



Natural Resource Management : The Emerging Trend

In a developing country like ours natural resources are the main stay of economy, providing sustenance to a large section of people. In spite of all scientific and technological development we still have to depend on natural resources like land, water and biomass for our very existence. The natural resource management science is passing through a critical phase. Over emphasis on economy and technology treats natural resources as commodities and develop management systems accordingly. Over exploitation, misuse and inappropriate use of resources and indiscriminate human intervention in a biophysical set up has pushed the earth system outside the stable environmental state. Many of the natural resource systems have crossed planetary boundaries. On an average the humanity is withdrawing resources 20% faster than what the Earth can renew and is consequently depleting our ecological assets. Therefore the challenge is to reorient policies, institutions and practices in the use of natural resources, reduce negative trade off and balance conservation with development. This requires knowledge based decision support across scales and a systematic analytical frame. A policy may be oriented accordingly to cater to this emergent need.

An alternate form of resource management is now being advocated which draws from systems approach and evolutionary theory. It strives to match utilization and conservation and to internalize the conservational aspects within the gamut of development process, thereby contributing to sustainability. In other words focus of natural resource management is on sustainability encompassing ecologic, economic and social concerns. Avoiding irreversibility is an important step in the present approach of natural resource management and it can serve as a useful link between ecological science and public policy decisions on resource use. The present approach is fundamentally interdisciplinary, and combines historical, comparative and experimental dimensions at scales appro-

Continued in page 2



Hon'ble Chief Minister of Kerala Shri. Oommen Chandy inaugurating the World Wetland Day 2012 celebrations at the Kanakakkunnu Palace by lighting the lamp. Shri. K Muraliedharan MLA, Prof. V. N. Rajasekharan Pillai, Executive Vice-President of KSCSTE and Ex-Officio Principal Secretary, Science & Technology Department, Ms. Meera Mehreshi, Additional Secretary, Ministry of Environment and Forests, Government of India, Dr. Siddharth Kaul, Advisor, Ministry of Environment and Forests, Dr. K. K. Ramachandran, Member Secretary, KSCSTE and Dr. N. P. Kurian, Director, Centre for Earth Science Studies are also seen.

World Wetland Day 2012

The National Celebrations of World Wetland Day 2012 was jointly organised by CESS and KSCSTE at Kankakunnu Palace, Thiruvananthapuram on 2 February 2012. As part of the celebrations a seminar on Wetlands and Tourism was inaugurated by the Hon'ble Chief Minister of Kerala, Shri. Oommen Chandy. The Chief Minister in his inaugural address stated that Kerala will give special consideration to set up the State Wetland Authority mooted by the Centre. During his inaugural speech, he stressed the need for paying serious attention to utilize our rivers, lakes and wetlands for the development of the State. He declared that the Wetland Institute will be headquartered at Kottayam and would also direct the Vembanad Development Authority to make Vembanad Lake and the six rivers debouching in to it viz. Achenkovil,

Manimala, Meenachil, Muvattupuzha, Pamba and Periyar pollution free. Shri. K. Muralidharan MLA presided over the function. Ms. Meera Mehreshi, Additional Secretary, Ministry of Environment and Forests, Government of India, Dr. Siddharth Kaul Advisor, Ministry of Environment and Forests and Dr. N. P. Kurian, Director, Centre for Earth Science Studies spoke on the occasion. Prof. V. N. Rajasekharan Pillai, Executive Vice President of KSCSTE and Ex-Officio Principal Secretary, Science & Technology Department, welcomed the gathering and Dr. K. K. Ramachandran, Member Secretary, KSCSTE proposed the vote of thanks. Certificates and trophies were distributed by the Hon'ble Chief Minister to the winners of the painting, elocution and quiz competitions held for school children on 1 February 2012

Director Speaks



Beach sand mining, prevalent in some of the coastal locations, can have far reaching implications on the beach-nearshore system. In spite of the negative impacts, sand mining from beach becomes a dire necessity when the beach sand comprises of valuable minerals. Sediment budgeting is a very useful tool in such situations to estimate the extractable volumes and assess the possible impacts of sand mining. The ledger of sediment budget consists of a variety of sources and sinks. In all coastal systems worldwide the sediment inputs to the beach-nearshore system are mainly from three sources: (i) the sediment moving up/down the coast in the longshore direction, (ii) sediment moving across the beach and innershelf and (iii) sand from land sources. Depending on the presence/absence of each of these and their magnitude, different scenarios of impact on the beach-nearshore system can occur.

In order to provide insight into the volumes of sediment being brought inshore by natural wave and current processes and to understand the impact of sand mining on beach-nearshore system CESS carried out a pioneering study on sediment budgeting for the Chavara coast of Kollam district in Kerala, which is world famous for its rich placer deposits, during 1999-2002. Field measurements and computer models were used to determine the volumes of sand arriving at the mining sites by natural processes so that detailed sand budget could be established for a sustainable sand extraction. The studies depicted a balanced sedimentary system described as "step-ladder". In this system dynamic sediment equilibrium is maintained by an annual net northerly sediment flux in the nearshore, driven by wave induced currents, balanced by a net southerly flux in the innershelf driven by wind-induced currents transporting wave-induced sediment suspension. The two counter directional sedimentary pathways are linked by cross-shore bridging transport. Mining of beach sand will have least impact on the beach as long as it is equal to the rate of onshore transport. Once the mining exceeds this replenished quantity, it will show its impact on the beach, leading to caving in of beach.

