

CSIR NEWS

VOL 57 NO 15 15 AUGUST 2007



Team CSIR



NEERI signs Agreement for Kalpasar Project

GOVERNMENT of Gujarat, Narmada, Water Resources, Water Supply and Kalpasar Department has proposed to create a freshwater reservoir by closing the Gulf of Khambhat across Ghoga in Bhavnagar district and Hansot in Bharuch district through construction of 64 km long dam. It is envisaged to create a fresh water basin of more than 2000 km² which will receive water from twelve rivers flowing into Gulf including excess water from Narmada, Mahi, Sabarmati and Dhadhar. Gujarat Government is determined to ensure long term water security in Gujarat in the new millennium by giving concrete shape to Kalpasar project. The area of Gulf of Khambhat proposed to be closed, harbours some major and minor ports catering to various industries and trade. Ports of Hazira and Pipavav will be outside the domain of Kalpasar whereas Dahej, Bhavnagar, Dholera will be inside the Kalpasar lake.

This mega project, Kalpasar may have both positive and negative impacts on the existing ports within and outside the Kalpasar as well as may also affect future development of ports along the coastline in Gulf of Khambhat. Some other options are being worked out to keep the alignment of dam in such a fashion so that some of the ports can be kept outside the Kalpasar lake.



Dr Satish Shetye, Director, NIO and Dr Sukumar Devotta, Director, NEERI, exchanging MoU documents with Shri M.S. Patel, Secretary, Kalpasar Project; Dr Zingde (*extreme left*) is also seen

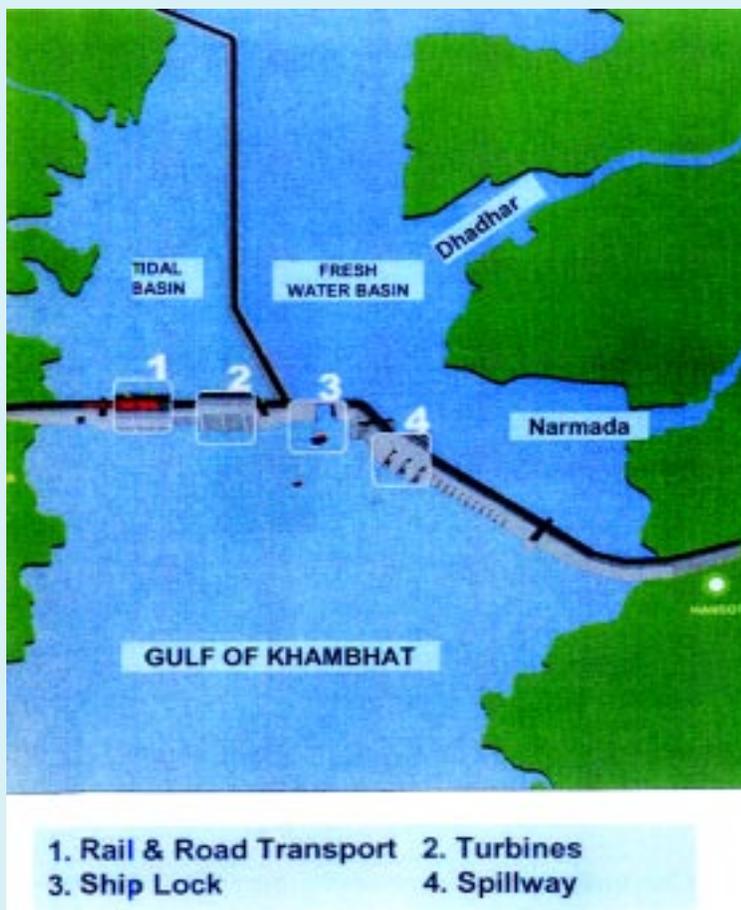


With a view to assess the potential impact of Kalpasar project on the existing and proposed port activities in the vicinity of Gulf of Khambhat, Kalpasar Department retained the National Environmental Engineering Research Institute (NEERI), Nagpur, the National Institute of Oceanography (NIO), Goa, consortium as consultant. CWPRS will be associated in advisory role. An agreement was signed between the Kalpasar department and NEERI at Mumbai Zonal laboratory of NEERI on 20 June 2007 for initiating the project studies. Shri M.S. Patel, Secretary, Kalpasar, Dr Sukumar Devotta, Director, NEERI and Dr Satish Shetye, Director, NIO besides senior scientists from NEERI, NIO and Senior officers of Kalpasar department were present on this occasion. NEERI would be the nodal agency for this project and will conduct the studies in association with NIO over a period of 15 months. The scope of work includes:

- Collection of the details of the existing port facilities within the Kalpasar project area from the competent authorities
- Collection of the details of planned port facilities in the coming years within the Kalpasar project area
- Study of the impact of Kalpasar project on the existing and the proposed port facilities
- Advantages/disadvantages of the Kalpasar project in respect of Ports
- Viability of maintaining Fresh water/Saline Water entities separately without getting mixed with each other while operating ship locks
- Suggesting remedial measures to be incorporated in the Kalpasar project for the sustainable continuation of the port facilities without compromising upon the envisaged benefits of the Kalpasar project along with the estimated costs.



