



CED News

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THE NEWSLETTER OF CENTRE FOR ENVIRONMENT AND DEVELOPMENT

CED STEPPING TO 22nd YEAR

The Centre for Environment and Development (CED), established on 6th May 1993, is an autonomous research and development, training and consultancy organisation. During the last two decades, CED has grown as a National Institute of Excellence with its Head Quarters at Thiruvananthapuram, Eastern Regional Campus at Bhubaneswar, and Regional Centre at Hyderabad. CED has completed 95 projects sponsored by various International and National agencies. CED works under six Program Areas viz., i) Natural Resources and Environment Management; ii) Water, Sanitation and Health; iii) Climate Change and Energy Studies; iv) Urban and Rural Studies; v) Culture and Heritage Studies; and vi) Information and Knowledge Management.

CED possesses a Quality Management System compliant with ISO 9001:2008. CED's growth is evident by the following recognitions it received.

- *Centre of Excellence on Solid Waste and Wastewater Management of Ministry of Urban Development, Government of India*
- *National Key Resource Centre for Drinking Water and Sanitation of the Ministry of Drinking Water and Sanitation, Government of India*
- *Regional Resource Agency of Ministry of Environment and Forests, Government of India*
- *Accredited Agency of Government of Kerala for Solid Waste Management*
- *Empanelled Agency of Ministry of Urban Development, Government of India, for the Preparation of City Development Plan (CDP) and DPR on Water Supply, Sanitation, Sewerage and Drainage, for ULBs.*
- *Recognised as a Scientific and Industrial Research Organisation (SIRO) by the Department of Scientific and Industrial Research, Government of India*





GIS Base Maps for 37 ULBs of Andhra Pradesh

As part of World Bank-Andhra Pradesh Municipal Development Project (APMDP), preparation of GIS Base Maps for 37 ULBs using High Resolution Satellite Data such as Quick Bird and Geo-Eye, DGPS Survey, Topographical Survey, available Master Plan Maps and Secondary data are progressing. 41 layers will be generated for each ULB. The Project covers an area of approximately 1000 sq.kms.



From the Executive Director's Desk



From its humble beginning in 1993 with three staff members and limited facilities, CED has grown today into a National Institute with formidable strength and credibility. CED has successfully carried out 95 projects funded by national and international agencies and has been presently working on another 30 projects. CED's activities spread across the states of Andhra Pradesh, Jharkhand, Bihar, Pondicherry, West Bengal, Maharashtra, Gujarat, Madhya Pradesh, Sikkim, Jammu and Kashmir and Odisha apart from Kerala.

The Governing Council and staff members of CED take this opportunity to place their deep gratitude to various institutions / agencies and individuals for their support and trust in our continued growth. We hope and solicit the continued support of all in our future endeavour.

Dr. Babu Ambat



River Bank Mapping and Sand Auditing in Kannur

CED has completed River Bank Mapping and Sand Auditing of Valapattanam, Kuppam, Thalassery, Perumba and Mahi Rivers. Quantification of the sand availability was done using total station survey and field studies. Mapping of the sides of the rivers in the

midland catchment area up to CRZ was done by field survey and land use, drainage, slope and aspect, soil, etc are mapped in village cadastral maps and then converted to GIS maps.



BIOTECHNOLOGY PROGRAM LAUNCHED

Biotechnology and Molecular Genetics have opened up numerous opportunities of research and offers enormous promises and implications for ecological security. In order to cater the societal needs by blending the conventional technologies with advanced state of art technology, CED has launched the Biotechnology Program with a full-fledged laboratory. The major thrust areas of the program are Plant Tissue Culture, Environment Biotechnology, Molecular Genetics and Microbial Biotechnology. Under the program, Biotechnology Research, Training and Outreach programs are proposed.



