IGCS BULLETIN

From the Editors' Desk

Dear Readers,

First of all we would like to express our apologies for the delayed publication of this issue. The main reason being the summer term breaks which are scheduled almost successively in India and Germany. It is on this note that we hope you all had enjoyable vacations!

This bulletin presents some of our annually recurrent news about the IGCS Summer Schools in Germany, which was hosted this time by Kiel University on the topic "Sustainable water management in rural landscapes".

Besides this, IGCS faculty was involved in a number of activities in research, teaching and outreach.

In this issue we also want to venture into something new. Instead of a feature article, we include an opinion piece about current engineering education in India. In the future, we intend to alternate such comments on pressing issues with research articles so as to highlight the state of current affairs of sustainability.

Enjoy Reading!

B S Murty and
Christoph Woiwode
Editors

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Prof. B. S. Murty

Prof. Chr. Woiwode

IGCS NEWS

IGCS Summer School 2015 at Kiel University

On Wednesday 27th May, 2015 the IGCS summer school “Sustainable Water Management in Rural Landscapes” (May 27 – June 10, 2015) was inaugurated at Kiel University. The particpants from 14 different Indian and German universities were welcomed by the host, Prof. Dr. Fohrer, IGCS Area Coordinator Water Management, the dean of the faculty of agricultural and nutritional sciences, Prof. Hartung. Dr. Schmode, head of the International Center, welcomed the students on behalf of Kiel University and gave an overview of the history and current developments. Prof. BS Murty, Prof. Ligy Philip, Prof. Franziska Steinbruch, Dr. Mohan Kanda and Dr. P. Sasidhar gave their lectures around the topic Water Management in India during the first two days. Further lectures, SWAT exercises, student projects and excursions to the picturesque surroundings of Kiel were also part of the program that was organized by Dr. Georg Hörmann and RWTH Aachen University.

Summer schools always have at least two sides to it: the official subject of the summer school by them was "Sustainable water management in rural areas". The aim was to learn how to manage these regions with an interdisciplinary and holistic approach that imparts students with a theoretical and practical overview of recent developments in Germany and India, taught by Indian and German academics and practitioners. The other side of the coin – the ‘hidden agenda’ - had to do with intercultural group dynamics, cold summers in North Germany and - last not least - party.

In hydrology and in real life, theory and practice can be quite a different thing. Summer schools are made to narrow this gap a little bit. In theory, computer models are all very well developed, in practice missing input data can make the whole process a frustrating experience. This also works on a personal level: theoretically, all particpants were aware of the climate during the summer school in Kiel. In practice, many (mostly Indian) students have confirmed that they never ever had experienced such cold weather in their live before. Fortunately, there were also some sunny days and fortunately there was a group to keep them warm and to help each other over hydrologic and meteorologic frustations.

The most important impressions were hidden in the many critical inquiries: you really have no water shortage? You really don't need air conditioning in summer? You really get data for free from your administration? The buses really operate on schedule? Overall it was a very enjoyable and fruitful experience for the students and the hosts/organisers. As far as we are aware of, there have not been any permanent frostbites.

Participants of the IGCS Summer School

Is the Cheyyur Power Project Good for Tamil Nadu?

This was the question posed for a discussion forum on the findings of the report analysing the financial implications of the 4000MW Cheyyur Ultra Mega Power Project in Tamul Nadu, which was hosted by IGCS on May 20, 2015 at IIT Madras. On behalf of IGCS, Visiting Prof. Christoph Woiwode welcomed the organizer Mr. K.C. Sundaram from Indian Institute of Public Policy, Chennai, and the audience of some 30 participants. Facilitated by Nityanand Jayaram, and with presentations by Tom Sanzillo (via telecom), author of the report, Institute of Energy Economics &Financial Analysis, USA, Mr. Jai Sharda, Financial Analyst, Equatorials, Mumbai, and Mr. M.G. Devasahayam, former Chairman, Haryana Electricity Board, the audience deliberated over the financial viability of the envisaged project. Last January, the Central Government aborted the bidding on the 4000 MW Cheyyur UMPP after the proposal failed to receive any bids from the private sector. The Government of India has decided that the bidding terms will be revised to make the project more inviting to private investors. The Indian Institute of Public Policy commissioned a study to estimate the tariff rate that would make the project financially viable for a private promoter, and assessed the impact of that rate on the health of TANGEDCO and Tamil Nadu consumers. The report finds that any tariff rate that would make business sense for a private investor would place an upward pressure on electricity tariff rates resulting either in an increased burden on the state exchequer or on electricity consumers.