Pre-agreement discussions between Kalpasar, NEERI and NIO officials



Conceptual plan of Kalpasar project



Technology Transfer

IIP & GAIL to Market a Technology Jointly

THE Indian Institute of Petroleum (IIP), Dehra Dun, entered into an agreement with the Gas Authority of India Ltd (GAIL) for jointly marketing the 'Natural Gas Liquid-To-Gas and Gasoline (NTGG) Technology'. The technology enables the conversion of natural gas liquid (NGL) to gas and gasoline and value-added products, viz, LPG-rich streams, gasoline blending stocks and diesel blending stocks. This agreement has formalized a joint technology ownership and will facilitate the commercialization of the technology jointly. The agreement is a result of the success of the pilot plant set up at GAIL's LPG plant at Vaghodia, Gujarat, running at a capacity of 8,000 tonnes per annum of natural gas liquid (NGL). A patent application for equal Intellectual Property Rights was filed in 2001 and the patent was to be shortly granted.

Dr M.O. Garg, Director, on behalf of IIP and Shri A.K. Purwaha, Director (Business Development), from the side of GAIL, signed the agreement.



Shri A.K. Purwaha, Director (Business Development), GAIL and Dr M.O. Garg, Director, IIP signing the Agreement documents

Commercialization of Sweetening Catalyst Technology

A trial run of sweetening catalyst developed by the Indian Institute of Petroleum (IIP), Dehra Dun, was being conducted in one of the largest LPG Mercox units of Reliance Industries Limited, Jamnagar. This unit is running with a throughput of 5520 MT/day which is a mixture of 80-85% FCC LPG and 15-20% Coker LPG. Although feed mercaptan varies from 400 to 700 ppmw, total sulphur in treated LPG is being maintained within 10-15 ppm as this goes to propylene recovery unit. The catalyst is performing very well under these rugged conditions. The process of licensing this catalyst production technology to Lona Industries Limited was in progress.

'Know-how for making bio-diesel from Vegetable oil feedstocks' transferred to M/s Armaco Consultants Pvt Ltd, Mumbai

The Indian Institute of Petroleum (IIP), Dehra Dun, has entered into an agreement with M/s ACPL, which details the modalities and the terms and conditions for the grant of license by CSIR/IIP to ACPL and its subsidiary FCPL for utilizing the know-how for making bio-diesel from vegetable oil feedstocks.

FACILITY

Bomb Calorimeter Facility at IIP

The Bomb Calorimeter Facility has been recently created at the Indian Institute of Petroleum (IIP), Dehra Dun. The instrument is capable of determining Calorific Value of all types of solid and liquid combustibles. It has many advanced features with automatic operations, such as firing, bomb rinsing, wash discharge etc.



Orchid House (Orchidarium) established at NBRI

IN order to make the existing plant diversity in the Botanic Garden of National Botanical Research Institute (NBRI), Lucknow, more diversified, educative and purposeful, an Orchidarium has been established

for the germplasm collection of this important group of plants i.e Orchids. The Orchidarium was inaugurated by Prof. H.Y. Mohan Ram, former Head, Department of Botany, Delhi University, Delhi, on 10 May 2007 in the presence of

several INSA members.

Orchids are a wondrous group of flowering plants known for their floral beauty, diversity and specific habitats. They belong to family Orchidaceae which is one of the largest angiospermic families. The

Some of the Orchids introduced at NBRI in flowering stage



A view of the Orchidarium of NBRI



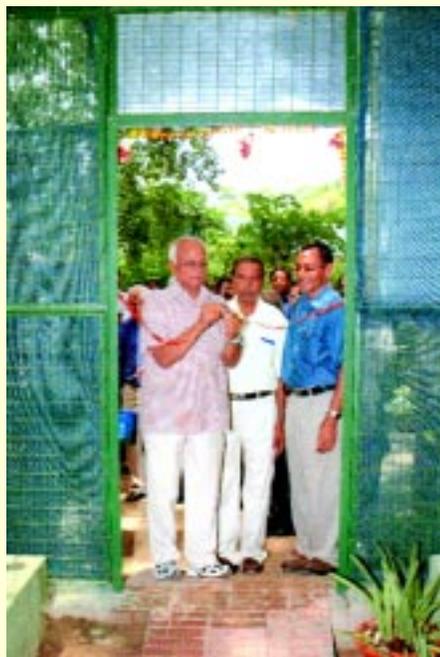
Paphiopedilum hirsutissimum (Lady Slipper's Orchid)



Dendrobium pauciflorum



Dendrobium chrysotoxum



Prof. H.Y. Mohan Ram, former Head, Department of Botany, Delhi University, Delhi, inaugurating the Orchidarium of NBRI



Dr A.K. Goel, Scientist, NBRI, showing the Orchids to Prof. H.Y. Mohan Ram and other dignitaries inside the Orchidarium

orchids are predominantly tropical, majority of the orchid species are distributed between 30° north and south of Equator. Orchidaceae includes nearly 860 genera and 25,000 species. They are perennial, epiphytic or terrestrial herbs, rarely lianas (Large Climbers) or rheophytic (Aquatic) in habit. Orchid flowers are spectacularly beautiful in wide array of colours and aroma. Some species with medicinal properties have been used in Indian systems of medicine.

India has a rich wealth of 170 genera and about 1200 species of orchids. North-East India harbours

maximum number of 835 orchid taxa. Progressive destruction of their habitats, over harvest for trade and other intrinsic biological reasons are the major causal factors for the threat of extinction faced by several orchid species in India. As many as 215 orchid species are endangered in India and 20 are feared to have become extinct. More than 150 taxa of Indian orchids are of floricultural significance especially in cut flower trade. Hardy species of orchids particularly from tropical and sub-tropical regions are being conserved in the Orchidarium.