National Key Resource Centre for Water and Sanitation

The Ministry Drinking Water and Sanitation, Government of India, recognised Centre for Environment and Development as a National Key Resource Centre to help the States and their agencies in capacity building of different stakeholders of both rural water and sanitation sectors. KRC's activities include Imparting training on Solid and Liquid Waste Management in the rural areas; Design training modules and materials based on TNA; Research and set up pilots to evolve latest technologies and to validate them; Capacity building for Key Resource Persons at the State and District level; and to provide technical guidance to Communication and Capacity Development Units (CCDUs)

Projects Initiated

- CED is involved in a project to prepare "Action Plan for Non-Revenue Water in Jammu City" under the ADB funded Jammu & Kashmir Sustainable Urban Infrastructure Project. CED mainly utilises GIS, Remote sensing and GPS technologies to carryout this study.
- CED has initiated activities to prepare Detailed Project Reports for Water Supply in 11 cities of state of Odisha.
- CED is also involved in the design and implementation of Effluent Treatment Unit in Kollam.

"Identification and Demarcation of Ecologically Sensitive Areas of Moist Deciduous Forests with respect to Regeneration in Western Ghats, Kerala"

The Kerala State council for Science, Technology and Environment (KSCSTE) recently granted financial assistance to identify and demarcate moist deciduous forests of state with respect to regeneration status. Outcome of this two year research will help the State Forest Department to better manage the Moist Deciduous Forests of Kerala.



JICA aided Kerala Water Supply Project on the final stage

CED is one of the members of the consortium of consultants led by the Tokyo Engineering Consultant Co. Ltd., Japan for providing consultancy services to the JICA aided Kerala Water Supply Project. The project envisaged implementation of five independent water supply schemes namely Water Supply Improvements to Thiruvananthapuram City Region; Water supply to Meenad and adjoining villages in Kollam district; Water supply to Cherthala and adjoining villages in Alappuzha district; Water Supply Improvements to Kozhikode city region; and Water supply to Puttuvam and adjoining villages in Kannur district. Out of five schemes, except the Kozhikode scheme, all the other four schemes are already commissioned. The major components of the projects are construction of intake well, water treatment plant, laying of transmission mains and distribution system and ground level and overhead reservoirs. The Consultancy Group provided engineering design, estimate preparation, DPR preparation and Bid documents for all the above mentioned components as well as construction engineering services during the construction of the project.

The project also includes Institutional Strengthening and Change Management activities which consist of Complaint Redressal System, Networking of Kerala Water Authority Centres, other IT and IT-Enabled services and Capacity Building and Training Programs.



Fishery Management Plan for Sindhudurg Coast

Considering the ecological and economic importance of the Sindhudurg Coastal and Marine Ecosystem (SCME) and the threat it is facing mainly due to unsustainable fisheries and tourism, the Ministry of Environment and Forests (MoEF) Govt. of India, initiated the project 'Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the Sindhudurg Coast, Maharashtra', in collaboration with UNDP - GEF and Government of Maharashtra. The present intervention aims to give stimulus to coastal and marine biodiversity conservation measures, while improving livelihood of coastal communities through appropriate intervention.

CED has completed the project "Development of sustainable fisheries management plan for the Sindhudurg Coast in Maharashtra" under this programme.



Comprehensive Capacity Building Program (CCBP) for ULBs

CED is the Centre of Excellence of MOUD, Government of India and MOUD entrusted CED to conduct the Comprehensive Capacity Building Program (CCBP) for Urban Local Bodies (ULBs) as part of the CCBP component of JnNURM. Accordingly CED has been involved in a number of Capacity Building and Training Programs for various functionaries of ULBs in Odisha, Jharkhand, Bihar, West Bengal and Kerala covering elected representatives, senior level officers and implementing officers. A total of 2373 urban functionaries have been trained so far under the program. CED also prepared training modules on different themes.



World Water Day 2014 Celebrated

One day brainstorming workshop was held on the occasion of World Water Day 2014 at CED Headquarters. Many eminent scientists and technocrats participated in the event. Er. N.T. Nair, Chief Editor, Executive Knowledge Lines, made a presentation on "Energy and Water: Interconnected and Interdependent".