Due to the strong connection between beach and innershelf, the impact of beach sand mining will have its impact on the innershelf as the source of the replenished beach sand is the innershelf. When sand is extracted from the beach the volumes available to be returned to innershelf in the erosive periods are reduced and the ultimate impact of mining is to deplete the innershelf source and lower the overall level of shelf. The time taken for a measurable impact on the innershelf bed can be long if the mining volumes are much less than the annual beach volume changes.

CESS has recently carried out another study for the Chavara coast, as per the request of the Indian Rare Earths Ltd. (IREL), to investigate the depletion of heavy mineral content in its beach washing sites of Chavara. This study involved a revisit into the hydrodynamic and sedimentological aspects of the area and a relook at the sediment budget. The study was able to identify the causative factors responsible for the reduction in heavy mineral content in the beach sediments of Chavara coast.

The results of the studies are relevant for other coastal locations where beach sand mining, legal or illegal, is prevalent. Illegal sand mining has to be curtailed strictly. Wherever sand mining is permitted for extraction of heavy minerals and such other precious resources, the mining volumes have to be limited to sustainable limits as determined from sediment budgeting studies.


Dr. N. P. Kurian

priate to the issues.

There are four basic domains of natural resource management: (a) natural resource base- land, water, air, forests and wild life or ecological domain, (b) socio-economic and demographic characteristics (c) infrastructural and technological issues, and (d) institutional and policy issues. Each of these subsystems is governed by its own set of rules and internal dynamics. Mutual interactions among these subsystems are scale dependent, multidimensional and co-evolutionary. The reductionist approach hitherto followed for natural resources management might have to be replaced by co-evolutionary perspective which emphasizes on natural resource management system as hierarchically arranged mosaics of co-evolving social, technological and environmental processes or elements. Social ecological approach is suggested so that management practices evolved based on ecological understanding can be related to the social mechanisms that operate behind these practices across various geographical settings, cultures and ecosystems.

The natural resource management programme must rely on adequate information on ecosystems, proper understanding of the ecosystem processes, state of resources use, resource demand, existing load, environmental health and impacts. Participation of stake holders and maintaining diversity are part of this exercise of changing perspectives. The co-evolutionary approach strives for adaptive system, in which ecological system and social system interacts and feed each other. This is manifested at the resource users level, where individual and community directly interact with natural resources within the boundary of an ecosystem. This can be captured with full ramifications within a ecozone or micro watershed, a functional ecosystem entity. The issue of governance is important in this context of social ecological functions as societal actions impacts natural resource systems, thereby changing the natural process and also get affected by this change.

CESS initiatives



Survey No.	Agricultural landuse	No. of Settlements	Others
331/1	Mixed crops	Nil	Temple, road
331/2	Mixed crops, Cultivable waste land	Nil	Nil
331/3	Mixed crops	7	4 Coir factories
331/4	Mixed crops, Cultivable waste land	6	3 Coir factories
331/5	Paddy reclaimed	3	Coir factory

Tabulation of ward-wise landuse and assets at cadastral level

The natural resource evaluation and analysis is one of the main activities undertaken by CESS since its inception. Over the years there has been growing importance of this aspect of Natural Resource Management (NRM) as part of research activities in CESS. Many of these projects have been taken up at the behest of government departments and therefore demand driven. This indirectly indicates increasing emphasis of the larger society on NRM. While developing natural resource data base

the plan is to collect data from various other concerned agencies besides those generated by CESS. Use of archival data, existing information, application of remote sensing and collection of field data are considered essential requirements for generating time series of regional and local level data. The prime aim is to understand resource distribution pattern, the present state of development and availability of ecosystem service for regional planning and development. It is proposed to continuously monitor resources, generate up-to-date knowledge of resource appraisal and disseminate those information for the benefit of the larger society.

The recent thrust of research is to undertake



Researchers documenting field data. Women Self Help Groups working for land preparation

integrated studies, investigate terrain/ geomorphic character both in macro and micro scale and to understand spatio-temporal dimension of human-environment relationship, changing trend of land use and impact of land use change on environment, particularly in water quality. Specific studies are being attempted for selected river basins to assess morphological and geohydrological conditions so that base line data are available for planning and management. Projects also address issues related to infrastructure development, resource evaluation for locating industries, assessment of water resources for fresh water lakes and resource assessment for tourism development. CESS also gained experience in execution of international collaborative projects on natural resource management more particularly covering population and land use, coastal resources, nexus between poverty and environmental degradation, and biogeochemistry of estuaries.

