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**Centres
of
Excellence**

Centres of Excellence

Introduction and Objectives

- ◆ The scheme of Centres of Excellence was started in 1983 by the Ministry to strengthen awareness, research and training in priority areas of Environmental Science and management.
- ◆ The following Centres of Excellence in specific areas have been setup so far by the Ministry which are as follows:
 - ✧ Centre for Environment Education (CEE), Ahmedabad on 'Environmental Education'
 - ✧ CPR Environment Education Centre (CPREEC), Chennai on 'Environmental Awareness'
 - ✧ Centre for Ecological Sciences (CES), Bangalore on 'Ecology of Western Ghats and Research'
 - ✧ Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore on 'Avian Ecology'
 - ✧ Centre for Environmental Management of Degraded Ecosystem (CEMDE), Delhi University, Delhi on Management of 'Degraded Ecosystem'
 - ✧ Foundation for Revitalization of Local health Traditions (FRLHT), Bangalore on 'Medicinal Plants & Traditional Knowledge'
 - ✧ Centre for Mining Environment (CME), Indian School of Mines, Dhanbad on 'Mining Environment'
 - ✧ Madras School of Economics (MSE), Chennai on 'Environmental Economics'
 - ✧ Tropical Botanic Garden and Research Institute (TBGRI), Thiruvananthapuram on 'Conservation of Tropical Plants'

Progress of activities undertaken by these Centres are as follows:

Centre for Environment Education (CEE), Ahmedabad

Introduction and Objectives

The CEE was established in 1984 as a Centre of Excellence on Environmental Education, supported by the Ministry. CEE's primary objective is to improve public awareness and understanding of the environment with a view to promoting the conservation and sustainable use of nature and natural resources, leading to a better environment and a better quality of life. To this end, it develops innovative programmes and educational material, builds capacity in the field of education for sustainable development, and undertakes demonstration projects in education, communication and development that endorse attitudes, strategies and technologies which are environmentally sustainable

Progress of Activities Undertaken Under Various Programmes

CEE implemented 134 projects under its 21 Thrust Areas during the year which are as follows:

Formal Education Programmes

Strengthening Environment Education in the School System

- ◆ This project of the Ministry is being implemented by CEE throughout the country, in collaboration with State Departments of Education to develop syllabi and material appropriate for the implementation of the Supreme Court order making Environmental Education (EE) compulsory at all levels of formal education. 27 States were assisted in developing proposals regarding text book writers' orientation, development and teachers training.

National Green Corps (NGC)

- ◆ NGC is an awareness programme initiated and funded by the Ministry aimed at spreading environmental awareness among school children and involving them in environment-related activities through eco-clubs. CEE is the Resource Agency in 15 states and two UTs, covering around 40,000

schools. A database on the schools and teacher-in-charge was created. Also conducted action projects for the 20 eco-clubs formed under the project “Dal Lake Conservation through Environment Education”.

Undergraduate Environmental Studies Course

- ◆ CEE for the second consecutive year, taught a semester-long three credit course to a batch of 240 fourth year B.Tech. students of Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT), Gandhinagar.

Environmental Education Activities in Schools

- ◆ EE activities were implemented and monitored in about 1700 schools in Andhra Pradesh, Karnataka and Delhi.
- ◆ A contest was conducted for selection of students from India for Stockholm Junior Water Prize.
- ◆ A summer camp on ‘Renewable Energy’ was organised in collaboration with Orissa Renewable Energy Development Authority.
- ◆ Prakriti EE Bus, run by youth volunteers, visited 75 schools in Gujarat.
- ◆ Environmental Days like Earth Day, World Environment Day, World Health Day, World Food Day, etc. were celebrated with children in a number of locations across the country.