ADB Sponsored Project Innovations For More Food with Less Water

CED is involved in a project "Innovations For More Food with Less Water" - a pilot project in the states of Gujrat, Madhya Pradesh and Sikkim. The project involved identification of technology to reduce water use in irrigation without affecting the production. This is an international project covering 3 countries namely India, Bangladesh and Nepal.

Inventorization and Characterization of Hazardous Waste Categories in AP

Centre for Environment and Development, Green Origin Ventures Pvt Ltd, Hyderabad and Lahmeyer GKW Consult GmnH (Lahmeyer) jointly carried out a study for Inventorisation and Characterisation of Hazardous Wastes in Andhra Pradesh sponsored under the World Bank and operated through Andhra Pradesh Pollution Control Board. As part of the project, detailed surveys were conducted in sectors covering Bulk drugs, Power plants (thermal, biomass based), Cement plants, Sponge iron plants, Metal finishing units (galvanizing, electroplating), Petroleum refineries, Common Effluent Treatment Plants (CETPs) and Treatment, Storage, Disposal Facilities (TSDFs). The project aimed at Creation of a detailed geo-referenced database of the industrial facilities relevant to hazardous waste on the territory of Andhra Pradesh; and Suggesting plan of actions in the light of findings of hazardous waste inventory in respect of waste minimization, proper collection, storage, treatment and disposal.

National Environment Awareness Campaign

National Environment Awareness Campaign (NEAC) is a flagship program of MoEF, Government of India for the past twenty eight years to raise awareness on environment and also to establish the links between lifestyle and sustainable development. The activities of the campaign included both action and awareness components, highlighting a focal theme selected every year. The MoEF has appointed the CED as the Regional Resource Agency (RRA) for coordinating the campaign in the State of Kerala, Lakshadweep and Minicoy Islands, in 2006.

CED has been co-ordinating various activities of NEAC in Kerala and Lakshadweep since 2006 and nearly 300 - 360 agencies participated every year in the program.



It is always an interesting exercise or challenge for the thinking minds to visualize the future of current technologies. It is also true that the future will not be a linear projection of the past. The wiser souls in the laboratories in the universities and research centers are deeply involved in their chosen tools and paths for predicting the future of the planet earth, nations and people. Obviously, a smaller group is pondering about the future trends of geospatial technologies or GIS.

In the 90's for example, the desktop version of GIS solutions, took the technology over to smaller enterprises and institutions outside of the developed world and to developing countries, such as India. Alongside the introduction of high speed computing and speedier internet connectivity and above all release of the GPS services to the public domain fuelled addition of newer tools and areas of application of GIS. Alongside, the passion about open GIS that permeated and pervaded across the academia and enthusiasts flowered a far more and larger population of younger minds attending the graduate classes.

The past decade inaugurated several new avenues and areas of GIS technology applications and solutions. GIS, once promoted as visualization, modeling and mapping tool of natural resources, environmental and census data, is now evolved into an indispensable analytical tool of environmental and weather data, tax mapping

OIL-EATING BACTERIA: A Tool to Cleaning Up Oil Spills

Scientists have been attempting to harness the abilities of oil-eating bacteria for decades even pursuing genetic modifications to enhance their abilities. Recently scientists have decrypted the effectiveness of two types of oil-eating bacteria, which could be used in the future to help combat oil spill disasters. According to a report written by scientists from the Helmholtz Centre for Environmental Research and the Helmholtz Centre for Infection Research in the peer-reviewed journal Applied and Environmental Microbiology, *Alcanivorax borkumensis* converts hydrocarbons into fatty acids which then form along the cell membrane. New insights on the bacteria *Oleispira antarctica* are important to understand their adaptation to low temperatures and could help in mitigation strategies for oil spills in polar seas or the deep sea, according to comments made by an international team in the peer-reviewed journal Nature Communications.

Until now, chemicals have often been used to clean up oil disasters, to break up the oil/water emulsion, making oil more soluble and thus removing it from the surface water. The new insights about the two oil-eating bacteria are a small, but important step forward in the search for alternatives to the toxic dispersants that have been used so far.