Micro level initiatives

There is a growing realization that natural systems and socio-economic systems are governed by self organization and co-evolutionary dynamics and therefore, mutually dependent and share characteristics of complex adaptive systems that express large macroscopic patterns

emerging out of local small scale interactions. Micro level approach facilitates understanding of local level interactions. Kerala experiment on micro level resource management starting with resource mapping at the panchayat level is a novel attempt. It emphasizes on local level initiatives providing significant opportunity for the people, professionals, planners and administrators to act together at the village level. To position it as an effective system for developing local level economy, the decentralized process must address the issues of local resources, resource use, micro-level environment, stake holders, scope of institutionalization, and people's participation. It is also well realized that macro level and aggregate data are not

adequate for the purpose of drawing plans relevant at the local level. The emergent paradigm for living on and with the environment brings together decentralisation, reliance on local resource base, democracy and diversity which will give way to an inclusive holism, open system thinking and diverse options instead of reduction, linear thinking and standard solution.

Kanjikuzhy - a case of convergence

Kanjikuzhy Grama panchayat with an area of about 17 sq.km and 18 Wards and having a population density of 1725persons/ km² is well known for vegetable cultivation in Kerala. People are enterprising and women self help groups function well. They even participate in land preparation for agriculture . The panchayat recorded annual population growth of 1.33% during 2001-11. Resource evaluation and documentation of environmental issues were taken up by CESS for two time points, 2003 and 2010 involving local people and panchayat. Plot level landuse mapping has been attempted in this panchayat. Number of settlements and other assets has also been recorded for each survey plot. Cadastral level data base has been created to help micro level planning.

Located in the coastal sandy plain, landform of this panchayat is dominated by ridge runnel topography, however internal relief is marginal. Removal of sand dunes has altered topography further. Some of the sand pits have turned into marshes. Average annual rainfall is around 300cm. Four micro watersheds drain this panchayat in all directions. Soil is sandy. Depth to water table is around 2m, however water is not potable. Landuse is dominated by mixed tree crops. Vegetables are grown in the runnels and paddy fields. There are 43 sacred groves distributed in this panchayat.

Considering all these factors and interacting with local people in each Ward major environmental problems have been listed. They problems include water logging and flooding during monsoon months, scarcity of drinking water, water pollution, sand mining, increased use of fertilisers and associated problems, salinity in wells and streams, improper waste disposal, declining agricultural productivity, and non cultivation of paddy lands. A list is compiled for major issues encountered in each ward using PRA method. Severity of problems has also been worked out based on spatial spread. Water logging-flooding emerged as the most serious problem as it was affecting 10 Wards followed by discharge of industrial effluents (8 Wards) and siltation of streams (6 Wards).

Environmental management action plan proposes watershed based approach to control water logging, prevention of salinity intrusion, pond renovation, rehabilitation of sand mining ditches, prevention of ground water pollution, rejuvenation of sacred groves, promotion of nature tourism, use of fallow land, management of agricultural waste, replacement of coconut plants and enhancement of land productivity. Some of the issues have to be tackled at the panchayat level and some at the ward level. Management of water logging and flood problem requires inter panchayat plans. Formations of user committees are significant. There is a need to monitor development initiatives regularly and take appropriate corrective measures as and when necessary. The convergence of CESS, local people and panchayat produced significant results. This provides a local level resource management model with stakeholders' participation that can contribute to sustainability.

Dr. Srikumar Chattopadhyay

Papers published in Journals

Ansar S, Dhanya C R, Thomas G., Chandran A, John L, Prasanthi S, Vishnu R and Zachariah E J (2011) Urban-Rural cooling rates over Thiruvananthapuram. *J. Ind. Geophys. Union*, 16(1), pp.29-36.

Arjun S, Kalarani P, Dhanya S S, Praveen A K, Reshmi N P, Kurian M V, Ramana Murthy T S, Shahul Hameed and Prakash T N (2011) Numerical simulation of the Makran 1945 tsunami on the southwest coast and Lakshadweep islands of India. *Marine Geodesy Special Issue on Tsunamis*, 34(1), pp.68-76.

Chattopadhyay S (2011) Critical environmental issues and democratic initiatives: Lessons from Kerala. *J. Centre for Creative Learning and Research*, 1, pp.38-46.

Hamza Varikodan, HariKumar R, Vishnu R, Sasi Kumar V, Sampath S, Murali Das S and Mohan Kumar G (2011) Observational Study of cloud base height and its frequency over a tropical station, Thiruvananthapuram, using a ceilometer. *Int. J. Remote Sensing (TRES-PAP-2010-0148.R2)*.

Harikumar R, Sampath S and Sasi Kumar V (2011) Altitudinal and temporal evolution of raindrop size distribution observed over a tropical station using a K-band radar. *Int. J. Remote Sensing*, 33 (10), pp.3286-3300.

Kusala Rajendran, Rajendran C P, Sreekumari Kesavan and Naveen R (2012) Recent microtremors near the Idukki Reservoir, Kerala, South India. *Current Science*, 102 (10), pp.1446-1451.