A collection of about 50 orchid

species including the genera *Arachnis*, *Coelogyne*, *Dendrobium*, *Eria*, *Micropera*, *Paphiopedilum* (Lady's Slipper Orchids), *Peristylis*, *Spathoglottis*, *Phaius*, *Pholidota*, *Renanthera*, *Rhynchostylis*, *Vanda* and *Vanilla* has been developed for conservation and studies on their performance, acclimatization and floral biology. Some of the well known orchid cultivars like, *Arachnis* 'Apple Blossum', 'Annix- Black', 'Spider Orchid', *Aranda* 'Mosaic Magic', *Dendrobium* 'Soniard', *Vanda* 'Diana', 'John-club', 'Prolific', 'Tricolour', 'Miss Jaquine' can be seen in the Orchidarium developed by NBRI



Twenty-first AGM of ISAMPE

THE Twenty-first annual general meeting (AGM) of Indian Society for Advancement of Materials and Process Engineering (ISAMPE) was held at the National Aerospace Laboratories (NAL), Bangalore, on 22 June 2007. Dr Prahlada, Distinguished Scientist and CC R&D (SI) was the Chief Guest. In his keynote address, Dr Prahlada focused on the changes that the materials are playing in various areas like aerospace, health care, textiles etc. He felt that the scientific community should also look into the issue of biodegradability of composites, as this is a huge problem today. He also felt that Indian scientists should go about patenting with more vigour and zeal.

A memorial lecture is held during every AGM in memory of Late Secretary Vijay Zaveri. Dr Arvind Pandalai, Chairman, and MD, State Trading Corporation of India, delivered the Vijay Zaveri lecture this year. He elaborated on the growth of composites over the last few decades and how every area from Railways, automotives, infrastructure and aerospace was increasingly using composites. He brought out that the global aerospace community would spend 57 billion dollars from 2007-26. As part of the offset programme, he felt that there is great opportunity that the composite community (both R&D and Private Industry) could take advantage of. The inaugural function concluded with the distribution of the awards. Following the inaugural programme, a technical session with the theme 'Engineering Thermoplastic Composites' was held. Dr. Sanjay Charati from GE (India) gave a talk on 'Trends in Engineering Thermoplastic Composites'. He focused on the key technology developments, applications and market trends in the area of engineering thermoplastic composites, functional composites, hybrid composites and natural fibre based composites.

The second talk was delivered by Dr Soumendra K. Basu, GM (India) on 'Bioplastics and Biocomposites in Automotive Industry'. He spoke on the work going on in the area of bioplastics, biofibres and biocomposites. He highlighted the advantages of the state of the art in biomaterials over traditional petroleum plastics and their composites. He concluded by stating that India being rich in Biomaterials, has a great opportunity to become a global leader in this field.

Workshop on Green Chemistry

BEING green has long been a battle cry of environmentalists and is becoming a strong marketing tool for technology transfer in different industrial sectors especially chemical sector. Green chemistry and its principles for application is the key tool for developing a green technology. In India, awareness about green chemistry and green technology amongst students of graduate and postgraduate levels, and a certain strata of academicians and process industries is poor.

The Workshop on Green Chemistry has been held in different parts of the country in pursuance of propagating the themes of chemistry for the sustainable development and also encouraging the academic institutions for inclusion of Green Chemistry as a part of curriculum. In continuity of the above-mentioned programme, Task Force on Green Chemistry constituted by Department of Science and Technology recommended for organizing a Workshop on Green Chemistry at National Environmental Engineering Research Institute (NEERI), Nagpur. The academicians, researchers, and scientists from the states of Chattisgarh, Madhya Pradesh, Maharashtra, and Orissa participated in the programme during 13-14 February 2007. The eminent speakers included Prof. S. Chandrasekaran, IISc, Bangalore; Dr J.S. Yadav, Director, Indian Institute of Chemical Technology, Hyderabad; Prof. M.K. Choudhary, IIT, Guwahati; and Dr Sukumar Devotta, Director, NEERI.

Summer Science Workshop on Science, Imagination and Discovery (SID - 07)

THE Central Electronics Engineering Research Institute, (CEERI) Pilani, and the Birla Institute of Technology and Science (BITS), Pilani, jointly conducted a nine-day summer workshop on Science, Imagination and Discovery (SID-07). Thirty seven school students, aged between 12-17 years, from schools located in Pilani, participated in the workshop. This workshop provided the participants an opportunity to know more about emerging fields in basic sciences such as astronomy, biology, chemistry, mathematics and physics and applied aspects such as biotechnology, IC technology, material science, MEMS and nanotechnology. It provided them an opportunity to extend their knowledge and discover their individual interests. The workshop also provided ample opportunities to the participants for a holistic growth to bring out their talents and discover their interests.

Delivering her welcome address, Prof. Suman Kapur, Chief, Community Welfare and International Relations Unit, Coordinator, from BITS, expressed that the inspiration for this workshop came from the speech of the then Hon'ble President Dr A.P.J. Abdul Kalam, delivered on 30 March 2007, during his visit to BITS.

Prof. L.K. Maheshwari, Vice



Prof. L.K. Maheshwari delivering his address to the participants.
Seated on dais (from left) are: Prof. Suman Kapur, Dr Rajesh Luthra, Dr Chandra Shekhar and Dr V.K. Dube

Chancellor, BITS, gave a brief insight about the workshop to the participants. Dr Rajesh Luthra, Head HRD, CSIR, elaborated on the need of development of science and the opportunities available to the talented students for pursuing a career in science. Dr Chandra Shekhar, Director, CEERI, in his special address highlighted the importance of experiential learning. Dr V.K. Dube, Scientist and Coordinator from CEERI expressed that this workshop was first of its kind and would provide a model for conducting similar workshops countrywide.