(Courtesy: <http://dailyfusion.net>)

FUTURE OF GIS: THIS DECADE & AHEAD

to enhance and optimize revenue collection to the government, land-holding-mapping, as well as mapping of public lands.

The countries in the European Union and N. America innovated several newer applications of the GIS-GPS couple. We are amazed by the inroads of GIS-GPS technologies in mapping incidence and distribution of crime in large cities, spatial distribution of road accidents, frequencies and hence evolving methods of mitigation or reduction, potential forest fire zones, city fires, utility network, design, and management and electoral rezoning of the cities and towns. Nationally, one other significant application of GIS tools is in speedily and efficiently redrawing the boundaries of electoral districts or constituencies - a task needing revisit at least once in ten years.

In India, CENSUS 2011 made use of GIS solutions in the states of TN and Punjab at least in an experimental mode. The population level of our nation (+80 crore voters and 540 MPs), calls for a redrawing the boundaries of electoral districts or constituencies for a better representation in the national parliament and also in state assemblies.

For this task of redrawing the boundaries of parliament, assembly or the three-tier Panchayats, spatial mapping of census data and creation of a digital map of the country with all the Panchayat wards/divisions need to become a reality. Undoubtedly a stupendous task of several thousand person-years, considering three lakh strong directly elected representatives. In fact a move in this direction is already in place under the NSDI Mission and State Spatial Data Initiatives.

In summary, country needs readying of a huge workforce tens of thousands of trained GIS personnel to fulfil the goals of NSDI. The CED silently participates in this national campaign by offering one month advanced training in GIS technology applications to various groups, in an ESRI-ArcGIS and ERDAS Imagine environment.

RIP. Dr. Roger Frank Tomlinson



Dr. Roger Frank Tomlinson, the 'father of GIS', passed away in San Miguel de Allende, Mexico on February 9, 2014. Born in England in 1933, Dr. Tomlinson was known as a visionary geographer who conceived and developed the first GIS for use by the Canada Land Inventory in the early 1960's. His innovation has

enabled the development of today's modern GIS technology applications and solutions.

Tomlinson was the author of the one of the most widely read books Thinking About GIS: Geographic Information System Planning for Managers and the 5th edition of this popular book was published in 2013.

IPCC Finally Acknowledges Its "Himalayan Blunder"

As per latest IPCC Report, Himalayan glaciers, the third pole, probably will not disappear that fast as predicted earlier and will be around for another couple of centuries. The Billion plus people living in the plains of Ganga, Brahmaputra and Indus rivers can securely live as these rivers are not drying up any soon (Courtesy: Pallava Bagla).

Harvard Physicists propose a Device to Capture Energy from Earth's Infrared Emissions to outer Space.

Transform Earth's IR emission to Direct Current ?

Yes indeed, according to researchers in the Harvard School of Engineering and Applied Sciences and especially of the team led by Federico Capasso. After a day long exposure to heat from the Sun, by end of the day, the earth is warmer than the frigid vacuum around and beyond and starts emitting IR energy spaceward. And this IR can be harvested with suitable technologies. This group at Harvard, has plan to harvest energy from this out going infrared emission headed to the outer space. "This heat imbalance could be converted to direct current" writes Federico Capasso (leader of the team) in a paper appeared this week in the Proceedings of the National Academy of Sciences. "The mid-IR has been, by and large, a neglected part of the spectrum," says Capasso. This team proposes an approach similar to photovoltaic power generation, but with a difference. The contemplated device generates electric power by releasing infra red-light. (Courtesy: Caroline Perry)

Terrestrial Carbon sequestration

The implementation of effective land use practices to build up carbon stocks in terrestrial ecosystems is a proven technology for reducing the concentration of carbon dioxide (CO₂) in the atmosphere. Forests are a significant part of the global carbon cycle, and in the past few decades, the world's forests have absorbed as much as 30% (2 petagrams of Carbon per year) of annual global anthropogenic CO₂ emissions - about the same amount as the oceans. Carbon sequestration is highest in young forests and will tend to reduce as forests reach maturity. The higher rates of carbon sequestration in salt marshes, soils of tidal salt and lower ethane emissions makes coastal wetlands more valuable Carbon sinks than other ecosystems in a warmer World. Wetlands represent the largest component of the terrestrial biological carbon pool and thus play an important role in global carbon cycles. This terrestrial wetland carbon pool, globally stores 44.6 TgC/yr with an average carbon sequestration of 210 g CO₂ m⁻² yr⁻¹. Salt marshes globally absorb about 0.1GtC per year.