Padmalal D, Kumaran K P N, Nair K M, Baijulal B, Ruta B Limaye and Vishnu Mohan S (2011) Evolution of the coastal wetland systems of SW India during holocene: evidence from marine and terrestrial archives of Kollam coast, Kerala. *Quaternary Int.*, 237, pp.123-139, DOI:10.1016/j.quaint.2010.12.021.

Prasanth Chandra Sekhar, Joseph Betsy, Janam Prasanthila, Narayanan Subhash (2012) Discrimination of periodontal diseases using diffuse reflectance spectral intensity ratios. *J. Biomedical Optics*, 17(2), pp.027001-2-027001-9.

Praveen S S, Reshmi A K, Dhanya P, Arjun, Kalarani S, Kurian N P, Ramana Murthy M V, Shahul Hameed T S and Prakash T N (2011) Numerical Simulation of 26 December 2004 Tsunami on the Southwest coast and Lakshadweep islands of India. *Marine Geodesy Special Issue on Tsunamis*, 34(1), pp.59-67.

Sreela Reghu, Reji Srinivas, Girish Gopinath, Rajesh Reghunath and Kurian Sajan (2012) A Numerical Weighted Parameter Rating (WPR) for Artificial Groundwater Recharging in Bharathapuzha River Basin: southern India. *Int. J. of Earth Sciences and Engineering*, 05(02), pp 268-275.

Sudhanandh V S, Potty V P, Ouseph P P and Narendra Babu K (2012) Distribution of potentially pathogenic enteric bacterial in coastal sea waters along the Southern Kerala Coast, India. *J. Environmental Biology*, 33, pp.61-66.

Sudhanandh V S, Arjun V K, Faisal A K, Ani M V., Renjini V S and Narendra Babu K (2012) In-vitro Antibacterial Screening of Selected Folklore Indian Medicinal plants with few Clinical Pathogens. *Ind. J. of Pharmaceutical Education and Research*, 46(2), pp.174-178.

Thomas G and Zachariah E J (2011) Ground level volume mixing ratio of methane in a tropical coastal city. *Environ. Monit. Assess*, DOI 10.1007/s 10661-011-2084-9.

Udaya Kumar P, Chandran A, Jean Jose J, Prasanthan V, Deepak M P and Narendra Babu K (2011) Heavy metals in the polychaete *Glycera longipinnis* from the Southwest of India. *Chemistry and Ecology*, 27(4), pp.327-336.

Vishnu R, Hamza Varikoden, Anil Kumar V, Murali Das S, Mohan Kumar G. and Subi Simon V.N (2012) Abnormal modulation of atmospheric parameters during tsunami of 2004. *Current Science*, 102 (11), pp.1575-1580.

Papers published in Proceedings/Books

Anooja S and Padmalal D (2012) Provanance of late quaternary sediments in the coastal lands of Kollam district, Kerala. *Proc. 24th Kerala Science Congress, RRII, Kottayam*, pp.357-360.

Anooja S, Baijulal B, Maya K, Sreebha S and Padmalal D (2011) Impact of sand mining on river bed changes and bed material characteristics- a case analysis. *National Seminar on Mining of River Sand and its Impacts on the Environment, CWRDM*, pp.173-181.

Anooja Prasad C, Vishnu Thilakan K C, Vimal M K, Sreeraj M K and Thomas K V (2012) Mining induced shoreline changes and morphological modifications. *Proc. 24th Kerala Science Congress, RRII, Kottayam*, pp.348-350.

Arun R and Shreya Bandhopadhyay (2012) Application of RS and GIS in detecting palaeo channels: A case study in the part of Pambamanimala interfluvium, Kerala. *Proc. 24th Kerala Science Congress, RRII, Kottayam*, pp.332-334.

Baburaj B, Remya S I, Padmalal D, Maya K, and Lekshmi I (2012) DIN, DIP, DIC and SO₄ fluxes from the Neyyar River (Kerala) into the receiving coastal waters. *Proc. of UGC sponsored National Seminar on SGSDNDM held at MS University, Tamil Nadu, held on 23-24, Feb.2012*, pp.11-15.

Baijulal B, Jissy Jyothi S, Padmalal D and Maya K (2011) Environmental effects of alluvial sand mining on the biological environment of Kerala rivers. *National Seminar on Mining of River Sand and its Impacts on the Environment, CWRDM*, pp.195-205.

Dhanya V (2012) Is Achankovil an antecedent river. *Proc. 24th Kerala Science Congress, RRII, Kottayam*, pp.361-363.

Jayanthi J L, Subhash N, Manju S, Nisha G U, Beena V T (2012) Diffuse reflectance imaging: a tool for guided biopsy. *SPIE-BIOS Photonics West conference, San Francisco, California, USA, January 21-26, 2012, Proc.SPIE 8220, 822004*; <http://dx.doi.org/10.1117/12.907734>

John Mathai (2012) Recent tremors in the Idukki region and its implications on Mullaperiyar. *Proc. 24th Kerala Science Congress, RRII, Kottayam*, pp.367-368.