The workshop had a series of multidisciplinary lectures delivered by scientists and professors from both the institutes. In all there were 30 lectures and 30 movies interspersed with laboratory visits.

The topics for lecture included waves, oscillations, astronomy, micro-electro-mechanical systems, VLSI design, integrated circuit fabrication technology, silicon lattice and unit cells, semiconductor devices, microwave tubes and biosensors. These were supported by slide shows. Amongst notable educative lectures, Dr S.N. Joshi, Dr G. Eranna, Shri Raj Singh, Shri Anil Kumar and Dr Kamaljit Rangra presented specialised talks that were greatly admired by the participants. There were interactive sessions when students came up with their questions and curiosity. 'The role of Robotics and future technologies could reshape the entire set of things prevalent today', was one of the most popular lectures. It was delivered by Prof. Ravi Mittal, Dean, BITS.



Interesting talks on biomathematics by Dr Sandip Banerjee and God's numbers by Dr Ashish Upadhyay from BITS, evoked spirited discussions among students. Lectures on things of daily use such as mobile, Internet, internal combustion engines, electrical switches as well as on space exploration were other key highlights of the workshop.

Movie shows on IC fabrication technology showed various steps involved in its processing such as chemical, diffusion and implantation. Students were shown various laboratories in both the institutes. The workshop provided the students a chance to meet researchers and to see the working in the laboratories. A very lively demonstration on microorganisms by Dr Ashish Das and his team members was another highlight of the workshop. Practical demonstration on molecular approach of life was followed by lectures on the chemistry of life, immunisation, vaccination, and blood typing. Different models and animation helped the participants to learn faster than the usual practice of textbook style. Students were given hands-on experience on gel for DNA and protein separation. Movie shows on evolution of life on earth and space were widely appreciated. They also came to know more about the efforts behind great discoveries and inventions of the modern day world. More movie shows on different planets, developmental

biology, chips and cell structure added to the scientific curiosity about life in laboratory to the students. Students also understood the need to protect the environment and learned more about the greenhouse effect. Movie on environment and heat conservation was thought provoking for all the participants.

The workshop was helpful in raising the bar of scientific orientation of students and liking for science. Development of scientific attitudes and temperament is essential for the development of Science. Dr Usha Manjunath came up with very interesting and interactive session with the students when they were told to express themselves in five words. Students came up with brilliant ideas and expressed themselves intelligently. Group exercises increased their participation and infused team spirit in them. Inventors and Inventions who revolutionised our life styles were also discussed. Students showed a keen interest on various selected topics as the workshop widened their concepts on DNA fingerprinting to energy conservation. Scientific quiz, daily reporting and presentations of the students on the last day reflected their attitude towards learning and keen interest in this workshop.

Students were also told about the various fellowships available to pursue a career in Science. Prof. K.E. Raman and Dr G. Raghurama,

Deputy Directors, BITS, told the students about various options available in science and learning from environment, respectively. The development of scientific skills requires patience, creativity, hard work and commitment. Students were encouraged to sharpen their scientific knowledge and practical approach to day-to-day scientific problems and find their solutions. It provided the students an opportunity to talk to experts and to hone their scientific skills and knowledge in pure and applied sciences. A positive feedback from the students reflects that the workshop was highly successful in increasing their exposure to laboratory life as well as inoculating the concept of scientific culture in the young minds, igniting the scientific temperament in them and polishing their developing minds with scientific fervor.

The concluding day was dedicated to participants for giving their presentations and feedback. Smt. Gayatri Maheshwari was the guest of honour who presented certificates and mementoes to the participants. Prof. L.K.Maheshwari Vice Chancellor, BITS and Dr Chandra Shekhar, Director, CEERI, concluded the proceedings with motivating messages for the participants. Dr Suman Kapur presented highlights of the workshop while Dr V.K. Dube proposed the vote of thanks.

Training Programme on fish culture in treated parboil rice mill effluent

RICE, is one of the major crops in Gondia district of Maharashtra. There are over 200 rice mills in the district of which 85 are generating parboil rice. Most of these mills release untreated wastewater, containing high organic load, to open land or nearby water bodies leading to environmental deterioration and inconvenience to local people. The National Environmental Engineering Research Institute (NEERI), Nagpur, adopted a biotechnological approach under a DBT sponsored project towards parboil rice mill wastewater treatment and recycling of treated wastewater for aquaculture, resulting in generation of additional source of income to surrounding local people. For this NEERI has constructed a parboil rice mill effluent treatment plant in the premises of Gupta Rice Mill, Gondia. The units comprise equalization tank, followed by UASB, aeration, settler, sand filter and finally fish pond. Anaerobic digestion in a single-stage UASB bioreactor, followed by aerobic treatment has enormous potential for stabilization of parboil rice mill wastewater. The treated wastewater (suspended solid < 100 mg/l, BOD < 100 mg/l and COD < 250 mg/l) was found to be suitable for fish culture specially of breathing fishes.

Under the project NEERI organized a training programme on "Fish culture in treated parboil rice

mill effluent" for local 64 SC/ST people in the premises of Gupta Rice Mill, Gondia on 14 March 2007. The programme was attended by Shri V. Bute, District Collector, Gondia; Dr T. Chakrabarti, Director grade Scientist; Dr G.V. Mulmuley, Scientist; Dr Santosh Zargar, Research Fellow; Shri S.R. Dubey, District Fisheries Development Officer, Gondia; Shri Suraj Gupta, the owner of Gupta Rice Mill, Gondia; and Shri S.N. Gulhane, Nisargika, Nagpur. Shri Bute inaugurated the training programme as well as the effluent treatment plant.