Capacity Building

- ◆ Forty Diplomas in EE were awarded under the Green Teacher Distance Education Programme. Contact sessions were also organised for the 2006 batch.
- ◆ The three-month residential Training in Education and Communication for Sustainable Development was organised for participants from three countries.
- ◆ Sida-sponsored International Training Programme in EES was organized.
- ◆ Teacher training workshops were organised in various places benefiting over 1200

teachers.

- ◆ The ninth batch of the Distance Learning Programme in Communicating for Development was completed.

Youth Programmes

- ◆ The 4th South Asian Youth Environment Network (SAYEN) Regional Meet in Colombo was organised.
- ◆ Thirty case examples for the Sub-regional Sustainable Development Strategy for South Asia – A Youth Perspective were compiled.
- ◆ Youth groups documented Learnings from Tsunami from India, Indonesia, Sri Lanka and Maldives. For India, a profile of 22 organisations was made and 10 case studies in Kerala and Tamil Nadu were documented.
- ◆ Study of the EE curriculum in Nepal and Maldives was undertaken. Guidelines and report for Youth to Schools in these countries was prepared.

Media

- ◆ A Communication Strategy for Solid Waste Management for Mumbai was developed
- ◆ A Communication and Management Plan was developed for the East Kolkata Wetlands
- ◆ A film festival along with British Library and SAYEN for climate change related films was organised
- ◆ A website “Kids Green” for the Children was developed and updated every month

Interpretation and Experiencing Nature

- ◆ Interpretation Programmes in nine protected areas and nature parks in the country inter-alia including designing are being developed, writing, fabrication and installment of exhibits, dioramas, touch screens, postcards, brochures and posters etc. to communicate information of the environment in an interesting and interactive manner.
- ◆ CEE was appointed as Facilitating Institute by the Central Zoo Authority for developing a Master Zoo Education Plan for India’s zoos.

- ◆ Over 70,000 people visited CEE's Sundarvan Nature Discovery Centre.
- ◆ Thirty camps for about 1400 students and youth, in 14 camp sites was organised by CEE.
- ◆ The project Achieving Action in Waste Management (AAWaM) in four temple towns – Vrindavan, Puri, Ujjain and Tirupathi was implemented.
- ◆ A regional workshop for media specialists along with UNEP-ROAP was organised
- ◆ A training workshop for government officials and industry on implementation of Ozone Depleting Substances (ODS) regulations was also organised by CEE

Publications

- ◆ Developed four modules for teacher educators along with NCTE.
- ◆ Developed and disseminated fourteen resource materials in different languages to teachers, schools, students and communities.
- ◆ Brought out four new titles under the E&D Book Series.

C.P.R. Environmental Education Centre, Chennai

Introduction and objectives

- ◆ C.P.R. Environmental Education Centre (CPREEC) was established in 1989 to increase consciousness and knowledge about the environment and the major environmental problems facing India today, and to spread the message of conservation of the environment through education in both the formal and non-formal sectors.
- ◆ CPREEC has been conducting a variety of programme to spread awareness and interest among all sections of the public, by organizing training programmes, workshops, courses, surveys, exhibitions, and by raising awareness through action.

Activities undertaken so far

Since its inception, CPREEC has been working in the rural, urban and tribal areas of Andhra Pradesh, Karnataka, Kerala, Goa, Maharashtra, Orissa, Pondicherry and Tamil Nadu. Imparting environmental education and awareness to various cross-sections of people is the chief mandate of CPREEC. CPREEC's field offices in the fragile eco system of Nilgiri Biosphere Reserve and Andaman & Nicobar Islands cater to the needs of the tribal on forest eco system and marine ecosystem respectively.

Progress of activities undertaken during the year

Audio visual campaign

The video van of CPREEC travelled to remote villages and cities in the states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Awareness raising programmes were conducted for school children during day time and for villagers at a common place at night. A total of 204 programmes were conducted covering 40882 participants.

Training of teachers

A total of 134 Training programmes aimed at educating and sensitizing a wide constituency on environmental issues were conducted for Primary School Teachers and teacher- trainees based on State and Central Board Syllabi in the states of Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Orissa, Pondicherry and Tamil Nadu.