Maya K, Padmalal D, Santhosh V and Aneesh S R (2011) Instream and floodplain sand mining from Muvattupuzha river basin, consequences and strategies. *National Seminar on*

Mining of River Sand and its Impacts on the Environment, CWRDM, pp.111-124.

Maya K, Santhosh V, Aneeshkumar S R and Padmalal D (2012) Impact of Mining and Quarrying in Muvattupuzha river basin – an over view on its environmental effects.. Proc. of UGC sponsored National Seminar on SGSDNDM held at MS University, Tamil Nadu, held on 23-24, Feb.2012.pp.78-81.

Mohanan C N and Thomas K V(2011) The Status of mangroves in Kerala, Towards Conservation and Management of Mangrove Ecosystems in India (Eds) Bhatt J R, Macintosh D J, Nayar T S, Pandey C N and Nilaratna N P, IUCN, India, pp.154-159.

Noujas V, Badrees K O and Thomas K V (2012) Numerical model studies on siltation of a harbour at Muthalapozhi along southwest coast of India, Proc. 24th Kerala Science Congress, RRII, Kottayam, pp.335-337.

Padmalal D (2011) Construction grade sand - sources and strategies, Proc. National Seminar on Mining of River Sand and its Impacts on the Environment, CWRDM. pp.55-64.

Prasanth C S, Joseph Betsy, Subhash N (2012) Non invasive detection of periodontal disease using diffuse reflectance spectroscopy – A clinical study, SPIE-BiOS Photonics West conference, San Francisco, California, USA, January 21-26, 2012, Proc. SPIE 8230, 823011; <http://dx.doi.org/10.1117/12.907693>

Raji S Nair, Aparna G Nair and Subhash N (2012) Herbicide stress detection in Colocasia esculenta plants by multi-spectral solar reflectance imaging, Proc. 24th Kerala Science Congress, RRII, Kottayam, pp.6-9.

Remya S I, Anooja S, Vishnu Mohan S and Baijulal B (2012) Textural dependence of C-org and C-inorg in the borehole sediments of coastal wetlands of Kerala – A case study, Proc. 24th Kerala Science Congress, RRII, Kottayam, pp.506-508.

Resmi R, Baburaj B, Santhosh V, Sreebha S and Padmalal D (2011) EIA of river sand mining using Rapid Impact Assessment Matrix (RIAM) – A case study, National Seminar on Mining of River Sand and its Impacts on the Environment, CWRDM, pp.183-189.

Sajeer S, Arunima R, Anoop Krishnan K, Baiju

R S.,Liji T M, Narendra Babu K (2011) Removal of Pb (II) from aqueous solution using activated carbon: An overview of batch adsorption studies, In. Proc. National Conference on Emerging Trends in Biodiversity Conservation & Sustainable management Department of Zoology, Christian College, Chengannur, pp.47-57.

Sasidharan C K and Sivanandan P (2011) Ecotourism for Inclusive Growth: A case study of Ashtamudi Lake, Proc. 13th World Lake Conference, Wuhan, China 2009, pp 1-6. Vandana M (2012) Evolution of micro level landforms in Kabani river basin Wayanad plateau, Kerala, In. Proc. 24th Kerala Science Congress, RRII, Kottayam, pp.364-366.

Vishnu Mohan S, Sreebha S, Padmalal D, Maya K and Linikrishna K L (2011). Sand mining in Pamba river, National Seminar on Mining of River Sand and its Impacts on the Environment, CWRDM, pp.141-151.

Vishnu Mohan,S and Padmalal D (2012) Evidences of changing climate in the past 10000 years from the sedimentary archives of southern Kerala, In. Proc. 24th Kerala Science Congress, RRII, Kottayam, pp.329-331.

Papers Presented in Conferences

Ajayakumar Varma R made three presentations on 'Summary of the FGD held on November 1, 2011; Inventory of pollution load & mitigation measures and land use management covering Vembanad & its immediate catchment' in the Focus Group Discussion (FGD) meeting on Vembanad Wetland system convened for the Senior Officials of the Ministry of Environment & Forests, Govt. of India, The World Bank and development depts. & agencies of Govt. of Kerala on 21st March 2012.

Anooja S and Padmalal D presented a paper on 'Provenance of Late Quaternary Sediments in the coastal lands of Kollam district, Kerala' in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Anoopa Prasad C, Vishnu Thilakan M, Vimal K C, Sreeraj M K and Thomas K V presented a paper on 'Mining induced shoreline changes and morphological modifications' in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Arun R presented a paper on 'Application of RS and GIS in detecting palaeo channels: A case study in the part of Pamba-Manimala interfluvium, Kerala, in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Dhanaya.V presented a poster on 'Is Achankovil an Antecedent River? Kerala' in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Faisal A K presented a paper on 'Sewage pollution and hydrologic impacts on the estuarine ecology; A case study from Ashtamudi estuary, Kollam District, Southern Kerala' in the National Seminar on conservation of the marine environment and management of marine fisheries organized by P.G. & Research Dept. of Zoology, N.S.S. College, Changanachery; 24th – 27th Feb. 2012.

