about 600 PFRIs registered by DSIR.

The registration to public funded research and other institutions mentioned in the notification is granted for maximum period of five years / ten years (for all institutions of national importance, CSIR, ICAR & ICMR labs, IITs, NITs, etc.). The registered institutions are advised to apply for renewal of registration well in advance of the date of expiry of the registration.

During the period under report, 130 institutions were due for renewal of registration. The department received 80 renewal applications. These were processed on individual files and approval of Competent Authority was obtained and 70 renewal certificates were issued.

2.5.9 Approval of In-house R&D Centres under Section 35(2AB) of I.T. Act 1961

In order to encourage R&D initiatives of industry, the finance bill 1997 introduced a sub section (2AB) in section 35 of the IT Act, 1961. The provision introduced initially was for select sectors of industry

i.e. drugs, pharmaceuticals, electronic equipment, computers, telecommunication equipment, chemicals and provided weighted deduction of 125 per cent on expenditure on in-house research and development facility as approved by the prescribed authority i.e. Secretary, DSIR. Subsequently, a number of other sectors were added to the list of eligible sectors. From the year 2009 the benefits have been extended to all sectors of industry with a select list of non-priority items. Rate of weighted tax deduction was raised from 125 per cent to 150 per cent subsequent to the year ending March, 2000. The rate of weighted tax deduction was further enhanced to 200% from 1st April 2010. Initially the provision was introduced up to 31st March, 2000. The provision was extended from time to time initially till 31st March, 2005 and then upto 31st March, 2007, further up to 31st March 2012. In the Union Budget 2012, the provision has been extended up to 31st March 2017.

During the period under report, 111 new applications were received for approval under the provision. New approvals were accorded to 121 companies in Income Tax prescribed Form 3CM. Further, the detailed R&D expenditure of the approved companies were also examined and 334 reports valued at Rs.9828 corers forwarded to DGIT (E) in Form 3CL as prescribed in IT Act. A list of companies approved under Section 35(2AB) of IT Act, during the year 2015 is furnished in **Annexure -12**.

3. ASIAN PACIFIC CENTRE FOR TRANSFER OF TECHNOLOGY (APCTT).

ACTIVITIES OF APCTT

Science, Technology and Innovation (STI); Technology Transfer; and Technology Intelligence were identified as three focus programme areas in the five year Strategic Plan (2013-2017). Under these programme areas, the activities focused on: promotion of national innovation systems; technology transfer support services for SMEs; the promotion of critical emerging technologies such as renewable energy technologies, biotechnology and nanotechnology; and the provision of information, networking and the sharing of experiences relating to the management of technology, and enhancing technology intelligence through the provision of technology information services.

During the reporting period (2014-2015), the Centre has undertaken the following activities:

Fostering a science, technology and innovation enabling environment and systems of innovation for sustainable development

The post-2015 development agenda adopted by member states at United Nations General Assembly (UNGA) is focusing on the promotion and balanced integration of the economic, social and environmental dimensions of sustainable development for present and future generations. Goal 9 of the draft post-2015 sustainable development goals is to "build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation". This overlaps with the Centre's strategic area of STI for sustainable development with a special emphasis on national technology innovation systems at various levels. Specifically, the goal 17 is to "strengthen the means of implementation and revitalize the global partnership for sustainable development". One of the targets for that goal is to enhance North-South cooperation, South-South cooperation and triangular regional and international cooperation on and access to STI, and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism when agreed upon, while another one is to fully operationalize the technology bank and STI capacity-building mechanism for least developed countries by 2017. The Centre is, therefore, poised to play a key role in promoting and strengthening STI for sustainable development in the Asia-Pacific

countries with special emphasis on South-South cooperation. The STI capacity-building activities of the Centre targets key actors of technology innovation — Government, industries, research and development (R&D) institutions and academia — that would enable them to develop their own holistic approach towards achieving their STI-based national sustainable development goals.

A. Strengthening of National Innovation Systems in the Asia Pacific Region

The national innovation systems programme of the Centre was launched in 2005 with support from the Department of Scientific and Industrial Research of the Ministry of Science and Technology, India. The Centre is implementing phase II of the project, which was launched in 2010, to promote national innovation systems in Asia and the Pacific. The project aims to assist the participating countries in strengthening specific key components of national innovation systems identified by individual participating countries. During this biennium, the Centre assisted countries through capacity-building activities for policymakers, industries, universities, R&D institutions and other relevant stakeholders in the following areas: formulating and implementing strategic policies and programmes; managing technology business incubators; strengthening the enabling environment and strategies for sustainable energy options; promoting technology-based entrepreneurship; and working on new and emerging technologies. A key feature of the second phase is the involvement of several countries with special needs, namely Afghanistan, Bangladesh, Bhutan, Cambodia, the Lao People's Democratic Republic, Myanmar and Nepal. Following are the key activities carried out during the reporting period.

National Consultative Workshop on Strengthening and Road Mapping of Emerging Technology Innovation systems of Sri Lanka was held in Colombo from 17-19 November 2015 in cooperation with the Coordinating Secretariat for Science, Technology and Innovation (COSTI), Ministry of Science, Technology and Research, Sri Lanka. The workshop aimed to enhance understanding of the global and regional trends in nanotechnology and biotechnology and assess their current and potential impact in Sri Lanka. Through the interaction between international experts from Malaysia and Thailand and local stakeholders, a way forward for integrating emerging technologies in to national development was proposed. The workshop also provided a platform for Sri Lanka's private and public sector institutions to interact with international resource persons and to facilitate linkages that may harness emerging technologies. The workshop helped in the assessment of the progress made and the national impact of emerging technologies in the development of Sri Lanka and derived recommendations on national policies to foster harnessing of emerging technologies. More than 80 participants from R&D institutions, policy makers, academia, industries from Sri Lanka participated the workshop.