Biodiversity Conservation Education

The CPREEC organized 21 training programmes covering 634 participants for teachers and teacher trainees in the states of Andhra Pradesh, Karnataka, Pondicherry and Tamil Nadu during the year.

Women and eco development

Training programmes on "Women and Environment" and "Health and Nutrition" covering 1654 woman were conducted. Community smokeless chulhas were also constructed in several mid-day meal centers.



Fig 71. Training on paper bag making at CPREEC, Chennai

Nenmeli eco-model village

The CPREEC organized a training programme on Micro Watershed Management for students from Menzies College, La Trobe University, Australia at Nenmeli eco-model village during the year.

Nilgiri Biosphere Reserve Conservation Education

In all programmes totalling 31 and covering 1511 participates were organized for spreading environmental education for conservation of Nilgiri Biosphere Reserve, an ecologically fragile area spanning three states of Karnataka, Kerala and Tamil Nadu.

Andaman & Nicobar Islands Conservation Education

The Centre conducted 20 programmes for 956 participates in the ecologically fragile area of the Andaman & Nicobar Islands, imparting environmental education to school teachers, students, women and villagers on the importance of the marine ecosystem.

Publications

During the year, the following materials were published:

- ◆ Environmental quarterly newsletter ECONNEWS
- ◆ Journal of Environmental Education
- ◆ ENVIS Newsletter
- ◆ SDNP Newsletter
- ◆ Ecological Traditions of Kerala
- ◆ Ecological Traditions of Maharashtra
- ◆ Booklet on *En veetu thottathil*
- ◆ The Tree – A book of facts and activities
- ◆ Animals – Its their world too
- ◆ Fun at the beach
- ◆ The Young Environmentalist's Manual
- ◆ Environmental Concerns of India

- ◆ Environmental Education – A Teacher’s Kit
- ◆ Reprint of Environmental Laws of India – An Introduction
- ◆ Pamphlets on Water and Disease, Pollution and Health, Disasters and their management, Wildlife of India and Sacred Animals of India

Research and surveys

The following research and surveys were carried out during the year:

- ◆ Assessment of ground water quality at more than 100 locations in Chennai city.
- ◆ Survey on ambient air quality at two locations in Chennai city.
- ◆ Survey on Noise level at different locations in Chennai city using integrated noise level meter.
- ◆ Assessment of soil quality of Vellakalpatti village in Trichy District, Tamil Nadu.
- ◆ Ground water quality of Union Territory of Pondicherry.
- ◆ Assessment of ground water in and around Kanchipuram Town with regard to pesticides and potability.
- ◆ Rapid impact Assessment study of Pallikaranai with regard to air, water and sludge.

National Green Corps (NGC)

- ◆ Trainings were imparted at the 5th “Eco Resource Teachers Training Workshop” for teachers under NGC organized by the Goa State Council for Science & Technology at Panaji and at Margaon. Orientation programmes were also coordinated on water monitoring for school students of six NGC schools in South Goa and conducted training programmes for NGC teachers of Kerala and Orissa.
- ◆ The Centre also assisted in writing and distributing Textbooks on Environmental Science up to Std. XII apart from monitoring and evaluating of NGC activities in the state

of Andhra Pradesh and organized a refresher course for NGC Teacher Coordinators in the state.

Other programmes

- ◆ Two workshops for Foresters / Forest Range Officers in collaboration with the Tamil Nadu Forest Department were organised.
- ◆ A short term course on Environment and Sustainable Development for NGOs and industrial people at Chennai during September and another course on Water Analysis for NGOs and industrial people at Chennai during October were conducted.
- ◆ A project on Biodiversity Conservation through Capacity Building in collaboration with the British High Commission, New Delhi was implemented and a series of workshops for NGOs and Chief Judicial Magistrates were organized in the states of Tamil Nadu, Andhra Pradesh and Karnataka.