Vandana M presented a Poster on 'Evolution of micro level land forms in Kabani river basin, Wayanad plateau, Kerala' in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Vishnu Mohan S and Padmalal D presented a paper on 'Evidence of changing climate in the past 10000 years from the sedimentary archives of Southern in the 24th Kerala Science Congress at Kottayam, 29-31 January 2012.

Remya S I, Anooja S, Vishnumohan S and Baijulal B presented a paper on 'Textural dependence of C-org C-inorg in the borehole sediments of coastal wetlands of Kerala – a case study' in the 24th Kerala Science Congress at Kottayam from 29-31st January 2012.

Prakash T N, Thomas K V and Badarees K O presented a paper on 'Application of GIS and Remote Sensing Techniques for the Preparation of Integrated Island Management Plan for Lakshadweep Islands' in the National Seminar on Geospatial Solutions for Resource Conservation and Management (GEOS-2012) organized by Karnataka State Remote Sensing Application Centre (KSRSAC) during 18-19 January 2012 at Bangalore.

Jayanthi J L, Subhash N, Manju S, Nisha G U and Beena V T presented a paper on 'Diffuse reflectance imaging: A tool for guided biopsy', SPIE BiOS, 21 - 26 January 2012, The Moscone Center, San Francisco, California, USA. pp.8220-3.

Vishnu S presented a paper on 'Monthly and daily variation of hydrography in relation with upwelling and vertical oscillation on marine waters of Port Blair (Eastern side), Andaman & Nicobar island, Bay of Bengal, India' in the National Seminar on conservation of the marine environment and management of marine fisheries organized by P.G. & research Dept. of Zoology, N.S.S. College, Changanachery; 24th – 27th February 2012.

Neelima T presented a paper on 'Geospatial studies of shoreline variation along Thiruvananthapuram coast' in the National Seminar on Coastal Zone Processes, Resources and social Relevance held at CUSAT, Kochi on 17th February 2012.

Padmalal D presented a paper on 'Holocene climate and sea level proxies in the borehole cores of southern Kerala with special reference to the evolution of the coast' in the National seminar on Coastal Zone-Processes, Resources & Social Relevance, held at CUSAT, Kochi on 17th February 2012.

Vishnu Mohan. S presented a paper on 'Textural and heavy mineralogical studies of a small catchment river in the southern Kerala-its implications in coastal evolution' in the National seminar on Coastal Zone – Processes, Resources & Social Relevance, held at CUSAT, Kochi on 17th February 2012.

Padmalal D presented a paper on 'Hydrochemical characterization and Water quality assessment of the coastal springs of southern Kerala, India' in the National seminar on Recent Advances and Future challenges in Geochemistry and Geophysics: The Indian Scenario, held at the Department of Geology, Centre of Advance study, Banaras Hindu University, Varanasi, on 22-24th Feb 2012.

Srikumar Chattopadhyay presented a paper on 'Strategic land use planning for climate change adaptation: A case of Kerala' in the International Conference on Dimensions of Development and Resource Conservation and chaired a session organised by the Department of Geography, Calcutta University, 11th March 2012 and on 12th March, 2012.

Srikumar Chattopadhyay presented a discussion note on 'Safe operating space for humanity and geography' in the National Seminar on Reorienting Geography to meet present and

future challenges organised by the Department of Geography, Banaras Hindu University on 14th-16th March 2012.

Srikumar Chattopadhyay presented a discussion note on 'Urbanisation in Kerala' in the National Conference organised by Town and Country Planning Department and Report prepared by the Department of Town and Country planning, Government of Kerala on 23rd March 2012.

A S K Nair delivered an invited lecture on 'Global warming – A Myth or Reality' and chaired the session on 'Role of Remote Sensing in Biodiversity Monitoring' in the International Seminar on emerging Threats and Challenges to Biodiversity Policy Framework for Sustainable Management, held at Sri. Venkateswara University, Tirupati during 2 – 4th March 2012.

Srikumar Chattopadhyay, as visiting professor, delivered two lectures on 'Why study geography' and 'Role of panchayats for sustainable land use planning: exploring the frontiers with examples from Kerala' and a key note presentation on 'Natural Resource Management: A framework' at the Department of Geography and Environment Management, Vidyasagar University, Medinipur during 17-18 March 2012.

Dhanya V presented a paper on 'Water yield variation as linked to catchment parameters: A micro level analysis of South Kerala river basins' in the International Conference on Population Dynamics and Sustainable Resource Development, held at Aligarh Muslim University, Aligarh, Uttar Pradesh on 25-17 March 2012.

Vandana M presented a paper on 'Resource base environmental degradation and poverty: Exploring the interrelationship at micro level- A case study of selected panchayats in Wayanad district, Kerala' in the International Conference on Population Dynamics and Sustainable Resource Development, held at Aligarh Muslim University, Aligarh, Uttar Pradesh on 25-17 March 2012.