Reflections on the IGCS Winter School 2015

Nikunj Sharma

The IGCS winter school included an interdisciplinary approach to study and understand the problems related to water management in urban areas. Water is the most important asset for public health, economy, and maintaining the urban environment. Therefore, it is very crucial to develop and innovate effective methods of water managements in urban regions. A number of strategies are being adopted to collect and reuse waste water from various sectors such as domestic, industries and commercial markets. A country like India, where most of the population is shifting to urban areas and where the total population is going to surpass China, needs rapid development in the operational and infrastructure sector to ensure adequate and healthy water supply to its citizens. In this article I am going to discuss several problems related to water sustainability and possible solutions.

There is a growing pressure on water resources and a failure to meet the basic needs of mankind due to the imbalance between the human`s need and natural production. The problem comes along with frequent urbanization, disturbance in hydrological cycles and outbreak of many waterborne diseases. The IGCS school brought attention to regulatory issues involved in sustainable water management, such as globalization and privatization of water, conservation and efficiency, illegal water connections, religious and conflict issues, impact of climate change of water, e.g. irregular rainfall patterns and decreasing green belt. The exploding urban population in recent decades in India had led to some serious disasters such as floods and droughts, also the lack of access to safe water for drinking and sanitation purpose. The major sufferers are the people living in slums, migrants who live as informal/unofficial residents. Underlying all these issues. The IGCS school was well constructed and planned to discuss and study the problems of urban water management in an interdisciplinary approach.

The roadway to various solutions to create efficient management of water resources. This includes scale up of the drip irrigation system at large scale on growing crops according to changing rainfall patterns. There is also increasing rise in developing an integrated system of sustainable urban water management, such as rainwater harvesting, reuse of treated water for alternative supply system for agriculture and washing. However, to develop a successful integrated system of water management requires active involvement of water governing bodies (local, state, national, and public-private relationships etc.).

A few clear-cut benefits of having sustainable water management systems in place are as follows:

- Unwanted effluent released from industrial, domestic and agriculture activities will be treated properly by waste water treatment plants.
- No water borne diseases such as diarrhoea, malaria and cholera.
- Reduction in green house gases and increment/more profit in carbon credits.
- Significant reduction in degradation of river ecosystem and soil erosion due to leaching out of waste water in rivers and soil.
- The treated water can be used again to irrigate agricultural fields.
- Developing better management system will generate more profit and also reduce the operation and management costs of water based projects .
- Reduces pressure on landfills.

The ultimate mission of sustainable water management is to make both rural and urban water management more sustainable. All these considerations are very important for a country like India, which is going through an urban transformation in coming years.

IGCS Research News

Fact Finding Mission on Rainwater Storage

Prof. Jürgen Schmidt, TU Freiberg, visited IGCS from May 1-6 to undertake a fact finding mission in preparation for a research project on rainwater storage.

Fresh water is a scarce resource in southeast India, receiving only one monsoon and remaining dry during the rest of the year. Thus as much rainwater as possible should be collected and stored for later use. For this reason rainwater harvesting has a long tradition in India and is been practiced for more than a thousand years.

The scope of the intended project is targeted on rainwater storage in porous sediments. As a result of preliminary experiments and mathematical simulation enclosed air within the sediment body has been identified as a major obstacle for infiltration of high intensity rainfalls. Monsoon rainstorms often cause flash floods because the gas phase cannot escape from the dried out sediment body. This happened recently on Chennai's IITM campus. Rainwater is hindered to infiltrate by entrapped air as long as a continuous water layer covers the soil surface. For this reason the intended project aims to develop a technical solution for air drainage of flooded soils in order to enhance groundwater recharge.

Inundation of IITM-campus after a flash flood in April 2015

The IITM/Department of Civil Engineering (Environmental and Water Resources Engineering) organized a workshop attended by almost 20 experts from universities and local authorities providing an excellent opportunity to present the intended project.

Workshop Participants

The workshop was followed by fruitful discussions and a field trip to the Minjur area north of Chennai in the afternoon. Another three day fieldtrip was carried out to Auroville to conduct a field survey related to soil erosion in the area.

