International Training Programme

Mainstreaming Sustainable Urban Water Management

Centre for Science and Environment

Kenya Water Institute

Organised by
Centre for Science and Environment (CSE), New Delhi, India
In partnership with local host
Kenya Water Institute (KEWI), Nairobi, Kenya

Duration November 30 – December 4, 2015

Venue KEWI, Nairobi, Kenya

Language English

Contents

About Centre for Science & Environment (CSE)

The Centre for Science and Environment (CSE) is an independent public interest research organization that aims to promote an informed public opinion in favor of environmental sustainability and sustainable development. CSE started in year 1980 by late Mr. Anil Agarwal, a leading figure in India's environment movement, to analyze and study the relationship between environment and development.

CSE's work is widely acknowledged for its intellectual leadership and the institution has grown into one of India's most influential and highly vocal environmental NGO. CSE received prestigious international awards ***Stockholm Water Prize*** in the year 2005 and the ***Prince Albert II of Monaco Foundation Water Award*** in the year 2008. CSE is actively working in India and South Asia (Bangladesh, Nepal, Bhutan and Sri Lanka).

The centre is recognized by the Government of India as:

National Knowledge Resource Centre (KRC) in the area of sustainable drinking water and sanitation by the Union Ministry of Drinking Water and Sanitation.

Centre of Excellence (CoE) in the area of sustainable urban water management by the Union Ministry of Urban Development.

Nodal Institute for conducting short & long term training programmes for environment regulators by the union Ministry of Environment and Forests (MoEF).

Some notable environmental programmes run by CSE include following:

Sustainable water management that mobilized the country through a water literacy campaign calling for decentralized solutions to water harvesting, control water pollution, urban sewage management, catalyzing policy changes at both national and state levels. In recognition for its efforts, the CSE was awarded the Stockholm Water Prize in year 2005, the highest international award in area of water management.

Food safety and toxins programme has created far-reaching changes in the policies and regulations governing the use of toxins such as pesticides and heavy metals. The two high profile studies (in year 2002 & 2003) that found high concentrations of pesticide residues in bottled water and soft drinks served to highlight public health concerns and are important contributions in managing the toxic fallouts of rapid economic and industrial growth.

Sustainable urban transport and air quality management that has achieved remarkable success in pushing for CNG in all public transport in Delhi and more recently, in pushing for better urban mobility options that have made significant impact on the city's air quality.

Sustainable industrialization is an innovative programme that rates the environmental performance of industry in high environmental impact sectors (such as cement, automobiles, pulp and paper, chlor- alkali, among others), helps motivate industries to make improvements in reducing pollution and improve efficiency of resource use. Green Rating Project (GRP) serves as a model for an alternative form of civil society governance to control industrial pollution in India, and today a good GRP rating is considered as a valuable certification about a company's environment performance.

Addressing the urgent need to introduce meaningful environmental education at the school level in India, CSE's **Green Schools Programme** goes beyond nature education to get children to evaluate and precisely measure their own environmental footprint using the Green Schools

Manual. The Green Schools Network today includes more than 5,000 schools across the country, and the manual has been translated into Hindi, Kannada, Punjabi and Arabic. In addition, *Gobar Times*, a monthly magazine for children, keeps students informed and inculcates environmental values.

CSE has worked closely with journalists for long time, recognizing the powerful role that mass media plays in setting public agendas and shaping public opinion. CSE's **Environmental capacity building with emphasis on media** has several components, from regular briefing workshops for working journalists, maintaining a syndicated feature service to fellowship programmes that enable journalists to take time out to study and report specific issues in-depth.

In the year 2004 Anil Agarwal Green College (AAGC), an education and training initiative of CSE, was established to communicate the science, complexity and politics of environment across India, South Asia and the world. It seeks to build a constituency and cadre of knowledgeable, skilled and committed environmentalists - from students, decision-makers, field-level practitioners, civil society groups, journalists, lawyers, and concerned citizens. As part of this mandate, AAGC serves as a research, academic and capacity building hub that conducts a number of short and long-term courses and training programmes. Short-term courses range from technical workshops on how to build rainwater harvesting systems and decentralized wastewater treatment structures to policy briefings on ecological poverty and food safety, to hands-on training on environmental communication, information management and advocacy. Other training programmes – such as Environment Impact Assessment (EIA), Managing Urban Growth, and Urban Mobility, seek to actively engage with industry representatives and regulators in the country and across the developing world. Over the past five years or so, AAGC has conducted more than 100 training programmes and trained more than 2,500 participants from India and around the world. AAGC has conducted several longer-term courses, one set of which targets students and young professionals from India (titled **'Agenda for Survival'** which is held in June each year), and others that target international students (titled **'Challenge of the Balance'**, which is held once in Winter and once in Summer each year).