Delivering his inaugural speech, Shri Bute lauded the work carried out by NEERI. He also requested NEERI to do research towards solving the disposal problem of rice husk ash (RHA), which is generated in large quantities by rice mills and is presently being dumped to nearby open land causing environmental and health problems. Dr T. Chakrabarti during his keynote address, explained the background of the project and benefits to be incurred by the local people from the outcome of the project. He added that in Gondia, more than nine thousand tonnes of freshwater fishes are produced annually and by culturing fish in treated parboil rice mill wastewater can increase the production.

Dr Mulmuley emphasized that the cost of food for fish culture constitutes 50-70 percent of the total

production cost and, amongst the different nutrients required, protein is the costliest. Under natural condition, fishes fulfill their demand of protein by grazing on plankton. Necessary nutrients, required for proper growth for plankton, are available in the treated wastewater. He further added that the concept of single treatment plant followed by a fish pond at select Rice Mill, Gondia, by NEERI can be expanded to Common Effluent Treatment Plant (CETP), owned by an association comprised of a group of rice mills, where larger amount of wastewater can be treated at a minimum cost and subsequently used for aquaculture practices.

Shri Suraj Gupta, owner of Gupta Rice Mill and Shri S.R. Dubey expressed that implementation of the technology in other rice mills would elevate the economic status of the backward classes in the region. Shri Gupta assured, on behalf of the Rice Mill Owners' Association, that all cooperation in this regard will be extended for implementation.

A brochure on the technology and fish culture was released for free distribution to all the trainees. Dr Santosh Zargar successfully organized the programme and proposed a vote of thanks.

The programme was coordinated by Dr T.K. Ghosh, Deputy Director, NEERI under DBT sponsored project.



Delegations to NAL

THE important delegations to National Aerospace Laboratories (NAL), Bangalore, during the past few months include:

Delegation from CAE

A team of two scientists led by Prof. Yi Xiaosu, Director of S&T Committee, National Key Lab of Advanced Composites (LAC, BIAM), Beijing Institute of Aeronautical Materials, visited NAL during 5-7 June 2007, under the bilateral cooperation between NAL and CAE (Chinese Aeronautical Establishment) in civil aeronautics. Prof. Yi presented an overview of the BIAM's activities. Dr. Tong Jianfeng, Sr. Engr. (LAC, BIAM) presented the work on structural ceramics and ceramics for intermediate temperature solid oxide fuel cells (ITSOFC). Presentations were also made by scientists of Materials Science Division, on the on-going projects and one new proposal for BIAM in the area of materials. Subsequently, the CAE delegation visited *SARAS* hanger and other divisions. The BIAM members met senior scientists of Advance Composite Division and Materials Science Division and had useful discussions on projects for bilateral cooperation between BIAM and NAL.

Team from Bombardier Aerospace

A team from M/s Bombardier Aerospace, Montreal, Canada, visited NAL on 7 June 2007 to discuss possible co-operation in technology development projects relating to aircraft components. The team had discussions with Director and senior scientists and later visited the Advanced Composites Division and Structural Integrity Division.

Israel Delegation

An Israel delegation visited NAL on the 31 May 2007. The teams from NAL and Israel made brief presentations and had detailed discussions. Subsequent to the discussions, the two teams felt it necessary to have an MoU/NDA between NAL and DDR&D, Israel to have collaborative work. The areas identified were advanced ceramic radome materials, thermoelectric materials and high strain materials for joint co-operation.

Delegation from DOW Chemicals, USA

A seven-member team from the Dow Chemicals International Private Ltd, USA, visited NAL on 31 May 2007. A brief introduction about NAL's activities was presented to the delegation. In the course of discussion the delegation evinced interest in collaborating with NAL in the areas of composites and FRP products.

Visit of Engineers from BAeHAL Software

A team of engineers from BAeHAL Software Ltd, Bangalore, visited NAL on 21 June 2007. The team was welcomed by Dr M. N. Sathyanarayana, Jt. Head, KTMD. Later the team visited the various facilities of NAL.

NIO publishes a Monograph on Mandovi-Zuari Estuaries

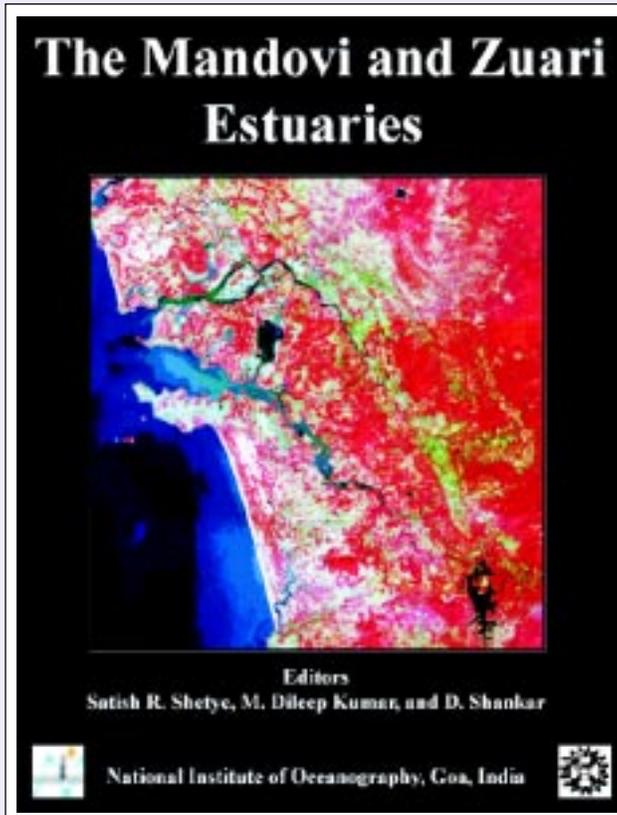
A book on 'The Mandovi and Zuari Estuaries' was released at the Workshop on Indian Estuaries at the National Institute of Oceanography (NIO), Goa, by the former Director, Dr B.N.Desai on 25 June 2007. Since the establishment of this institute, these estuaries are of interest to the researchers at NIO and therefore these are the most studied estuaries in India. The primary objective of the book is to compile the information and knowledge that exists on the Mandovi and Zuari estuaries.