Soil erosion near Auroville

The intended project attracts wide interest with respect to research institutions as well as state authorities. Research activities planned in the Chennai region can count on broad technical and organizing support. Discussions of various funding alternatives resulted in a joint DFG-application headed by Schmidt (TU Freiberg) and Steinbruch (IGCS). In order to ensure a profound evaluation of fundamental physics as well as technical aspects of implementation the project aims for a combination of different methods.

The field tests are scheduled for May to June 2016 probably on Anna University campus.

IGCS Research Scholars

Dr. Viktoria Schiller works as an IGSC research fellow in Dr. T.S. Chandra's (Biotechnology Department, IIT Madras) project “Fast sampling analyses for anthropogenic micropollutants in wet environmental compartments in the area of sustaining urban water bodies and improving public sanitation” , in cooperation with the Institute for Environmental Research, RWTH Aachen. She arrived at IIT Madras in June 2015 and will stay until August 2016.

Her research focus is to assess and monitor the impact of urban and agricultural pollution on the aquatic ecosystem. To this end, she implements a set of bioassays at IIT Madras which can be used for acute and chronic toxicity studies as well as to identify the predominant mode of action of the environmental pollutants. Hence, the test battery will include Algae toxicity tests, Daphnia toxicity and locomotion tests as well as *in vitro* assays for endocrine and neurological disruption (Yeast Estrogen Screen (YES)-assay and acetylcholinesterase inhibition assay, respectively).

The efficiency of those bioassays in detecting contamination will be tested on different water samples, such as drinking water samples from the "Velachery" district in Chennai and agricultural run-off samples. For each scenario, the most sensitive bioassay will be determined, which, long-term, can be applied as a fast and cost-effective biomonitoring tool for water contamination.

First Post Doc from IIT Madras to visit TU Berlin under IGCS Fellowship

Dr P. Vasanth visiting the Institut fur Energietechnik, TU Berlin under the IGCS Post Doc Fellowship for one-year term starting in the month of August 2015. He will be working under the supervision of Prof.Dr. Frank Behrendt, IGCS Area Coordinator – Energy at the Institut fur Energietechnik, TU Berlin, Germany. Dr P. Vasanth obtained his Ph.D degree at IIT Madras under the guidance of Dr Ajit Kolar, IGCS Area Coordinator – Energy in India (Former) in July 2015.

Dr P. Vasanth is the first candidate to visit Germany under the IGCS Fellowship Scheme. IGCS wishes him all the best in his acadmic endeavour at TU Berlin.

Construction begins for new IGCS Premises

On June 12th, the "Bhoomi Puja" (function conducted by the constructor before starting the building activity) for construction of the Bio-Technology and Center for Sustainability Building at IIT Madras was conducted. The date of construction start was 18th June with a stipulated date of completion on 17th December 2016. The building is located right next to the present Bio-technology building. IGCS Area Coordinator for Waste Management, Prof. Ligy Philip, being the Chief of Engineering Unit at IITM, oversees the progress of the works. IGCS will be housed on the 4th floor of the ground+6 floor building, with a total area of 12,238 sqft/1,139 sqm. This floor will have mixed use functions comprising classrooms, discussion spaces, studios, workshop, conference room and auditorium.

In Brief

IGCS and peri-urban research presented at TU Dortmund

On June 16, Dr. Christoph Woiwode paid a visit to the Faculty of Spatial Planning at TU Dortmund University. Besides interacting with the faculty to discuss possibilities of collaboration in research and academic exchange opportunities, he delivered a lecture to the master students of the international program SPRING Regional Development Planning and Management. The focus of the presentation was ongoing research in the interdisciplinary project in Sriperumbudur, a peri-urban region of Chennai.

Photo Competition on "Clean and Green India"

Dr. Christoph Woiwode served as one of the judges for the "Clean and Green India" photo competition organized by ASSIST (Asia Society for Social Improvement & Sustainable Transformation). Almost 150 entries were submitted depicting a wide range of fascinating, troublesome and also worrying photographs from all over India. The idea behind the contest was twofold, to showcase and inspire initiatives that support a better lifestyle towards waste management, water conservation, and energy.