Fig 72. Training on vermicomposting pit by CPREEC

- ◆ A workshop on Coastal Regulation Zone (CRZ) Notification 1991 at Chennai for NGOs, panchayat members, villagers of Tsunami affected villages was organised in collaboration with the Department of Environment, Government of Tamil Nadu.
- ◆ Organized in collaboration with the Department of Environment, Government of Tamil Nadu
- ◆ The VATAVARAN 2006 film festival at Kalaivanar Arangam, Chennai, on October 5-7, 2006 was organized in collaboration with the Centre for Media Studies, New Delhi and Department of Environment, Government of Tamil Nadu,
- ◆ A workshop on “Environmental Film Making: Opportunities and Constraints” was organised during the year.
- ◆ The Centre also Co- sponsored the 4th Biennial Asia for Animals Conference 2007 organized by Blue Cross of India at Chennai on January 10-12, 2007.
- ◆ and Pereira, in southern India.
- ◆ Community Ecology and Population Genetics of Herpetofauna in the Western Ghats.
- ◆ Delimiting species boundaries among Hanuman langurs through collection of a combination of behavioral, ecological, morphological, and genetic data.
- ◆ Canopy gaps, regeneration and biodiversity in natural forests and plantations in the Western Ghats to address the implications of forest canopy gap size on biodiversity and regeneration.
- ◆ Interaction between invertebrates and a dominant understorey leguminous tree in the wet evergreen forests of the Western Ghats
- ◆ Studies on Calls of twenty cricket species constituting the nocturnal dry season acoustic community in Kudremukh National Park.
- ◆ Assessment of the impact of projected climate change on forest ecosystems in India.
- ◆ The structure and stability of tropical forests and their role in the carbon cycle in the context of future climate change.
- ◆ Participatory Natural Resources monitoring in selected villages in Uttara Kannada district of Karnataka

Centre for Ecological Sciences, IISc, Bangalore

Introduction and Objectives

The Centre for Ecological Sciences was recognized as a Centre of Excellence in the year 1982-83 to conduct research and undertake education and training in the broad area of ecology of Western Ghats.

Progress of Activities

The Centre carried out 28 research projects during the year under the broad themes of Biodiversity Conservation, Behaviour and Evolution, Climate Change and its Impact, and Eco-development. In addition, it offered several courses for PhD students, hosted visiting scientists and students from other institutions, and conducted several workshops/training programmes for stakeholders, particularly the forest department. A summary report of the main activities is as follows:

- ◆ Population genetic structure of gaur (*Bos gaurus*) through non-invasive sampling from three major populations, Nilgiris, Anamalai,

Sálim Ali Centre for Ornithology and Natural History (SACON), Coimbatore

Objectives

The Centre was established in 1990. The main objectives of the Centre are to design and conduct research in ornithology covering all aspects of biodiversity and natural history.

Activities undertaken

During the year, SACON has undertaken 30 research projects which deals with a variety of specialized topics related with ecosystems in general and with different biological components in particular. Species specific studies on birds and reptiles, and studies relating to ecosystems / community ecology, impact assessment,

environmental contamination, and environmental chemistry were the broad categories of studies. SACON also continued ENVIS programme on wetlands, and pursued its nature education programme intensively during the period.