Workshop on Technology-based Entrepreneurship Development and Commercialization, Tehran, 27-28 October 2015 was organized by the Iranian Research Organization for Science and Technology in cooperation with the Centre and the Regional Centre for Science and Technology Transfer of the Indian Ocean Rim Association. Having recognized the contribution of knowledge-based entrepreneurship to employment, growth and sustainable development, the Islamic Republic of Iran organized this event with the principal aim to address relevant issues, such as formulation of new business models, practical policies and measures to promote the growth of entrepreneurship by sharing best practices and lessons learned with participating countries. The workshop also focused on conceptions, models and infrastructure for the development of technology based entrepreneurship. Experts from Korea based management consultant, India and Thailand shared national policies and support mechanisms and case studies at the workshop. More than 70 policy makers, incubatee managers, industries, academia, start-up companies,

venture capital and other STI stakeholders from Iran participated in the workshop.

Third Asia-Pacific NIS Forum Diagnosis of NIS and Development of STI Strategies in the Open Innovation Framework 8-9 April 2015, Bangkok, Thailand - The Forum was 0rganised in cooperation with the National STI Policy Office of Ministry of Science and Technology (MOST), Royal Thai Government, Thailand and the Research and Information System for Developing countries (RIS), a think tank funded by the Government of India. The Third NIS Forum offered opportunity for 12 Asia Pacific countries (Bangladesh, China, India, Indonesia, Islamic Republic of Iran, Lao PDR, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand), including three LDCs to exchange experiences among national institutions who study national STI policies, diagnose NIS, and advise on STI strategies in the context of national development goals thus supporting the policy makers to make evidence based policy decisions. In addition to the 12 experts from participating member states, resource persons from UNESCO Paris Office, RIS, Council for Scientific and Industrial Research (CSIR) in India and APCTT staff made presentations, participated in the panel discussions and shared their views on the emerging concepts of NIS diagnosis, STI strategy development, mainstreaming of gender and open innovation in STI, and south-south and regional cooperation. An expert from Slovenia also joined the Forum and made a presentation through Skype. The Forum deliberated on the critical issues and gaps in NIS diagnosis and suggested strategies and approaches to address them at national and regional levels in the Asia-Pacific region.

Regional Seminar on Technology Facilitation for Sustainable Development Goals in the Asia-Pacific, New Delhi, India, 17 December 2015

The Regional Seminar was organized in partnership with the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India to facilitate high level dialogue and discussions between senior representatives of APCTT Member States and key STI policy makers and technology stakeholders from India. The Secretary, Ministry of New and Renewable Energy (MNRE), Government of India in his keynote address informed that India would work in partnership with APCTT member countries to operationalise the International Solar Alliance (ISA) initiative launched during COP 21 climate change conference recently held in Paris. He also informed that with USD 30 million support, the secretariat of ISA would be located in New Delhi. The ESCAP regional Advisor on STI shared the perspectives of ESCAP on the role of STI in facilitating inclusive and sustainable development in the Asia-Pacific region. The Seminar was attended by nearly70 STI experts and representatives from government agencies, R&D institutes, universities, academia, technology promotion agencies, industry associations and Member State focal points (from Bangladesh, China, Fiji, India, Islamic Republic of Iran, Malaysia, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand and Viet Nam) participating in the 11th Technical Commettee and Governing Council meetings of APCTT. They participated and interacted during the panel discussions held on “Strengthening of National Innovation Systems (NIS)for achieving SDGs” and “Regional Cooperation in Technology Transfer of SDGs”.

Asia-Pacific National Innovation Systems Online Resource Centre http://nis.apctt.org. This online knowledge platform, set up with the objective to give science, technology and innovation stakeholders the opportunity to share policy approaches and experiences of countries on issues pertaining to strengthening national innovation systems, was updated with outputs and outcomes of the activities under the science, technology and innovation/ national innovation system programme area of work of the Centre as of October 2014. Users can view and download presentations made by the national and internal experts and reports of the regional and

national workshops, meetings and national innovative systems forums. In addition, sustainable energy strategies and reports on Indonesia and the Lao People's Democratic Republic are now accessible from the Online Resource Centre.

Development of guidelines on national science, technology and innovation strategies and initiatives for least developed countries

The Asian and Pacific Centre for Transfer of Technology and the Science and Technology Policy Institute of the Republic of Korea have been combining some of their ongoing programme activities to assist the Lao People's Democratic Republic and Nepal in analysing their current STI framework conditions and developing strategies to strengthen their national innovation system enabling environments for STI-based national development. APCTT participated in the Final Workshop on Innovation System Diagnosis and STI Strategy Development in Lao PDR held in 14-15 January 2015 in Vientiane. At this workshop Lao STI stakeholders and experts from APCTT and STEPI deliberated on the Lao socio-economic context; STI diagnosis, solutions, priorities and programmes; Taiwan Province of China case of STI Development and current STI initiative of the Ministry of Science and Technology, Lao PDR. This was followed by brainstorming on potential and promising technology domains from medium to long term STI base development. The outcome of this activity as well as earlier ones has resulted in a report on the STI strategies for poverty reduction in the Lao People's Democratic Republic. This report was brought out in 2015 for wider circulation among the STI stakeholders in the country with the aim to catalyse the initiation of steps to implement the strategies. This report will soon be made available at www.nis.apctt.org.