Eco Club at SRM University Chennai

SRM University, one of the leading private universities in Tamil Nadu, invited Dr. Franziska Steinbruch and Dr. Christoph Woiwode on 12th August to deliver a lecture on "Sustainability and Lifestyle Changes" in their Eco Club lecture series. This is part of the university's endeavor to educate their students in environmental issues and sustainability. The program was attended by more than 200 students. This event marked also the inauguration of the tree planting initiative, during which the students will plant several hundred trees across Chennai over the course of the academic year.

Environment News...

Involve stakeholders in preparing Smart City vision document: Experts

The Hindu, Hyderabad, August 27 2015

President of Foundation for Futuristic Cities Karuna Gopal, who was involved in the preparation of the guidelines for Smart Cities wants all stakeholders involved. She said that the `Vision Document' would contain the views of the people on how they would like their city to get changed in the future. "That is the first step all cities would have to take. It is very important because people of a city have never been part of governance in the history of free India", Ms. Karuna told The HIndu.

Observing that the vision document could not be prepared unilaterally by the city authorities, she said it was mandatory to involve stakeholders from all segments of the society in its preparation. Based on the 'Vision Document', each city would have to appoint a consultant to develop Smart City Plan. The Smart City Plan would deal with aspects like sector-wise development, financial investments and setting up of SPV.

How the future of a city would be shaped would depend entirely on the Vision Document and what the people articulate in it. Aspirations of people would vary from one city to another. For instance, people in one place might like to give predominance to preserving culture, relics and heritage in the document, while priority might be given to low-cost housing in another city.

Ms. Karuna said a Smart City was not about technology and investments. "Smart cities are all about liveability, sustainability and inclusion", she added.

View full article here: http://www.thehindu.com/news/national/expert-calls-for-involving-all-stakeholders-in-preparing-vision-document/article7586796.ece?ref=relatedNews

Upcoming Event

Expert Meeting on "Recent advancement in online/remote water quality monitoring and management technologies"

Professors from RWTH Aachen University / Indo German Centre for Sustainability (IGCS) at IIT Madras and the Department of Mining Engineering of Anna University in India will jointly organize an expert meeting from 2-4 February 2016 in Chennai, India. This expert meeting is funded by the Indo-German Science and Technology Centre (IGSTC) and will support the travel expenses of up to 10 participants from German institutions and 10 participants from Indian institutions. Applications will be selected based on a first comes first approach and the specific contribution proposed by the applicant to the expert discussions.

Experts from Indian institutions, kindly send your expression of interest and working title of your presentation to

Dr. Subramani | geosubramani@annauniv.edu

Experts from German institutions, kindly send your expression of interest and working title of your presentation to

Dr. Franziska Steinbruch | steinbruch@igcs-chennai.org

The talks will focus on the following main topics:

Focus Discussions

DP1: Technologies for remote monitoring of water and waste water quality

DP2: Combining remote water quality monitoring with the monitoring of the hydrological cycle and water budgets

DP3: Techniques of remote sensing for the monitoring of spatial and temporal variation of contaminant loads

DP4: Technologies to integrate remote and online water quality monitoring into water management and decision-making

DP5: Online and global portals and platforms for water quality monitoring, data and information sharing and dissemination

Kindly visit the IGCS homepage for further details: http://www.igcs-chennai.org/?p=4081

OPINION

Redefining Technology Dynamics and Education – An Indian Perspective

Pravin Joshi

Engineering, by definition, is a practice that serves an existing societal need through teamwork and the skilful working of materials. Barring exceptions, no individual engineer today achieves public recognition; rather, it is an entire enterprise, represented often by a collection of engineering firms and technologists that produce achievements and generate awe, like nuclear technology, a metro system, a supercomputer or even an automobile.

Engineering is primarily a performing art, the result of integration of knowledge and skills meeting specified benchmarks/ standards, sparked by an innovative spirit that transcends beyond the present, and ends up redefining life forms. The thrust of engineering education therefore needs to be in building teams of individuals with analytical mind engaged in integrating knowledge and skills to deliver a ***performing application.***

Unfortunately, what one sees in India today, is a form of engineering training that creates at its best, Capsules of Knowledge, build up individual skills in theory and analysis and tends to view practice as yet another form of number crunching in a model on a computer screen. No wonder of the 1.5 million engineering pass-outs every year, most have little or no understanding of the type and extent of teamwork needed to solve real-world problems in operating dynamics. Many are unwilling to be face to face with heat and dust of a shop-floor, restricting themselves to cabins and offices (often as software specialists) or take up professions in consumer goods sales, banking, even ending up as real estate or mall managers. Most are unwilling, unfit and ill prepared, to take challenge of technological development.