Lijith P Nair presented a paper on topic 'Application of Remote sensing and GIS for resource management and planning – A case study of Neyyar basin, Kerala' in the International Conference on Population Dynamics and

Sustainable Resource Development, held at Aligarh Muslim University, Aligarh, Uttar Pradesh on 25-17 March 2012.

Arun R presented a paper on 'Application of Remote Sensing and GIS in Land use change detection of Alappuzha district, Kerala' in the International Conference on Population Dynamics and Sustainable Resource Development, held at Aligarh Muslim University, Aligarh, Uttar Pradesh on 25-17 March 2012.

Anoop Krishnan K presented a paper on 'Identification of spatiotemporal physico-chemical pattern in coastal waters of Kochi and Mangalore, Southwest coast of India' in the National Conference on Frontiers in chemistry held on 25-27 April 2012 at Department of chemistry, University of Kerala, Kariavattom, Trivandrum.

Invited Talks

Dr. N P Kurian delivered a presidential address in the National Science Day celebrations organized by KSCSTE at Science & Technology Museum on 24th February 2012.

Dr. Srikumar Chattopadhyay delivered two lectures for participants of the Refresher's Course in Environmental Science organised by Academic Staff College, Kerala University on 13th February 2012. The lectures were on 'Main streaming environmental issues for sustainable development' and 'Environmental ethics'.

Dr. N P Kurian delivered a talk entitled 'Status of hazard, vulnerability and risk assessment studies in Kerala' in the International Workshop on Disaster Risk Reduction and Contingency Planning, organised by State Disaster Management Authority and ILDM on 10th March 2012 at Thiruvananthapuram

Dr. R Ajayakumar Varma delivered a talk entitled 'EIA- A Case Study' in the National Seminar on Environmental Impact Assessment organized by the Department of Environmental Sciences, Kerala University on 31st March 2012.

Dr. Archana M Nair delivered a talk on 'Remote Sensing and Geophysical Methods for Geoexploration' at Dept. of Civil Eng. IIT Guwahati on 2nd March 2012.

Dr. N P Kurian delivered a lecture entitled

'Coastal Zone Management and Application of Geospatial Technologies' in the National Workshop on Geospatial Technologies for Coastal Resources Management held during 28 - 29 May, 2012 at IIST, Trivandrum.

Sri. B K Jayaprasad delivered a lecture on 'The potential uses of GIS Technology in Public Health' at Achutha Menon Centre for Health Service Studies, Sree Chitra Tirunal Institutes for Medical Sciences and Technology, Trivandrum on 16th May 2012.

Dr. T N Prakash delivered an invited lecture at the INSPIRE camp at KLE Society's College, Belgau from 16th - 22nd June 2012.

Membership in Committees

Dr. N. P. Kurian

Member, Project Management Board, Coastal Engineering Division, National Institute of Ocean Technology, Ministry of Earth Sciences, Government of India.

Member, Board of Studies in Physical Oceanography under the Faculty of Marine Sciences, Cochin University of Science and Technology, Cochin.

Member, Kerala Dam Safety Authority by Water Resources (Inter State Water Cell) Department, Government of Kerala.

Member, Kerala Protection of River Banks of Regulation of Removal of Sand Rules 2002-State High Level Committee for River Management Fund by Revenue (P) Department, Government of Kerala.

Member, Governing Body, LBS Centre for Science & Technology by Higher Education Department, Government of Kerala.

Member, Kerala Coastal Zone Management Authority by Ministry of Environment & Forests, Government of India.

Member, Working Group for Water Sector by Water Resources (IR) Department, Government of Kerala.

Member, Governing Body, Institute of Land and Disaster Management, Revenue Department, Government of Kerala.

Dr. N Subhash

Guest Editor of a Special issue on Fluorescence in Natural Systems being brought out by the

International Journal of Spectroscopy (Hindawi Publishing Corporation, USA).

Member of the Governing Council of STIC (Sophisticated Test & Instrumentation Centre), Cochin.

Dr. K. V. Thomas

Member, KCZMA subcommittees to look into various CRZ issue implementation, policies, violations and reports.

Member Lakshadweep Coastal Zone Management Authority

Dr. Srikumar Chattopadhyay

Editor of the ANNALS, National Association of Geographers, India

Dr. Ajaykumar Varma

Chairman of the Committee constituted for assessing the damages to the properties of local people due to the blasting operations in a 7 km long tunnel of Sengulam Augmentation Scheme.

Expert Member in the Assessment Committee of C-DIT.

Dr. C N Mohanan

Member, State Level EIA Authority (SEIAA)

Member, Technical Committee of Karumpukonam Community Ecosystem Management Committee constituted by Dept. of Environment & Climate Change.

Dr. C M Harish

Member of the Board of Studies in Environmental Studies at CUSAT

New Arrivals in CESS Library

Varma, O.P.[et al.](Eds). New Paradigms of Exploration and Sustainable Mineral Development: Vision 2020. Indian Geological Congress, Roorkee, 2011.

Zhang, Chunlong. Fundamentals of Environmental Sampling and Analysis. Wiley, New Jersey, 2007.