Promoting innovation systems for new and emerging technologies

APCTT implemented several activities aimed at strengthening nanotechnology R&D management capacity of relevant stakeholders (e.g. policy makers, R&D institutions, researchers and SMEs) in the member countries with the availability of Section 23 Funds during 2011-2014. Under this programme, relevant knowledge, experience and best practices were shared among stakeholders through South-South cooperation to enhance their R&D management capacity and market competitiveness in the area of nanotechnology-based value added product development and commercialization. During the reporting period, APCTT continued its efforts to assist the member States under this project:

a. APCTT continued to disseminate programme outputs, relevant information among stakeholders through its website 'Asia-Pacific Nanotechnology R&D Management Network' (http://nanotech.apctt.org).

b. APCTT-developed "Manual on Critical Issues in Nanotechnology R&D Management: An Asia-Pacific Perspective" was disseminated through the above website to help various stakeholders involved in the research and development (R&D) and innovation management activities in the area of nanotechnology. The Manual addresses the following issues: (a) nanosafety, standardization, and certification; (b) protection and valuation of nanotechnology intellectual property (IP); and (c) the commercialization of R&D results in the area of nanotechnology.

c. APCTT's Iran (Islamic Republic of) national workshop on nanotechnology R&D management held in early 2014 in Tehran inspired fruitful engagements between participating experts from Iran and Thailand in fostering cooperation on technical protocol for inter laboratory comparison activity on nanoparticle size and characterization. This engagement eventually led to the establishment of a tripartite programme on 'Nanoparticle Characterization Comparison on Nanoparticle

Size Activity' between Iran, Thailand and Taiwan province of China under the aegis of Asia Nano Forum (ANF). This is an important outcome of APCTT's Section-23 funded programme on nanotechnology R&D management capacity building of member country stakeholders,

d. The Centre liaised with the Coordinating Secretariat for Science, Technology and Innovation (COSTI), Government of Sri Lanka to assist them in the development of road maps for further strengthening and integrating emerging technologies such as nanotechnology / advanced materials and modern biotechnology in the national development. Towards this endeavor, a capacity building workshop with road mapping exercises was organized on 17-19 November 2015 in Colombo, Sri Lanka. As an outcome of this workshop a draft roadmap is currently being reviewed and updated.

B. Technology Transfer Capacity Building

The Asian and Pacific Centre for Transfer of Technology has been engaged in strengthening the technology transfer capacity of relevant stakeholders in member countries through a wide range of activities including, but not limited to, organizing Training of Trainers (ToT) programmes on planning and managing technology transfer projects; provision of technology transfer support services for SMEs and entrepreneurs through online as well as offline mechanisms; organizing business-to-business meetings in specific sectors in partnership with key nodal agencies in member countries; technology information services through information portals and technology publications; establishment of specialized technology transfer networks in specific sectors for enhancing cross-border technology-based business and research cooperation among member countries. Emphasis is currently being placed on supporting South-South Cooperation in new and emerging areas such as renewable energy, sustainable agriculture and nanotechnology.

Renewable Energy Cooperation Network for Asia and the Pacific

To support the implementation of ESCAP Commission resolution 64/3 on promoting renewables for energy security and sustainable development in Asia and the Pacific, the Centre established the Renewable Energy Cooperation-Network for the Asia Pacific (RECAP) in 2010. The main focus of this mechanism is to strengthen the capacity of participating member countries in implementing projects related to renewable energy technologies through training, cooperation and the promotion of partnerships among R&D institutions, universities, industries and other stakeholders in the region. The current membership of RECAP includes 16 member States of ESCAP, namely Bangladesh, China, Fiji, India, Indonesia, the Islamic Republic of Iran, Malaysia, Mongolia, Nepal, Pakistan, the Philippines, the Republic of Korea, Sri Lanka, Thailand, Vanuatu and Viet Nam. The Centre has so far provided training to more than 550 renewable energy professionals from the region on various aspects of renewable energy technology transfer and adoption. A brief summary of the Centre's activities carried out under the RECAP framework during the reporting period is provided below:

Renewable Energy Resource Assessment and Mapping, 28 to 30 September 2015 in Davao City, Philippines: The Centre and the International Renewable Energy Agency, in partnership with the Technology Application and Promotion Institute and the Department of Science and Technology -Region XI of the Philippines organized a regional training programme on renewable energy resource assessment and mapping, from 28 to 30 September 2015 in Davao City, Philippines. Solar and wind energy experts and government officials involved in energy planning from seven ASEAN countries, namely Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, the Philippines and Thailand, participated in this programme. The objective of the programme was to provide a platform for strengthening existing

capacities of member countries for identifying and assessing potential solar and wind energy resources and to initiate efforts to fully realize the social, economic and environmental benefits of these resources in countries in South-East Asia.

Asia-Pacific Regional Workshop on Biomass Energy Resource Assessment,* Bangkok, 6-8 July *2015. APCTT in partnership with the International Renewable Energy Agency (IRENA),the Ministry of Science and Technology(MOST) of the Royal Thai Government and Thailand Institute for Scientific and Technological Research (TISTR) organized an Asia-Pacific Regional Workshop on Biomass Energy Resource Assessment in Bangkok during 6-8 July 2015. This workshop focused on strengthening the existing capacities of member countries in the Asia Pacific region to undertake biomass renewable energy resource assessments at the national level. The workshop facilitated sharing of best practices in identifying and assessing the potential biomass energy resources and to initiate efforts to fully realize the social, economic and environmental benefits with a specific focus on sustainability of biomass resources as a key priority. Biomass energy experts from 16 countries namely, Australia, China, Fiji Islands, India, Indonesia, Islamic Republic of Iran, Japan, Lao PDR, Nepal, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Viet Nam were provided hands on training on various methodologies, tools and techniques for biomass energy resource assessments that are developed by IRENA and other international organizations including the Food and Agriculture Organization (FAO) of the United Nations.