To compound the problem, the firms that carry out little or no engineering work increasingly absorb the best performing students from institutions such as the IITs. These include banks and financial institutions, software companies, which hire chemical engineers not for their skills in engineering but for their analytical mind. Thus the best engineers become willing servants of multinational companies that are looking for ***trained analytical machines*** available cheaply & readily. The system at all levels, is driven by maximizing profits & rank opportunism – clearly, a short sighted approach.

Meanwhile, on the floor where actual technical skills are desperately needed, both technicians and qualified, engineers are scarce. Those who end up with less than stellar grades and degrees often end up as squares to be fitted in round holes. The focus and resource base are deployed in pursuit of assured profits and expediency, to corner the public resources & create personal wealth. Who on earth can ever guarantee success of a development cycle or outcome of true research? No wonder 'Jugaads', twists and imitations dominate the discourse. Innovation and enterprise are guaranteed victims of this approach.

In manufacturing, where there are tie-ups with foreign firms, today, much of the work is contract manufacturing & licensed assembly, garnered by exploited labour contracts that ensure economic rents to small coteries of financiers. The entire sector is now turning into labour contracting, trade and courier economy. There is no scope for innovation, actual technology transfer, - technology generation will be a pipe dream. The technology development issues are treated in a condescending & casual manner. It is con-

sidered as minor hiccups & fixing issues in a garage.

But this is not an accidental problem. It is a result of marriage of convenience amongst the beneficiaries to go for easy money. Quiick fixes are camouflages for Innovation through small and micro enterprises, with self-taught technicians and product developers make do with off-the-street forms of engineering knowledge. It is to be noted that, the largest source of technical employment is in micro & small enterprises, which make up more than 90 percent of all firms in India. Enterprise is there in abundance but exists in a highly distorted form and therefore quite useless.

No wonder the system fails to generate high quality specialists and integrators who are competent to occupy august chairs. This is evident in both private and public sector firms where power struggle permits only those with business and finance degrees, to be the executive head, rather than seasoned engineering or science graduates, unless they are smaller start-ups. The problem spans across all sectors – from defense to retail.

Given the scale and scope of the issues involved, if one wants to conceptualise a sustainable basic engineering strategy for the country, the following areas need attention:

- Materials of construction
- Manufacturing practices
- Toolings
- Standards & Certification
- Degree of automation desired.
- Quality Assurance.
- Skill development & organized knowledge platform
- Laboratories
- R & D
- Design & Development.
- Pilot plants
- Long-term strategy, policy formulation & its implementation.

Only seasoned system integrators can then ensure a seamless delivery of engineering performance. It is equally important that these intra-disciplinary domains need be well integrated with external disciplines of knowledge – from social sciences to ecology to evolve a balance and a sustainable public Policy Framework.

Mr Pravin Joshi is part of a dying breed of experienced engineering professionals in India. The views here are his own.

Forthcoming Conferences

Sustainability Transitions and Wider Transformative Change

IST Conference 2015 at the University of Sussex

The International Sustainability Transitions Conference (IST) 2015, titled "Sustainability Transitions and Wider Transformative Change: Historical Roots and Future Pathways" will be hosted 25-28 August at the University of Sussex. As in previous years, the conference will provide opportunities for scholars to share theoretical, empirical and practical advances in the field of sustainability transitions.

You find further information at: http://www.ist2015.org/

Twelfth International Conference on Environmental, Cultural, Economic, and Social Sustainability

Portland, OR, USA, Portland State University, Smith Memorial Student Union
21-23 January 2016
CONFERENCE THEMES

Proposals for paper presentations, workshops, poster presentations, or colloquia are invited that discuss the broader themes listed below. In addition to the special focus, paper presentations will be grouped into one of the following categories for presentation at the conference:

Theme 1: Environmental Sustainability
Theme 2: Sustainability in Economic, Social and Cultural Context
Theme 3: Sustainability Policy and Practice
Theme 4: Sustainability Education

Special Focus: Urban Sustainability: Inspiration and Solution

For more information and to submit a proposal visit:
http://onsustainability.com/portland-2016

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