The first chapter of the book describes the environment in which the Mandovi and the Zuari exist. Covered in this chapter are the geometry of the terrain over which the estuaries flow, the rainfall and runoff they experience, the winds, etc. Chapters 2, 3, and 4 provide an overview of the basic physics of the two estuaries: nature of tides, efforts made so far to simulate them in numerical models, and characteristics of stratification and mixing. These are followed by chapters that examine the fundamentals of biology and chemistry of the estuaries. A distinct characteristic of the estuaries is the annual cycle that they exhibit. Chapter 5 describes the annual cycle of nutrient concentration, Chapter 6 of phytoplankton,

Chapter 7 of zooplankton, and Chapter 8 of benthic macrofauna. A motivation for estuarine research around the world stems from the desire to keep them healthy and free of pollutants and human interference. Chapters 9, 10, and 11 describe three pollutants that are of special relevance to the Mandovi and the Zuari. Chapter 9 describes the observed concentrations of iron

been used extensively in the past for transporting people and goods. Over the last five decades they have been used to transport iron and manganese ore. The estuaries have also been used to discharge sewage, most of it raw. Chapter 11 discusses the distribution of bacteria that are linked to sewage disposal. Chapter 12 discusses characteristics of wetlands found along the banks of the two estuaries. Known locally as *khaznam*, these wetlands have sustained a special form of agriculture and fishery for almost ten thousand years. The chapter describes how *khaznam* work and their relationship with the estuaries. The book concludes with a chapter that discusses future directions for research on the two estuaries. The editors hope that the contents of this book will encourage further studies of the Mandovi and Zuari, and of our country's several other estuaries.

This book has been dedicated to Dr Mahesh Zingde, Scientist-in-charge, Regional Centre NIO at Mumbai on his 60th birthday. Studies on estuarine and coastal regions of India have been the hallmark of his professional career. Dr Zingde's contributions have greatly improved our knowledge of the structure and functioning of the estuaries in the states of Maharashtra and Gujarat.



and manganese, whose source lies in the extensive iron and manganese mines of Goa. Chapter 10 discusses distribution of TBT, which is used widely in building of ships and in their maintenance. The channels of the Mandovi and the Zuari have



National Technology Day Celebrations at NCL, NEERI, NEIST and NGRI

THE National Technology Day (NTD) celebrations at CGCRI, NAL and NBRI were covered in 30 July 2007 issue of *CSIR News*.

Presented in this issue are brief accounts of NTD celebrations at the National Chemical Laboratory (NCL), Pune; the National Environmental Engineering Research Institute (NEERI), Nagpur; the North-East Institute of Science & Technology (formerly RRL), Jorhat, and the National Geophysical Research Institute (NGRI), Hyderabad.

NTD and Prof. Tilak Memorial Lecture at NCL: 'Innovations in Rural Eye Care Delivery: Aravind Model'

Dr P. Namperumalsamy, Chairman, Aravind Eye Care System and Aravind Eye Hospital and PG Institute of Ophthalmology, Madurai, delivered the National Technology Day Lecture and the fifth Professor B.D. Tilak Memorial Lecture at the National Chemical Laboratory (NCL), Pune, on 18 May 2007. Prof. Tilak was the Director of NCL from 1966 to 1978 and was recognized as a pioneer in establishing a close relationship between NCL and chemical industries. Prof. Tilak contributed significantly to the country's march towards self-reliance in chemical technology. Under his dynamic leadership NCL contributed to the establishment of several industries based on NCL know-how. He also contributed immensely to the preparation of science and technology plan of chemical industry.

Dr Namperumalsamy in his talk titled 'Innovations in Rural Eye Care Delivery: Aravind Model' spoke about the Aravind Eye Care System that seamlessly integrates community health and outreach

programmes, education, hospital management, research and manufacturing. He said that, 'though, we had state-of-the-art eye care system available, we started with the community eye care system. We mostly depended on rural community support and grew in volume both in quantity and quality offering an eye care at affordable price'. He shared the innovations that went in managing the eye care delivery, particularly for the rural community. He informed that of the 45 million blind people in the world, 12 million are in India. Most of the blindness in India is curable and also preventable but sufficient facilities and faculties are not available to take care of these blind people. And even if the ailment is identified, for most of these people the treatment is not affordable. Under these circumstances, the government alone can not cater to



Dr Namperumalsamy delivering Prof. Tilak Memorial Lecture

the need of the people. Dr Venkataswamy started an 11-bed hospital in a rented building in 1976 with a team of five people. In the course of three decades this has grown into an institution that manages hospitals at five locations, with a bed strength of 3600, in Tamil Nadu including one in Pondicherry. He also informed that the sixth hospital is coming up in the neighbouring State of Andhra Pradesh. Speaking about the innovations in managing the hospital, he said that, 'we not only



train the people in eye care but also provide managerial skills to them to start new hospitals on the role model of Aravind. Three such hospitals have already started functioning one each in the State of Uttar Pradesh, West Bengal and Gujarat. Aravind has also trained paramedics who visit the villages and provide primary and secondary stage treatments on the spot and refer the patient to the base hospital for the tertiary treatment, if required, cutting down doctors' precious time. Aravind has strong communication system and videoconferencing as well as telemedicine facility in place by which the doctors at base hospital provide the correct treatment to the patient who visits eye care camps and vision centers.