Mangroves play a significant role in sequestering of carbon and reducing greenhouse gases. Global distribution area of mangroves consists of 157,000 km² to 160,000 km². The global carbon burials of mangroves are approximately 18.4 TgC yr⁻¹ and therefore they have the potential of providing an efficient sink of CO₂.

Kepler-186f: First potentially habitable Earth-sized planet confirmed

Using NASA's Kepler Space Telescope, astronomers have discovered the first Earth-size planet namely 'Kepler-186f' orbiting a star in the "habitable zone" - the range of distance from a star where liquid water might pool on the surface of an orbiting planet. The discovery confirms that the Earth-sized planet exist in the habitable zone of stars other than sun. Kepler-186f resides in the Kepler-186 system that is also home to four companion planets, which orbit a star half the size and mass of the sun. The host star, Kepler-186, is an M1-type dwarf or red dwarf star relatively close to our solar system, at about 500 light-years and is in

the constellation of Cygnus.

Kepler-186f orbits its star once every 130-days and receives one-third the energy from its star that Earth gets from the sun, placing it nearer the outer edge of the habitable zone. On the surface of Kepler-186f, the brightness of its star at high noon is only as bright as our sun appears to us about an hour before sunset. (Source: <http://www.nasa.gov/kepler>; More information: "An Earth-Sized Planet in the Habitable Zone of a Cool Star," by E.V. Quintana et al. Science, 2014).



Chileans drank arsenic contaminated water as early as 1000-1500 years ago

A team of scientists of UCLA discovered Arsenic in the hair of a mummy and in soil around the site, in Chile, S. America. Skin appearance also indicated arsenic poisoning. This finding confirms that members of the Pre-Colombian civilizations in northern Chile (including the Incas and the Chinchorro culture) were exposed to arsenic contaminated water. Using a variety of hi-tech instruments, the scientists analyzed hair samples of a 1000-1500 yr old mummy from the Tarapaca valley of Atacama Desert. The scientists reported ".... high concentration of arsenic in the mummy's hair came from drinking arsenic-laced water and, possibly, eating plants irrigated with the toxic water". (Courtesy: Joseph Castro and LiveScience)



Online Global Freshwater Biodiversity Atlas Launched

An online Atlas of freshwater biodiversity presenting spatial information and species distribution patterns has been launched at the Water Lives Symposium (29th January 2014), bringing together European Union policy makers and freshwater scientists. Freshwaters cover less than 1% of the Earth's surface yet are home to 35% of all vertebrate species but the habitat is declining at an alarming rate mainly due to anthropogenic activities. The online Atlas adopted a book-like structure allowing easy browsing through its four thematic chapters; 1) Patterns of freshwater biodiversity, 2) Freshwater resources and ecosystems, 3) Pressures on freshwater systems and 4) Conservation and management.

The Atlas is an output of BioFresh - an EU-funded project and is edited by a pan-European group of freshwater science and conservation experts from 12 research institutes, and is supported by GEO Biodiversity Observation Network (GEO BON), the International Union for Conservation of Nature (IUCN), the Global Water System Project (GWSP), Conservation International (CI), Wetlands International, The Nature Conservancy (TNC) and the World Wildlife Fund (WWF). The Atlas is a resource for better, evidenced-based decision making in the area of water policy, science and management (Source: IUCN).