Major activities of the centre during the year

- ◆ Studies in the Andaman & Nicobar Islands focused on rare and endemic birds such as the Andaman Crake. Valuable information on the data deficient Andaman crake is recorded. In situ & Ex-situ conservation programme for the Edible-nest Swiftlet being pursued since 1999 showed very encouraging and positive results, in terms of establishing new colonies and successful rearing of chicks. The results reveal that the strategy of making local communities responsible for the conservation and also the beneficiaries of the programme can be very fruitful in conserving the species.
- ◆ Species specific studies included studies on Grey-breasted laughing thrush, Indian Grey Hornbill, and House sparrows. The study on Grey-breasted laughing thrush, a globally near threatened endemic species, generated valuable information on its population, habitat use and threats, which can be used in developing a conservation strategy for the species. Among other specific studies the one on House Sparrow is expected to bring out insights into their reported fall in population from many urban Centres of the county. The study also examines the possible impacts of urbanization on the species. A study on adaptation and tolerance of birds to urbanization and one on plant-bird interactions were also in progress.
- ◆ The study on butterflies was undertaken in the Silent Valley National Park with specific inquiries on the relationship between forest gaps and butterflies diversity. Several rare species were recorded during the study.
- ◆ The four year ecological study on the mammals, birds, herpetofauna and butterflies in Teesta river basin was completed during



Fig 73. A flock of rosy pastor (*Sturnus roseus*), at Bhuj, Gujarat

- the year. The study documents the richness of the biodiversity of the area, and high number endemic and exclusive species. A nature awareness workshop was also organized targeting especially school and college students to communicate and emphasize the need for immediate conservation measures to protect the ecologically rich area.
- ◆ Documentation and ecological investigations of herpatofauna was undertaken in the Upper Vaigai plateau. The study is expected to document species distribution across altitudes, endemicy and habitat requirements. A research project on ecology of Python in Keoladeo National Park was also initiated.
 - ◆ As part of monitoring environmental contaminants in Indian avifauna, bird carcasses were collected from different parts of the country and analyzed for organochlorine residues. The results indicate various levels of contamination. Studies were also undertaken on fish collected from various sources with respect to pesticide residues.
 - ◆ The ENVIS Centre on Wetland Ecosystem continued to disseminate vast information on wetlands systems to various stakeholders.
 - ◆ A study undertaken on the structural and functional aspects of wetlands of the Indo-Gangetic plains focusing on the Utter Pradesh examined over 37 wetlands, and reported significant losses of the habitat since 1970-72. Another study on status of wetland and wetland birds in Tamil Nadu was undertaken and has already covered about 60 wetlands.
 - ◆ As part of environmental assessments, SACON undertook studies on Kundha pumped storage hydroelectric project, Mumbai Trans Harbor Sea Link project, Blewitts Owl habitats in view of the proposed bauxite mines in Arakku valley, and India based neutrino project at Masinagudi. The scopes of the projects were mostly limited to impacts on birds, other fauna and floral aspects.
 - ◆ During the year, SACON conducted a Vacation Training Programme for school children, a residential program that extended for 25 days. The People's Biodiversity Register through children, in collaboration with certain schools and Sálím Ali Nature Club Network was continued. As part of nature education programme, SACON organized guest lectures, nature awareness campaigns, nature camps, school nature club networks, children's ecology congress, Sálím Ali rolling trophy nature competitions and trainers training programmes.
 - ◆ SACON published about 15 research articles in peer reviewed journals or edited volumes, 10 research reports, and more than 30 seminar / conference papers during the year.

Centre for Environmental Management of Degraded Ecosystem, Delhi

Introduction

The Centre for Environmental Management of Degraded Ecosystem (CEMDE), under the aegis of School of Environmental Studies, Delhi University has been functioning as Centres of Excellence of the Ministry since 1997.

Activities undertaken during the year

- ◆ Fine Ore Dump (Deposit 5, 10,11 A) of Bailadilla Iron Ore project of National Mineral Development Corporation at Bachelí, Chattisgarh has been transformed in to a grassland ecosystem consisting of 20 grass species and 5-10 legumes through the restoration technology developed at the Centre. This grassland ecosystem will be developed into a tropical semi evergreen forest in a phased manner.
- ◆ A 10 acre plot of degraded forest belonging to 'Beed' area of Vidya Bhawan Society in Udaipur range of Aravallis was selected for ecological rehabilitation after eradication of weeds such as *Lantana*. Using the cut root stock method, *Lantana* has been successfully eradicated. In the first phase of ecosystems redevelopment a grassland having 14 grass

species has been successfully established; other native tree species will be introduced in a phased manner.