***The Biomass Open Research Forum: Biomass Resource Assessment for ASEAN+6 Countries* in Bangkok during 9-10 July 2015.** Participants from 15 member States, namely Afghanistan, Australia, Cambodia, China, Japan, India, Indonesia, the Islamic Republic of Iran, Malaysia, Nepal, New Zealand, Pakistan, Sri Lanka, Thailand and Viet Nam, participated in the regional workshop and the open forum. They were provided with hands-on training on various tools and techniques for performing biomass resource assessments at the national level. The open forum facilitated brainstorming on the establishment of the ASEAN network on biomass open research for facilitation of South-South cooperation among member countries in the ASEAN region and beyond with regards to biomass energy development, transfer and adoption. This APCTT-led initiative to support the establishment of an ASEAN Network for Biomass Open Research (ANBOR) with Thailand Biomass Consortium (TBC) as the Secretariat of ANBOR received formal approval from ASEAN Secretariat. The ANBOR network is envisaged to be the gateway for technology transfer as well as research collaboration among ASEAN countries on biomass energy and APCTT will be working towards facilitating cross-border technology transfer partnerships of ANBOR with other national and regional cooperation networks on biomass energy in the Asia Pacific region.

APCTT-ESCWA Study Tour for Policymakers from West Asia to India for learning best practices in renewable energy policy making during 26-30 October 2015. In partnership with UN Economic and Social Commission for Western Asia (ESCWA), World Institute of Sustainable Energy (WISE) and the Environment and Development Division of ESCAP, APCTT co-organized a Study Tour during 26-30 October 2015 in Pune, India for Policymakers from 9 countries from West Asia, Asia Pacific region and Europe namely, Jordan, Lebanon, Mauritania, Morocco, Oman, Sudan, Nepal, Lao PDR and France to learn best practices in ensuring access to modern energy through the use of renewable energy technologies from India. A total of 28 policymakers from 9 countries participated in this study tour, which was organized as part of a UN Development Account (UNDA) project currently being implemented by the ESCWA. This study tour involved technical presentations from policymakers and experts involved in the promotion of renewable energy at the national level in India including Ministry of New and Renewable Energy (MNRE),

India, Chhattisgarh Renewable Energy Development Agency (CREDA) as well as not-for-profit organizations in India involved in the renewable energy sector. The study tour also involved field visits to BAIF Central Research Station, Uruli Kanchan, Pune, 9.36 KW Solar PV based mini-grid project in Darewadi, Maharashtra and Maharashtra Energy Development Agency (MEDA), Pune. Participants were also exposed to various technological options for increasing the share of sustainable energy in the total energy mix. Various policy options for promoting renewable energy in the form of subsidies, feed-in-tariffs and risk sharing mechanisms were also shared with the participants to encourage them to develop similar policy instruments in their respective countries for promotion of renewable energy.

SATNET Asia

APCTT successfully concluded in June 2015, implementation of the South Asia component of the European Union-funded project entitled "Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia)". This project was co-implemented in partnership with the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) and the Trade and Investment Division of ESCAP. The Centre trained more than 700 participants, including representatives of agricultural research institutions and farmer federations, agribusiness professionals and government officials, policymakers and agricultural extension workers from six South Asian countries, namely, Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan. Through a capacity-building programme for officials of the National Plant Protection Centre, the Centre assisted Bhutan in established the first local manufacturing facility for bio-control agents in the country to assist the Government in achieving the goals set under its organic agriculture road map. In addition, the Centre helped a former federation with a membership of 3,000 smallholder farmers in South India to export bananas to China, the Islamic Republic of Iran and Malaysia through a capacity-building programme on electronic traceability for agricultural trade facilitation. During the project implementation period, the Centre organized 21 capacity building activities in 6 South Asian countries.

LIFT Project

The Centre is implementing a project entitled "An Integrated Rural Economic and Social Development Programme for Livelihoods Improvement in the Dry Zone of Myanmar" in partnership with the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) and the Centre for Sustainable Agricultural Mechanization (CSAM). The project, which is being funded through the Livelihoods and Food Security Trust Fund (LIFT), supports integrated socioeconomic development in the Myanmar dry zone in the context of inclusive and sustainable development with special emphasis on livelihoods improvement and food security. The Centre is working towards strengthening the capacities of key stakeholders in the transfer of improved and environmentally sound technologies for small and medium-sized enterprises to improve the livelihoods and food security aspects of the people in the dry zone. The project activities comprise a range of analytical and capacity-building interventions and development of case studies, policy papers and policy briefs. During the reporting period, the Centre organized and participated in the Inception workshop, Yangon, Myanmar, 5 May 2015 and orientation meeting for consultants, 27th August 2015, Yangon, Myanmar.

Support to member countries for technology transfer

APCTT has been engaged in strengthening the technology transfer capacity of key stakeholders in member countries through a wide range of activities, such as organizing training of trainers programmes on planning and managing technology transfer projects, providing technology transfer support

services for small and medium-sized enterprises and entrepreneurs, organizing business-to-business meetings in specific sectors in partnership with key central agencies in member countries and technology information services through information portals and technology publications, and the establishment of specialized technology transfer networks in specific sectors. Emphasis is currently being placed on supporting South-South cooperation in new and emerging areas, such as renewable energy, sustainable agriculture and nanotechnology. During the reporting period the following activities were organized:

a. Workshop on strengthening small and medium-sized enterprises in the manufacturing sector through skill development in networking and technology transfer, New Delhi, 30 January 2015, in partnership with the Federation of Indian Export Organizations (FIEO).

b. APCTT participated and delivered technical presentations in the Confederation of Indian Industries (CII) Agri Technology and Mechanization Summit, 1 September 2015, New Delhi

c. APCTT participated and delivered a training session during the Research to Rupees (R2R) programme organized by Gujarat State Biotechnology Mission (GSBTM) in Ahmedabad, India in 26 February2015.