The benefits of innovations have now extended beyond the boundaries of India. Aravind has signed MoU with Chinese universities and Chinese doctors visit Madurai not only for training in surgery but also to study the Aravind model of hospital management to start similar institutions in China. Aravind is also working in Bangla Desh with the Grameen Bank to start five hospitals that will be called Grameen Bank Aravind Eye Care Hospitals. To fill-up the gap of non-availability of trained doctors, Aravind has started Aravind Eye Hospital and Post Graduate Institute of Ophthalmology at Madurai. 'Instead of waiting for the patients to come to us, we go to the patients to identify and screen them in the form of eye camps', informed Dr Namperumalsamy. In 2006, five

hospitals of Aravind put together conducted 1400 camps. Aravind Eye Care System accounts for 40 per cent of cataract surgeries in the State of Tamil Nadu. The process developed by Aravind enables its doctors to conduct, on an average, 2000 surgeries per year against an average of 250 - 300 per doctors per year in other hospitals. Aravind owes its success to a team of about 900 paramedical workers. Aravind has carried out 2.7 million surgeries till the year 2006, and of these, 250,000 cataract surgeries were conducted in the year 2006 alone. Every day about 6000 out-door patients are attended to and 850 surgeries are conducted. Aravind is supporting 210 hospitals in the country for capacity building and the number is increasing.

Dr Namperumalsamy further informed that, 'having developed the Aravind Model, we are not keeping it to ourselves, we are disseminating this knowledge within and outside the country; we have set up the Aravind Institute of Community Ophthalmology for sharing the knowledge and expertise. We could not continue to give the intraocular lens that costs 75 - 100 dollars to the patients'. To make available the lens at affordable cost, Aravind started manufacturing these lenses and brought down the price to 2 dollars a piece, and still makes profit with the large volume. These lenses are being exported now to 136 countries.

Dr S. Sivaram,

Director, NCL, in his welcome remarks remembered the pioneering contribution of Prof. Tilak to NCL, Chemical Industry and society. Prof. Tilak transformed NCL from academic laboratory to the laboratory that delivered the values to the chemical industry and society. Prof. Tilak, a distinguished organic chemist, came to NCL at a very crucial time to change its history after a very illustrious career as Professor of dyestuff chemistry and technology at University Department of Chemical Technology, Mumbai. Dr Sivaram further said that, 'we at NCL celebrate National Technology Day by remembering Prof. B.D. Tilak, one of the builders of this laboratory. On this day we invite distinguished personalities who have dedicated their life to the well-being of the society through application of science and technology. Prof. Tilak himself devoted two decades, after retirement as Director of NCL, applying science and technology for the benefit of the society. While introducing Dr Namperumalsamy to the audience, Dr Sivaram said that the organization he heads was formed with the noble vision of illuminating the darkened lives of



Dr Sivaram giving welcome remarks



NTD Celebrations

the millions suffering from visionlessness. The Aravind Eye Care System is not only the largest eye

care facility in the world, but also most productive and efficient institution performing more than 200,000 cataract

operations per year at an average cost of Rs. 1250/- per operation including cost of the intra-ocular lens.

Celebrations at NEERI

National Technology Day was celebrated at NEERI on 14 May 2007. Prof. S.T. Deshmukh, Director, Shri Ramdeobaba Kamla Nehru Engineering College (RKNEC) was the Chief Guest on this occasion.

While addressing the gathering, Prof. Deshmukh spoke on the topic “**Challenges of Change**”. He said that though recent technological advances have influenced social, economical and educational structures, there is need to undertake an in-depth study to assess the impacts occurred due to these technological changes. This will not only help in generating new ideas but will also contribute towards widening the imagination of engineers and scientists to fulfill the social objectives, he added. Prof. Deshmukh said that these changes should be accepted as a challenge, since technologies have changed from analog to digital. Particularly speaking with reference to



Prof. S.T. Deshmukh delivering the NTD lecture; Seated on the dais (from left): Dr S.P. Pande, Dr Sukumar Devotta and Shri A. Ghosh

environment, he said that the concept of sustainable development has resulted in development of environmentally sound technologies. Prof. Deshmukh said that there is need of close co-operation among specialists working in different multidisciplinary areas for solving complex environmental problems. In spite of treating science, technology and development as three independent components, an integrated approach should be adopted, he added. Prof. Deshmukh said that scientists should produce such indigenous self-reliance technologies which satisfy basic

human needs and have harmony with the environment and local cultures to ensure the long-term sustainability.

Earlier in his welcome address, Dr Sukumar Devotta, Director, NEERI, spoke about the importance of National Technology Day. He drew attention towards the latest World Competitiveness Report and informed that India is 27th and China is 15th in the rankings in the Competitiveness Report. To improve our ranking in the World Competitiveness Report, Dr Devotta advocated that value addition in the existing technologies is must. He advised the scientists to transform resources into technologies and earn maximum GDP. Sustainability can be achieved by improved environmentally sound technologies only, he added.