- ◆ A total of 30 acres of *Lantana* infested area distributed across Corbett Tiger Reserve, Satpura Tiger Reserve, and Kalesar National Park was selected for eradication of *Lantana* and restoration of weed free habitats to grassland ecosystems, primarily to enhance the trophic levels in the Protected Areas as well as enhance the biological productivity of the protected areas. *Lantana camara* has been successfully eradicated at the local level, using the innovative cut rootstock method developed by the Centre together with the physical control of new invasions brought out by generalist birds. The areas selected in Corbett Tiger Reserve have been restored to grassland ecosystems, which are now being used by different species of herbivores. The management of Corbett Tiger Reserve has already eradicated *Lantana* from 620 ha of

Lantana infested forestes using this technique. In Satpura Tiger Reserve and Kalesar National Park grasslands are being developed on weed free landscapes.

- ◆ A workshop on “Eradication of invasive weeds and habitat Restoration” was organized for Range Officers, Assistant Conservator of Forests, Divisional Forest Officers, etc. some of whom have already initiated *Lantana* eradication in areas under their jurisdiction. Another workshop of the International Symposium on the “Management of Invasive Weeds” was organized at the Centre. The workshop was attended by the Principal Chief Conservator of Forests, Chief Wildlife Wardens, Chief Conservator of Forests and other senior officials of different State Forest Departments. All the officials attending the workshop expressed that eradication of *Lantana* should be taken up on a priority basis using the innovative cut rootstock method developed by the Centre.



Fig 74. Spotted deer in Lantana grassland developed by CEMDE

Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore

Introduction and Objectives

Medicinal plants being recognized as an important national resource of economic and cultural value, which needed to be conserved and sustainably used. The Ministry setup a Centres of Excellence on 'Medicinal Plants & Traditional Knowledge' at FRLHT, Bangalore in October, 2002 to undertake six major activities viz.:

- ◆ Creation of a Bio-cultural repository of Medicinal plants of India
- ◆ Development of Educational Materials (on the rich traditional knowledge of the Medicinal Plants of India)
- ◆ Training to Village Botanists in identification and monitoring of Medicinal Plants
- ◆ Establishment of an ethno-medicinal demonstration garden in Bangalore
- ◆ Pharmacognostic studies on prioritized medicinal plants

- ◆ Preparation of Medicinal Plants Distribution Maps using GIS

Progress / Achievements during the year

Creation of a Bio-cultural repository of Medicinal plants

- ◆ Botanical expeditions were conducted in Southern India regions namely Javvadi hills, Kovilpatti, Kodaikanal, Tuticorin, Cuddalore, Mahabalipuram, Kanyakumari and Nilgiris (Tamil Nadu) & Bangalore district and Chitradurga district (Karnataka), North-Western Himalayas, Trans-Himalayan regions of Pangi and Lahaul valleys (Himachal Pradesh). North-west Plains of Ajmer and Jodhpur (Rajasthan), Gujarat and NE Himalayas (Arunachal Pradesh). A total of 942 field records were collected for identification of the specimens.
- ◆ Ninety four raw drug samples were collected (market samples), identified and accessed to the repository. A total of 60 authentic raw drug samples were collected from different



Fig 75. Sarsiva – an endemic medicinal plant of Southern India



Fig 76. *Ramvolfia serpentina* (L.) Benth Ex Kurz commonly known as Sarpagandha

fields and added to the raw drug repository. Seven hundred herbarium specimens with proper identification and authentication were selected, scanned at 300 dpi resolution and stored at a size of 500 to 700 kb. One thousand quality photographs depicting whole plant, plant part, exudates, population, habitat, etc. were selected, digitized (300 dpi), edited and appended to the main image library.