C. Technology Intelligence of Member Country Stakeholders Strengthened

e-Periodicals

Oer the past three decades, one of the key objectives of APCTT has been to provide technology intelligence to help member States, their policymakers, institutions, academia, technology transfer intermediaries and SMEs to address the challenges of today's dynamic business and technological setting. In this endeavour, APCTT continued publishing several online periodicals and carrying out a combination of normative and analytical studies of regional relevance to identify trends highlight good policies and practices, and foster regional cooperation. Various activities undertaken during the reporting period could be summarized as per the following:

The Centre continued to publish several e-periodicals, namely Asia-Pacific Tech Monitor (quarterly) and Value Added Technology Information Services (VATIS) Update series on Biotechnology, Food Processing, Non-conventional Energy (renamed as 'New and Renewable Energy' since January 2015), Waste Management (all quarterly), and Ozone Layer Protection (bimonthly). APCTT continued to provide free access to the e-periodicals. The Asia-Pacific Tech Monitor features articles on technology trends and developments, technology policies, technology market, innovation management, technology transfer and new products and processes. The VATIS Updates feature a range of technological information on latest technological innovations, technology policies and market related developments, recent publications and events. The activities with relevant outputs relating to the periodicals during this reporting period are presented below:

(a) Asia-Pacific Tech Monitor:

- The Editorial Advisory Board for Asia-Pacific Tech Monitor comprising of ten international experts (from China, Germany, India, Indonesia, Japan, Malaysia, Republic of Korea, Sri Lanka and Thailand) provided useful and advice and guidance as and when required.

- APCTT published 04 issues of Asia-Pacific Tech Monitor which were made available and disseminated online free of cost at www.techmonitor.net.

- The Tech Monitor featured articles focusing on four special themes such as: Technology-based

rural entrepreneurship incubators (Oct-Dec 2014); New and emerging science technology and innovation strategies (Jan-Mar 2015); Renewable/sustainable energy technologies for last mile connectivity (Apr-Jun 2015); and Smart specialization to enhance national technology competitiveness (Jul-Sep 2015).

- The four special issues of Tech Monitor featured 18 articles contributed by 33 authors/ experts from 16 countries such as Bangladesh, Belgium, Fiji , Greece, India, Indonesia, Japan, Malaysia, Philippines, Slovenia, Spain, Sri Lanka, Thailand, The Netherlands, the United States of America and Viet Nam.

- The Tech Monitor disseminated information on about 60 latest technological innovations from around the world in several new and emerging areas such as: renewable energy technologies, nanotechnology, technologies for rural application, and technologies for sustainable development. An almost equal number of technology policy and market related news items from the Asia-Pacific countries were also collected and disseminated through the periodical.

- About 40 short articles providing useful how-to guides, best practices, and tips for SMEs were sourced, compiled and disseminated through the 'Business Coach' section of Tech Monitor. The articles were featured under various topics relevant for SMEs such as start-up venture creation, venture financing, managing innovation, technology transfer and green productivity.

- The Tech Monitor disseminated 31 technology offers and 19 technology requests from 07 countries such as China, Egypt, Hungary, India, Islamic Republic of Iran, Philippines, and the United Kingdom.

(b) VATIS Updates:

- APCTT published 22 issues of VATIS Updates which disseminated information on more than 700 latest technological innovations with potential commercial applications and important technological events that was sourced from more than 500 information sources (mainly web-based). The key features of the VATIS Update series are the packaging of information in a capsule form and the facilitation of direct access to information sources, wherever available.

- Since the first issue of 2015 onward, the VATIS Update on non-conventional energy has been renamed as 'New and Renewable Energy' to make the periodical more relevant and focussed on the technologies being covered in this periodical.

- The Centre partnered with prominent institutions to jointly publish two of the VATIS Update periodicals. Ozone Layer Protection was published with support from the Ozone Cell of the Ministry of Environment, Forests & Climate Change (MoEF&CC) of the Government of India. Biotechnology was co-published with the Biotech Consortium India Limited (BCIL), a government of India undertaking.

- APCTT supported India's ozone depleting substances (ODS) phase-out efforts under the Montreal Protocol through disseminating about 1500 printed copies of each issue of VATIS Update (Ozone Layer Protection) among the stakeholders including SMEs, policy makers, intermediary agencies and related stakeholders in India.

D. Participation in ESCAP programmes

APCTT participated and made substantive contribution in various ESCAP programmes and activities during the reporting period:

(a) Participated in the first and second Regional Workshop on Harnessing Science, Technology

and Innovation for Sustainable Development, UNCC, Bangkok, Thailand, 6 August 2015 and 02 November 2015 respectively. Provided technical inputs to TID in designing the workshop programme and identifying experts for the Regional workshops on Harnessing Science, Technology and Innovation for Sustainable Development.

(b) Reviewed and provided inputs to the draft 1st Task Force concept note on preparations for the Theme Study of 72nd Commission session: "Science, Technology and Innovation for Sustainable Development" as requested by TID

(c) Participated in the meetings of the Task Force on Preparations for the Theme Study of the 72nd Commission session: "Science, Technology and Innovation for Sustainable Development", Wednesday, 22 July 2015

(d) Provided inputs to the CS71 policy statement of Executive Secretary, on APCTT's needs for regional capacity development projects in areas of renewable energy, food and nutritional security, National Innovation Systems (NIS) and STI strategies, new and emerging technologies such as nanotechnology, micro-entrepreneurship development, and open innovation.

(e) Developed the concept note of the project on "South-South cooperation for science, technology and innovation policies in the Asia-Pacific region" in cooperation with TID-ESCAP. The concept note has been approved for funding from the United Nations Development Account to be implemented from 2016-2019. APCTT is contributing in developing the project document to be implemented in cooperation with TID-ESCAP.