Dr S.P. Pande, Scientist & Head, R&D Planning Unit, introduced the Chief Guest and Shri A. Ghosh, Scientist, R&D Planning Unit, proposed a vote of thanks.

Celebrations at NEIST

Prof. (Dr) K. Kannan, the Vice Chancellor of Nagaland University, graced the occasion as the Chief Guest and delivered the Technology

Day Lecture on an interesting subject ‘A tale of two technologies : Biotechnology’. Dr P.G. Rao, Director of the institute welcomed

the invited guests and staff members and described the significance of National Technology Day as India’s great achievement in harnessing

nuclear energy and technology, space technology, aviation technology, communication technology, biotechnology, petrotechnology, etc. Dr Rao also highlighted NEIST's contribution to the development of cement technology, new industrial material, development of oil field chemicals, coal energy utilisation and value addition, drug and pharmaceuticals, etc.

Prof. Kannan spoke on importance of biotechnology as a modern frontier science that is greatly helping in treatment of diseases and drug development. He gave historical development of antibiotics like penicillin, streptomycin, the synthesis of insulin for control of diabetes and importance of modern stem cell research and its application in controlling cancer disease. The discovery of plasmids in cell systems in 1973 in USA was a great breakthrough and new challenges have come up before the scientists to develop medicines and food crops using the modern biotechnological methods. Prof. Dr Kannan also lauded the different technologies developed by NEIST scientists.

Prof. Kota Harinarayana delivers NTD Lecture at NGRI



Dr V.P. Dimri, Director, NGRI, presenting a memento to Prof. K. Harinarayana

Prof. Kota Harinarayana, Rajramanna Fellow at the National Aerospace Laboratories (NAL), Bangalore, delivered a lecture on 'Innovation in Exploration Technologies' at the National Geophysical Research Institute (NGRI), Hyderabad, on National Technology Day (NTD) on 11 May 2007.

Prof. Harinarayana said that technology is an interface between science and society. He pointed out that the technology gap between developed and developing countries is increasing, 80% of high tech exports originate from developed countries and 93% of the patents are owned by developed countries. He further stated that technoware, humanware, inforware and orgware are the four components of technology and opined that technology management is the process of moving a new idea from the mind to the customer and also building and leveraging technological

capabilities for growth. He commented that in ever changing world it is the learner who inherits the future, others live in a world that exists no longer.

He dealt with fundamental problems in ground penetration radar technique and also touched the various factors leading the exploration technology gaps in the Indian context and light detection ranging application. He underscored the need for integrated approach in dealing geophysical problems and in developing innovative technologies. He emphasized the importance of coordinated efforts between geologists, geophysicists, geochemists and also in remote sensing, modeling, simulation and visualization disciplines in exploration technology.

Earlier Dr V.P. Dimri, Director, NGRI, introduced the speaker to the dignitaries and other invitees.

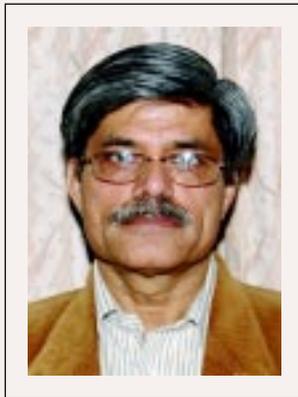
Dr Y.J. Bhsakara Rao, Scientist, NGRI, proposed the vote of thanks.



Dr Rakesh Tuli awarded J.C. Bose Fellowship

DR Rakesh Tuli, Director, National Botanical Research Institute (NBRI), Lucknow, has been awarded the J.C. Bose Fellowship. This prestigious fellowship was instituted on 5 August 2005 by the Department of Science and Technology (DST), Government of India, to give a boost to scientific research in the country. The Fellowship is awarded to active, performing scientists and engineers below the age of 60 years in the country for their outstanding performance and contributions.

Born on 21 September 1953, Dr Tuli is a leading molecular biologist, microbial geneticists and biotechnologists of the country. Under his leadership and guidance; molecular biology and genetic engineering research at NBRI got



recognition at national and international level. During his distinguished research career, he has made remarkable contributions to the basic and applied research in the area of Transgenic Plants for Agricultural Biotechnology, Molecular Genetics for Crop Resistance to Biotic Stresses, Biochemistry and Molecular

Genetics of Agriculturally and Medicinally Important Plants, Edible and Plant-based Vaccines, Genomic Diversity in Plants and Computational Analysis, Biological Nitrogen Fixation, Secondary Metabolism and Regulation of Gene Expression. He is especially recognized for developing the first Indian Bt cotton technology for the development of commercialisable insect resistant Bt-cotton cultivars. In recent years his group has published a number of research papers in some of the best journals in the area of regulation of gene expression in plants, computational designing of promoters and identification of novel genes related to secondary transformation of phytosterols.

Dr Kalachand Sain

DR Kalachand Sain, Scientist E II and Head, Gas-hydrates Group of the National Geophysical Research Institute (NGRI), Hyderabad, has been appointed as a Bureau Member of the International Lithosphere Program (ILP) for the term 2006-2010 by both

International Union of Geological Sciences (IUGS) and International Union of Geodesy and Geophysics (IUGG). Dr Sain has to serve the IUGG, and liaise with the Vice President and General Secretary of IUGG and other scientific bodies with a view to providing benefit to the society. The ILP cooperates with

IUGS and IUGG on the International Year of Planet Earth (IYPE) and is leading the IYPE theme DEEP EARTH.

The next Bureau meeting was organized in Perugia, Italy, during the course of the IUGG General Assembly during 2-13 July 2007.