Development of Educational Material on the rich traditional knowledge of the Medicinal Plants of India

The following four CD's on medicinal plants of India were produced during the year:

- ◆ Plants in Charaka Samhita,
- ◆ Plants in Siddha system of medicine,

- ◆ Plants in Homeopathy system of medicine
- ◆ Plants in Unani system of medicine.

Another two CDs are at completion stage:

- ◆ A CD on 500 clinically important medicinal plants of India,
- ◆ A technical report on bio-cultural identities of 100 controversial medicinal plant used in Ayurveda.

Training to Village Botanists in identification and monitoring of Medicinal Plants

It has been recommended in policy circles that the training of para-taxonomists is an important priority for bio-diversity documentation and monitoring. A directory of the Village Botanists (VBs) of Tamil Nadu and Andhra Pradesh has been published for the VBs who were trained in the

previous years and formal training manuals for VBs have been prepared in Tamil and Telugu. During the year, a cadre of 35 village botanists from Karnataka, are undergoing training in identification of the medicinal plants of their eco-regions. The subjects on which they are being trained are plant morphology, identification, nomenclature, classification, herbarium methods, preparation of inventory of medicinal plants of their locality, forest types, traded medicinal plants, plants in Red List, CITES and Negative lists, field exposure to biodiversity rich and protected areas, patenting & intellectual property rights of Indian medicinal knowledge, national biodiversity act, documentation of medicinal and cultural information of plants, seed bank, nursery and propagation techniques. A website for village botanists has also been hosted at URL : www.villagebotanist.org

Establishing an ethno-medicinal demonstration garden

An area of 6.5-acres of land has been planted with around 750 medicinal plant species on the FRLHT campus. During the year, various thematic sub-gardens have been added in the main garden viz., Plants of important Ayurvedic formulations, Plants showing specific biotic associations like: Host specificity & Symbiosis, a garden of endangered species, traded plants used as Substitutes and Adulterants. The nursery in the garden has distributed over 20,000 numbers of seedlings to the households and institutions in Bangalore city. Signages have been introduced for all the new additions to the garden.

Pharmacognostic studies on prioritized medicinal plants

The lab carried out studies to compare 'Embelin' from *Embelia ribes* & *E. tsjeriam-cottam*, which are the two species used in trade. There was no difference in CHCl₃ and hexane extracts in HPTLC fingerprinting, and in HPLC profile of methanol extracts of the two spp. using C18 column, MeOH. However difference were found in general profile of methanol extracts of *Embelia ribes* and *E. tsjerium cottam* on RP-TLC plates on HPTLC. Studies conclude that there is no

significant difference between the chemoprofiles of *E. ribes* and *E. tsjeriam-cottam* and *Embelin* is found in both. It was therefore recommended that manufacturers can use both these species as sources of Vai-vidang

The Preparation of a draft monograph on 'Vidanga' is being finalised.

Preparation of Medicinal Plants Distribution Maps using GIS

The design and preparation of digital atlas of 1,000 short-listed medicinal species in respect of their distribution and eco-distribution is being completed by March 2007. The Geo Distribution Maps of 250 species of conservation concern are being prepared. Detailed Eco Distribution Maps of 80 species which give latitude/longitude values for the distribution of the species are also being prepared for endemic species. These maps also contain GIS layer on rainfall and altitude.

Centre of Mining Environment, Dhanbad

Introduction

The Centre for Mining Environment was established in 1987 in the Indian School of Mines, Dhanbad under the sponsorship of the Ministry for raising awareness, conduct training programmes and undertake research for improving Mining Environment.

Objectives

The prime objectives of the Centre are:

- ◆ To impart training to in-service field personnel in environmental science and technology with particular reference to environmental management in mining areas
- ◆ To carry out research in the field of mining environment
- ◆ Initiation of regular academic programmes leading to M.Tech. Degree in Environmental Science and Engineering, and
- ◆ To undertake consultancy and testing work to help mining and mineral industries in the neighbouring areas in solving environmental pollution problems.