(f) Participated in ESCAP Research and Publications Committee (RPC) Focal Point Network meeting on 19 Feb 2015 to learn and discuss about RPC's background, mandate and the role of the focal points

(g) Provided inputs on APCTT's activities for Least Developed Countries (LDCs), 2011-2014 for the SG report on LDCs

(h) Reviewed and provided inputs for the draft 'Concept Note on Science, Technology and Innovation (STI) for Sustainable Development and the Role of ESCAP'

(i) APCTT shared its knowledge and experiences in assessing STI capabilities in the Asia and the Pacific; designing appropriate policies to advance STI for sustainable development as well as next steps to be taken by ESCAP in the area of STI at the Second Regional Workshop on Harnessing STI for Sustainable Development held in UNCC, Bangkok on 2 November 2015.

(j) APCTT staff participated and presented biennium (2014-2015) activities of APCTT at the Fourth Session of the Committee on Trade and Investment, Fourth Session held in Bangkok from 4 to 6 November 2015.

E. Inter-Agency Collaboration

APCTT works with other United Nations agencies in India through various channels. During the past year, APCTT engaged with different UN agencies in India on a range of areas relevant to its work programme.

1. United Nations in India on its United Nations Development Assistance Framework (UNDAF)

Under the United Nations in India on its United Nations Development Assistance Framework (UNDAF), APCTT is currently involved in the activities related to Outcome 6 'Government, industry and other relevant stakeholders actively promote a more sustainable environment and

enhanced resilience of communities in the face of challenges of Climate Change, Disaster Risk and natural resource depletion'. APCTT continued to share information on technologies, best practices and it's 'Guidebook of Technologies for Disaster Preparedness and Mitigation' with other UN Agencies.

During the reporting period, APCTT continued to serve as a member agency of the United Nations Disaster Management Team (UNDMT) in India which functions under the overall umbrella of the United Nations Development Action Framework (UNDAF). APCTT regularly participated in the UNDMT India meetings and provided inputs related to technology transfer aspects of disaster risk reduction (DRR) and shared information related to best practices in the region based on APCTT project outputs. As a UNDMT member agency, APCTT also participated in the following meetings during the reporting period:

- Participated in the Workshop on Enhancing Private Sector Partnership for Disaster Risk Reduction, 24 August 2015, New Delhi, India organized by UNDP-India.

- Reviewed and provided comments on the UNDP-India study report - "Gap and opportunity Analysis for mainstreaming of Disaster Risk Reduction and Climate Change Adaptation in National Flagship Programs"

- Participated in the "2nd Meeting of the Programme Management Committee and Consultation Meeting on Mainstreaming DRR in the National Flagship Programmes", 18 Feb 2015 at New Delhi, India to discuss with various Indian Government Ministries and select states the findings of the study on Mainstreaming DRR and CCA in Development Planning

2. Research and Knowledge Team

In April 2013, APCTT joined the Research and Knowledge Team (RKT) which has been established as one of the UNCT's Core Committees, to promote creation and sharing of knowledge and research by the United Nations entities active in the country. During the reporting period APCTT continued to participate in the RKT meetings and shared outputs and experience related to normative and analytical works with other member agencies in India. During these engagements, APCTT shared its comments and suggestions on the RKT-led draft MDG report for India.

3. Participation in the UN Communication Group (UNCG), India

APCTT, as a member of the UNCG, India participated in the advocacy and inter-agency communication meetings organized by UNCG time to time and also contributed inputs to the issues of UN Development Supplement (UN News) published by United Nations Information Centre for India and Bhutan.

PROGRAMME OF WORK

Ongoing programmes:

a. The Centre is assisting the Trade and Investment Division of ESCAP in developing the project document on South-South cooperation for STI policies in the Asia-Pacific region, funded by the United Nations Development Account. The main objective of the project is to strengthen the capacity of selected countries of the Asia-Pacific region to formulate STI policies and strategies to strengthen their national innovations system. This project is scheduled to be jointly implemented by the Trade and Investment Division and the Centre during the period 2016-2019.

b. APCTT would continue to work closely with the member countries in strengthening specific key-components of their natation innovation systems during the coming years. Special emphasis would be made to assist the least developed countries by promoting south-south cooperation among Asia-Pacific countries.

c. In 2015, the Centre initiated work on its project entitled "An Integrated Rural Economic and Social Development Programme for Livelihoods Improvement in the Dry Zone of Myanmar", which is being funded through the Livelihoods and Food Security Trust Fund. The Centre will be focusing on transfer of improved and environmentally sound technologies for small and medium-sized enterprises to improve the livelihoods and food security aspects of key stakeholders in the dry zone of Myanmar.

d. The Centre will continue to publish and upgrade the e periodicals, Asia-Pacific Tech Monitor and VATIS Updates, in five specific areas namely: biotechnology; waste management; new and renewable energy; food processing; and ozone layer protection. In addition to web-based approaches (www.techmonitor.net), these periodicals will also be disseminated widely through social media, such as Facebook and Twitter. The archived information will be used to develop specialist publications and knowledge products in various technological themes of current interest. The outputs will then be disseminated to planners, policymakers, researchers, and managers of technology.

New projects/programmes for funding:

a. A concept note on diagnosis of national innovation systems and development of STI strategies to meet the national and sustainable development goals. The proposed project will add value to the ongoing national innovation system programme of the Centre, which so far has focused on the concept and key components of a national innovation system. Potential donor agencies and members of ESCAP are being approached to help implement this project, starting in 2016.

b. Regional and national capacity-building activities in the area of new and emerging technologies. In this endeavor, a new project will focus on South-South cooperation and regional cooperation mechanisms to develop and deploy new and emerging technologies. Funding opportunities will be explored with potential donor agencies.

c. A project on renewable energy capacity-building activities in the member States in partnership with specialized institutions, such as the International Renewable Energy Agency;

d. An Asia-Pacific regional project to promote the development, transfer, dissemination and diffusion of environmentally sound technologies to strengthen the means of implementation for sustainable development.

e. A project to institutionalize and establish a network for fostering grassroots technology innovation based enterprise development in rural areas of South Asian countries; and

f. A project on promoting clean technology access, business incubation and venture support systems in South Asian countries.

g. A project for establishing G2G and B2B platforms for countries in South and Southeast Asia for facilitating cross-border agricultural trade and technology transfer.