Faure Gunter and Mensing, Teresa M. Isotopes: Principles and Applications. 3rd Ed. John Wiley & Sons, New Jersey, 2004.

Mallick, K, Vasanthi, A and Sharma, K.K. Bouguer Gravity Regional and Residual Separation: Application to Geology and Environment. Capital Publishing Company, New Delhi, 2012.

Ph.D Awarded



Dr. Balachandran K P has been awarded Ph.D Degree under Faculty of Physics, Mahatma Gandhi University, Kottayam for his thesis, 'Investigation of the relationship between atmospheric electrical conductivity and meteorological parameters'. Dr. S. Muralidas, Scientist-F (retired), CESS was the supervising guide for his Ph.D dissertation work.

Dr. Jayanthi J L has been awarded Ph.D Degree under Faculty of Physics, University of Kerala, for her thesis 'Autofluorescence and diffuse reflectance spectroscopy for non-invasive detection of oral cancer'. Dr. N Subhash, Scientist-G & Head, Atmospheric Sciences Division was the supervising guide for her Ph.D dissertation work.



Honours/Awards



Vishnu Mohan S secured the Young Scientist Award of the Kerala State Council for Science, Technology and Environment for his paper entitled "Evidences of changing climate in the past 10000 years from the sedimentary archives of southern Kerala" presented in the 24th Kerala Science Congress held at Rubber Research Institute of India, Kottayam during 29-31 January 2012.

Dhanya V has won the Best Poster Award of the Kerala State Council for Science, Technology and Environment for her poster presentation entitled 'Is Achankovil an antecedent river?' during the 24th Kerala Science Congress held at Rubber Research Institute of India, Kottayam from 29 to 31 January 2012. She was recipient of the Prof. N. P. Aiyar Young Geographer's award during the 33rd IGC (NAGI) seminar held at Burdwan University, West Bengal during 11-13 November 2011



Geo Fluids Research Laboratory

The Geo Fluids Research Laboratory (GFRL) is a premier analytical facility in CESS for studying fluids trapped within minerals especially in the diagenetic environments. Fluid inclusions occur in natural crystals and can be considered as sealed microscopic (usually < 50 mm in length) entities that contain a sample of fluid trapped during (or after) formation of the host crystal. Determination of the chemistry of the fluid components trapped in the crystal



cavity provides fundamental information which can facilitate the reconstruction of the conditions of mineral growth. This in turn leads to a better understanding of the physical and chemical environment of such economically important geological processes as petroleum and ore deposition. Fluid inclusions provide a record of fluids present during rock evolution, so they can be used to expand the understanding of the petrogenesis of rocks by providing significant information (i.e., temperature, pressure, density and composition) concerning the role of fluid that formed or traversed the rock.

Visit Abroad



Dr. Srikumar Chattopadhyay visited ZMT, Bremen, Germany for a three week period from 14 May 2012 for discussion on a new collaborative project proposal.

Dr. V. Nandakumar visited the International school on Raman spectroscopy applied to Earth Sciences and Cultural Heritage at the Faculty de Sciences, Nancy, France during 14-16 June 2012 and held discussions with Prof. Jean Dubessey on a granulite based monazite research project with the Department of Geology, University of Lorraine.



Dr. K. Anoop Krishnan visited ZMT, Bermen, Germany during 12-23 January 2012 in connection with the project 'Interdependencies between River systems and Vembanad lake'.



Sri. Prasanth C S, Ph.D Research Scholar, Bio Photonics Laboratory, Atmospheric Sciences Division has visited Bulgarian Academy of Sciences, Sofia, Bulgaria in March 2012 as a part of the joint Indo-Bulgarian project funded by the DST, Government of India.

Extension

National Science Day 2012

National Science Day was observed on 29 February 2012. A lecture on 'Dynamics oscillations in nature' was delivered by Prof. M.S.

Gopinathan IISER, Thiruvananthapuram and another lecture on 'Solar terrestrial physics: Emerging perspectives' was delivered by Dr. Tarun Kumar Pant, Space Physics Laboratory, VSSC.

Earth Day 2012

Earth Day-2012 was observed in CESS on 25 April 2012 with an Open House programme. Laboratories in CESS were kept open the students and public. Dr. R. Harikumar, Technologist, EMC Trivandrum gave a talk and Dr. Bijukumar, Head Aquatic Biology, Kerala University. Sri. Rameshwar Rao, Deputy General



Students interacting with scientist during the Open House session of Earth Day 2012

Manager, State Bank of Travancore was the Chief Guest of the programme. Dr. N. P Kurian, Director, CESS gave away prizes & mementos and Dr. V. Nandakumar, the convenor of the programme proposed the vote of thanks

Recruitments



Smt. V. Geethamol joined as Stenographer (Gr. 1) in Director's Office

Retirements

Dr. Narayanaswamy Scientist-F, Geo Sciences Division retired on 31 January 2012



Smt. K. Nirmala Clerical Assistant (Gr. 1) retired on 31 March 2012

Obituary



Sri. V. Vasudevan Scientist E2, Marine Sciences Division, expired on 24 March 2012