Activities undertaken during the year

R&D Projects

The following projects were completed during the year:

- ◆ An assessment of overburden dump rehabilitation technologies
- ◆ Investigations into the Air Quality Status and its Impacts on Social Spectrum of some Coal Mining Areas of Korba Industrial belt of Chhattisgarh
- ◆ Impact of mining on the pattern of Land Use Change in Mines and their neighbourhood in selected Mining Areas of Jharkhand.

Academic Activities

The Centre offers post-graduate academic programmes of M. Tech. (Env. Sc & Engg.) and Ph. D. (Env. Sc. & Engg.). Over 150 students have successfully completed these programs and are well received by the various industrial, research, regulatory and consultancy organizations.

The Centre started B.Tech program in Environmental Engineering through IIT-JEE in 2006 (first of its kind offered by any National Institute). Currently 26 students are pursuing this course during the year.

During the year the Centre organized the following Environmental Conferences/ Seminars/ Workshop/Lecture Organised

- ◆ *“Peaking Oil Production - Facts and Challenges”* by Professor YP Chugh, Southern Illinois University, Carbondale, USA (December 4, 2006)
- ◆ Prof. S.K.Bose Memorial Lecture on “Environmental Concerns of Coal Mining – Broad View In Indian Context” by Shri Pravat Ranjan Mandal, Adviser (Projects), Ministry of Coal, Govt. of India (January 29, 2007).
- ◆ One Day Workshop on *“Life Skills and Solid Waste Management”* for school students to create awareness among the students about stark realities of life by appraising the bleak problems of solid waste management on January 31, 2007.

Environmental Awareness Programme

- ◆ The Centre celebrated World Environment Day on 5th June. Various activities carried out as part of environmental awareness were:
 - ✧ Tree Plantation: Few plants of medicinal value, fruit bearing and timber yielding were planted.
 - ✧ Sit and Draw Competition: About 150 students expressed their views through their art on assigned specific focal themes under various age-groups.

Madras School of Economics, Chennai

Introduction

The Ministry set up the Centre of Excellence on “Environmental Economics” at Madras School of Economics, Chennai on March 31, 2002. The research areas of the Centre include : Economic Instruments, Trade and Environment and Cost Benefit Analysis. The Centre is also responsible for the development and maintenance of a website on environmental economics.

Activities undertaken

The status of various programme undertaken by the Centre are as follows:

◆ Research Projects

The following research projects were completed by the Centre during the year:

- ✧ Trade and Environment: A study of India’s Leather Exports
- ✧ Ecotaxes on Polluting inputs and Outputs
- ✧ Utilisation of fly-ash by Brick Manufacturers – Environment Costs Vs. Benefits
- ✧ Another project on “Economic Analysis of EIA in India: Costs of delays, Impacts and Mitigation Measures is at completion stage

◆ Dissemination Papers

“Hedonic Price Method – A Concept Note” and “Public Disclosures – Using Information

to reduce pollution” have been completed and put up on the web-site. A third paper on “Economics of Municipal Solid Waste Management” is also being prepared.

◆ **Environmental Economics Website**

The Centre’s website <http://coe.mse.ac.in> was regularly updated in terms of research studies on environmental economics. Collection of data on existing economic instruments like the water cess was also initiated. Research reports, dissemination papers, and newsletter etc. have been uploaded in website.

◆ **Other activities**

In addition to the activities funded directly

by the Ministry, Centre faculty were also engaged in research projects funded by other agencies such as the Central Statistical Organisation, Central Pollution Control Board, Tamil Nadu Planning Commission, Indo-Canadian Environmental Facility, and South Asian Network for Development and Environmental Economics. During the year faculty presented papers at Conferences including the meetings of the International Society of Ecological Economics and the International Society of Environment and Resource Economics. A research scholar in environmental economics has also been awarded the Ph.D degree.