Partnerships

APCTT partnered with the following agencies to delivering its programme of work during the reporting period.

- Bangladesh Agricultural Research Council (BARC).
- Centre for Alleviation of Poverty and Sustainable Agriculture (CAPSA) of ESCAP, Indonesia
- Centre for Sustainable Agricultural Machinery (CSAM) of ESCAP, China.
- Coordinating Committee on Science, Technology and Innovation, Ministry of Science, Technology and Research, Sri Lanka.
- Department of Science and Technology (DOST), Philippines.

- Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, India.
- Institute of Rural Management, India.
- International Renewable Energy Agency (IRENA), United Arab Emirates.
- Iranian Research Organization for Science and Technology.
- Ministry of Agriculture and Forestry, Bhutan.
- Ministry of Science and Technology, Lao PDR.
- Nepal Agricultural Research Council (NARC), Ministry of Agriculture, Nepal
- Nepal Farming Institute.
- Pakistan Agricultural Research Council, Ministry of National Food Security and Research.
- Regional Centre for Science and Technology Transfer (RCSTT) of the Indian Ocean Rim Association (IORA), Iran
- Research and Information System for Developing Countries (RIS), India
- Science and Technology Policy Institute (STEPI), South Korea
- STI office of the Ministry of Science and Technology, Thailand
- Technology Application and Promotion Institute (TAPI), Department of Science and Technology (DOST), Philippines
- Thailand Institute of Scientific, Technological Research (TISTR), Ministry of Science and Technology
- United Nations Economic and Social Commission for West Asia (UN ESCWA), Jordan
- World Institute of Sustainable Energy (WISE), India
- World Vegetable Centre South Asia, India

APCTT Technical Committee and Governing Council Meetings:

The Eleventh Meeting of the Technical Committee of APCTT and the Eleventh Meeting of the Governing Councilwas held from 17-18 December 2015 in New Delhi, India.

Participation of Government of India (GOI) Staff in APCTT programmes:

1. Director General of Sardar Swaran Singh National Institute of Renewable Energy, Ministry of New and Renewable Energy, Government of India, Mohali, Punjab, India participated in the Asia Pacific Regional Workshop on Biomass Energy Resource Assessment, 6-8 July 2015, Bangkok, Thailand and Biomass Open Research Forum: Biomass Resource Assessment for ASEAN+6 , 9-10 July 2015, Bangkok, Thailand.

2. Sector Specialist from Gujarat State Biotechnology Mission [GSBTM], Dept. of Science & Technology, Govt. of Gujarat, Block # 11, 9th Floor, Udyog Bhavan, Gandhinagar - 382 017 participated in the Research 2 Rupees programme, 26 February 2015, Ahmedabad, India

3. Director of Federation of Indian Export Organizations (FIEO), Ministry of Commerce and Industries, Government of India, New Delhi, Strengthening SMEs in the Manufacturing Sector through Skill Development in Networking & Technology Transfer, 30 January 2015, FIEO, Niryat Bhawan, New Delhi

4. Director General and Consultant from RIS, Ministry of External Affairs participated in the third NIS Forum Diagnosis of NIS and Development of STI Strategies in the Open Innovation Frameworkheld in Bangkok in April 2015.

5. Officers from DSIR attended the Regional Seminar on Technology Facilitation held in New Delhi on 17 December 2015.

6. Officials from CSIR and NRDC attended the Regional Seminar on Technology Facilitation held in New Delhi on 17 December 2015.

7. Representative from DST attended the Workshop on Technology-based Entrepreneurship Development and Commercialization, Tehran, 27-28 October 2015.

4. INFORMATION TECHNOLOGY AND e-GOVERNANCE

4.1 Introduction

Information Technology and e-Governance (IT-eG) group was formed during mid of the 10th Plan period in order to create an IT enabled work environment in the Department through accelerated usage of various Information Technology opportunities. Primarily aims to convert the existing procedures and processes into *citizen centered,* IT-eG division implements e-Governance in the Department progressively that needs be in conformance to the National eGovernance Action Plan. For the implementation of an IT Action Plan IT-eG Division operates on a separate IT Budget Head that came into effect in DSIR since FY 2004-05.

4.2 IT Action Plan

For IT and e-Governance activities a comprehensive IT-Action Plan in the department as formulated in line with the Government directions issued during Tenth Plan remains

- *Infrastructure Development:* Provide and maintain Personal Computers (PCs) and other essential IT- equipment and software to all the functionaries.

- *Networking:* Up gradation, extension and maintenance of the Local Area Network (LAN).

- *Office Automation:* Implement various applications software that not only maintain records of receipt, issue of letters and movement of files but also offer enhancement in accountability, responsiveness and transparency in governance.

- *IT Training:* Provide relevant training courses to the officers/ staff that enable them to work on computers by using application software developed.

- *e-Reports*: Convert the Acts, Rules, Circulars and other published materials of interest or relevance to the public, in the electronic form.

- *Website*: Enrich the contents of the DSIR website by including downloadable forms and guidelines relevant to various citizen services that Department provides.

- *IntraDSIR*: Enrich the contents of the IntraDSIR by including downloadable forms and circulars relevant to employees of the Department.

4.3 Automation of DSIR Operations

DSIR essentially focuses on enabling Indian industry to reach state-of-the-art innovation excellence and competitiveness through research & technological interventions.