The Gaia Hypothesis and James Lovelock

The Gaia Hypothesis proposed in 1970's by Lovelock, (1919-) along with Lynn Margulis pictures the earth as a living organism or a like a self regulating system. In his 2006 book, "The Revenge of Gaia", Lovelock wrote that ".... Only a handful of the teeming billions now alive will survive". An exhibition of James Lovelock's contributions to the field of Medicine, Environmental Science and Planetary Science opened in London, on April 9, 2014. The exhibits included the electron capture detector invented by Lovelock in the 70's that enabled measuring of atmospheric levels of chloro-fluorocarbons or the Ozone destroying green house gas (Courtesy: Philip Ball and Nature Magazine).

Scientists identified the world's most irreplaceable protected areas

A study by an international collaboration of scientists [from the Centre for Functional and Evolutionary Ecology (CEFE), International Union for Conservation of Nature (IUCN) through its Species Survival Commission and World Commission on Protected Areas, the World Conservation Monitoring Centre (UNEP-WCMC), and Bird Life International] has identified the protected areas most critical to preventing extinctions of the world's mammals, birds and amphibians. The study, published in the 'Science' journal, calculated the 'irreplaceability' of individual protected areas, based on data on 173,000 terrestrial protected areas and assessments of 21,500 species on The IUCN Red List

of Threatened Species. The analysis compared the contribution each protected area makes to the long-term survival of species. Seventy-eight sites (comprising 137 protected areas in 34 countries) have been identified as exceptionally irreplaceable. Together, they harbour the majority of the populations of more than 600 birds, amphibians, and mammals, half of which are globally threatened. Many of these irreplaceable areas are already designated as being of 'Outstanding Universal Value' under the UNESCO World Heritage Convention. These sites include Ecuador's famed Galápagos Islands, Peru's Manú National Park, and India's Western Ghats (Source: IUCN).



GIS Training Program

CED initiated short term training program on GIS and Remote Sensing in 1996 at Thiruvananthapuram and has now completed 110 batches. The Advanced Certificate course in Geoinformatics is a one month course and provides theory, practical and hand on training in GIS, GPS and Image Processing. This training is also offered in our CED Eastern Regional Campus at Bhubaneswar and Regional Centre at Hyderabad. Since CED is involving many projects using GIS, GPS and Image processing of satellite data, the participants of the course are also being exposed to the application of these technologies in different project sectors.



Kerala Environment Congress 2014

CED has been organizing many outreach programs to disseminate the knowledge among different target groups. The Centre is organizing Kerala Environment Congress (KEC) every year since 2005 on specific themes related to environment and development. So far nine congresses were held with the themes viz., Coastal & Marine Environment; Forest & Environment; Wetlands of Kerala; Environmental Sanitation and Health; Water Resources of Kerala; Solid & Liquid Waste Management; Energy & Environment; Agriculture & Environment; and Culture, Heritage & Environment respectively. KEC acts as platform for information and knowledge sharing between scientific community and policy decision makers, to discuss the major environmental issues the states are facing.

The 10th Environment Congress (KEC 2014) is scheduled to be held on 22nd - 23rd August 2014. The focal theme of the Congress is 'Urban Environment and Development'.

CED jointly with Human Development Foundation initiated Odisha Environment Congress (OEC) in 2010 and 4 OEC's are completed so far.

(For details contact e-mail: kec@cedindia.org or phone: 0471 2369721).

- **The 22nd Foundation day of CED on 6th May, 2014**
- **Next batch of Advanced Certificate Course in Geoinformatics from 12th May, 2014.**
- **'Meet the Scientist' Program for the month of May on 24th, 2014 at CED Headquarters.**

CED to launch the 'WELL' Program

The formal launch of Water and Energy: Literacy and Learning (WELL) Program is planned during the occasion of the foundation day celebrations of CED on 6th May, 2014. In the coming decades, the nation will face the grim reality of scarcity of water as well as shortage of energy. Further, water and energy are two sides of a coin as hydropower, thermal and nuclear power need water in plenty to generate energy.

Interestingly these twin factors of water and energy are fueling global climate change a slow but steady manner threatening the future climate and future of humanity, ecosystems and ecology.

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This newsletter is an in-house publication that provides glimpses of activities by CED and latest innovations in science and technology.

We look forward to your valuable suggestions and comments.

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