Information Technology and e-Governance (IT-eG) group within DSIR has got it developed and implemented an IT enabled work environment and Enterprise Resource Planning (ERP) application to automate all the operations of DSIR and link it to providing online services to the Industries and

relevant stakeholders. Incidental benefits include reduction of costs / efforts in seeking and obtaining information and services and minimization of administrative overheads.

4.3.1 Enterprise Integration, Program Implementation and e-Service Delivery

A user friendly online application form submission for recognition and renewal to In-House R&D Units, Scientific and Industrial Research Organizations (SIRO), Public Funded Research Institutions (PFRI) and Fiscal Incentives to Industry for Submission of Application in FORM 3CK, generation of 3CM certificate & submission of yearly returns in the Form 3CL has been developed. User friendly and time efficient backend application approval process has been developed. The workflow for each scheme has been configured as per the hierarchy in the department.

System for on-line submission of application in web-enabled form as per the prescribed application format under Patent Acquisition and Collaborative Research and Technology Development (PACE) Program has been developed for technology providers and seekers along with submission of proposals under Technology Development and Demonstraion. Time efficient backend application approval process has also been developed.

System for on-line submission of application in web-enabled form as per the prescribed application format under Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM) Program has been developed along with backend application approval and workflow for grant release.

System for on-line submission of application in web-enabled form as per the prescribed application format under Grant-in-Aid Support to Autonoumous Bodies, Public Sector Enterprises, and Asian and Pacific Centre for Transfer of Technology (APCTT) has been developed along with backend application approval and workflow for grant release.

The application has provision of entering legacy data into the system. A platform is designed for continuous tracking of issues across users. The usage of the system can be monitored through logs, system reports and electronic traces across transactions.

4.3.2 Office Automation Solution, Workflow Management, Record Management, and Data Warehousing

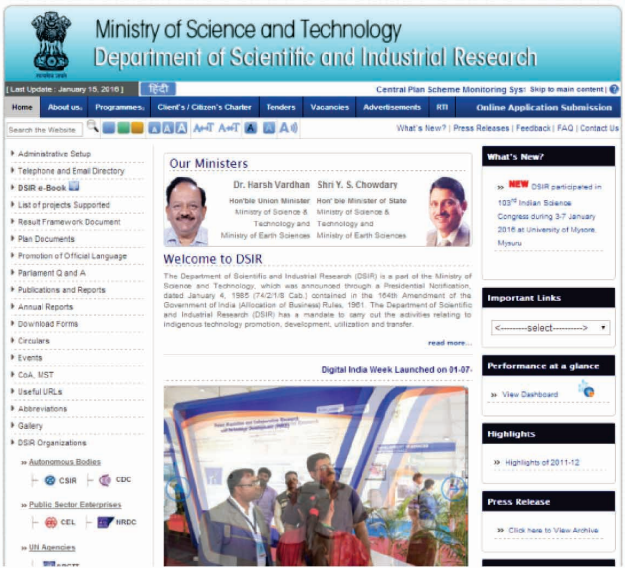
Scope of ERP include various modules such as Office Automation Solution, Workflow Management, Record Management, Data Warehousing and additional modules such as HR Management and processes, Store and Purchase, Planning, Budget and Audit, revamping of existing website bilingual, m-governance compliance, RFID implementation in record room. For achieving these objectives, value added through Document Management and Business Process management solution designed, developed and tested to suit and adequately addresses the requirements within any Government environment.

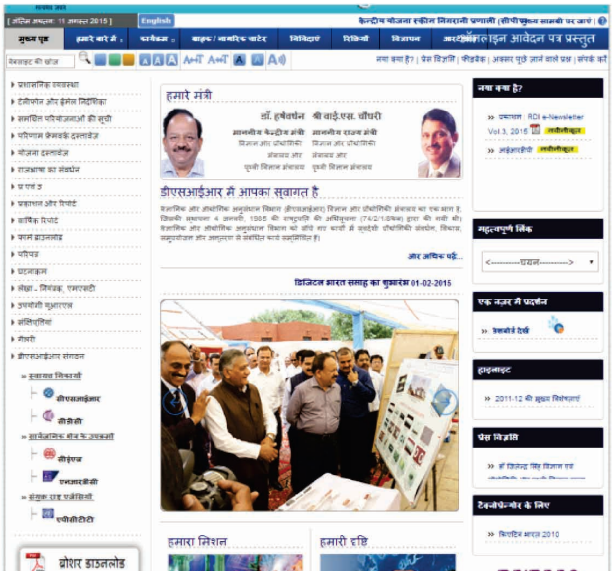
The progress made under ERP project is being reviewed and monitored through regular meetings. Training to the Users along with Hand-hold sessions has been regularly conducted.

4.3.3 DSIR Website

The DSIR Website has been made compliant to the Guildelines for Indian Government of Websites (GIGW). The website has been regularly updated and has has been visited 124882 times.

The users when they log in to the ERP Portal, are presented with a customized adaptive landing page and electronic desktop with links related to tasks to be performed by them. The Graphical User Interface (GUI) of this re-designed website is user-friendly and rich in appearance since uses superior graphics, self-explanatory, promptly guiding the user to different sections, offer appropriate navigation assistance to user in the form of tooltips, messages, images etc. wherever required / applicable.





4.3.4 IntraDSIR (An electronic Workdesk)

IntraDSIR (An electronic Workdesk) has been created, wherein all the employees of DSIR can accss through a username and password to communicate with each other as well as the electronic work desk of all the employees of DSIR. An employee can perform activities assigned to him/her. An employee has the facility of switching the roles (if s/he has multiple roles) and performs the tasks which appear in the in-tray and all the completed tasks are shown in his the out-tray. The employee has online access to the Employee Self services such as LTC, Leave, Reimbursement of Medical Claims, Telephone, Newspaper, Children Education etc.