In order to upscale the training and capacity building activities, CSE is establishing an **Environment Training Institute (ETI)** at Tijara Block in the Alwar District of Rajasthan State in India. ETI aims to strengthen capacities within the government, in the civil society, in the private sector and practitioners and the academia, and will be supported by state-of-the-art research, information services and a platform to interact and exchange ideas on best practices. The ETI will conduct short-term and long-term training programmes, tailored for different target groups, on a wide array of environment and development issues and topics. To encourage participation, the courses offered will be linked to the training needs of the specific target groups and will be synergized with certificate and diploma courses offered by mainstream universities, so that there is value addition to the career of the persons taking the courses.

Global Water Programme of CSE

The water programme of CSE has evolved to help in establish policy principles, innovative technologies and implementation strategies for water and wastewater management in India. These efforts have been directed towards meeting the twin goals of laying the foundations for a water prudent society and adapting for climate resilience.

CSE has been an important thought-leader in water management sector. It has already influenced global policies and strategies to focus on the need for technologies to augment water resources in a decentralised manner through rainwater harvesting and to use that water to optimize on benefits. In 2010, CSE started the South Asia Water Programme involving three countries viz. Bangladesh, Nepal and Sri Lanka. Important objectives of the programme include awareness generation about environment and development as well as capacity building of societies to understand and deal the environmental issues. The programme is successfully ongoing since past five years. Though the main aim of the programme was training government and non-government partners, it has diversified to model curriculum development, knowledge support to a regional rain convention and providing technical guidance on the implementation of model projects related to sustainable water management. In December 2013, a meeting was conducted on South Asia Water Programme Partners and Practitioners at New Delhi, India to review the knowledge gained and shortcomings of this programme. This was essentially to decide a way forward for this programme to take the partners to the next level.

We believe this experience needs to be leveraged to share solutions with other countries in the developing world from South America, Africa and Asia that are enjoined in a common struggle to find ways of meeting the needs of urban and rural populations in the current water and wastewater paradigm which are affordable and sustainable.

In coming five years, the Centre would like to build on expanding this work to other regions in the world in particular focusing on select countries in Africa through experience sharing workshops to identify gaps and challenges in urban water management and complement it later by capacity building in the region through tailor made training programmes.

Recently in February and March 2015, the Centre organized India-Africa experience sharing workshops and a training programme on urban rainwater harvesting and decentralized waste water treatment and reuse. The purpose of these two events was to understand about status of water and waste water management in African countries. In both the events around 14 countries participated from all across Africa. The invited participants represented various government and non-government institutes providing services and working in water and sanitation management aspects. Also CSE Water team on invitation by **Rwanda Natural Resources Authority** and **Rwanda Ministry of Infrastructure** conducted a training, supported strategy workshop followed with roundtable meetings to develop a long term partnership. The water team is partner in the **Global Faecal Sludge Management E-Learning Alliance** which is a platform to facilitate development and empower the dissemination of knowledge on faecal sludge management through e-learning means, so that the sanitation challenges can be embraced with deeper insight, advanced knowledge and greater confidence.

To find out more about workshop visit http://www.cseindia.org/content/india-africa-experience-sharing-workshop-urban-rainwater-harvesting-mainstreaming-sustainabl

To find out more about training programme in Sri Lanka visit http://cseindia.org/content/international-training-programme-mainstreaming-sustainable-urban-water-management-urban-rain

To find out more about training programme in Rawanda visit: http://cseindia.org/content/workshops-mainstreaming-rainwater-harvesting-rwanda-29-june-1-july-2015-kigali-rwanda-1

About Kenya Water Institute (KEWI)

Training for the Water Sector started in 1960 with a Unit in the Hydraulic Department of Public Works to train water supply operators. In 1970, the unit was upgraded to a training section under the same Department. When the Water Department was transformed to a fully-fledged Ministry of Water Development in 1974, the training section became the Water Development Staff Training School. In 1985, the Institute became a National water training institution and was henceforth referred to as Kenya Water Institute (KEWI). An Act of Parliament to establish the Kenya Water Institute was enacted by Parliament in 2001 and assented to by the President on 31st December 2001. According to the KEWI ACT (No.11 of 2001), the Institute is a semi-autonomous corporate body serving the entire water sector in Kenya. The Applied Water Research (AWR) department was merged with Training department to form the new KEWI in 2003.

Vision

To be the preferred Institute for water training and research in the Africa region

Mission

To support the realisation of water security through competence-based training, applied research, consultancy and outreach services in the East African region for sustainable development

Mandate

Provide services in human resource development, consultancy, research and outreach to the water sector.

A forum for effective collaboration between public and private sector and other interested parties in the water sector.

- To provide training programs, seminars & workshops for the water sector.
- To produce publications aimed at maintaining standards in the water sector.
- To conduct examinations and award certifications

About the training programme

The Centre for Science and Environment is organising an international training programme jointly with Kenya Water Institute (KEWI) local partner and host institution at Nairobi.

Aim:
Capacity building of practitioners both state and non state actors in Africa to implement best management practices (BMPs) for sustainable urban water management.

The five days training will be interactive and include following themes:

November 30-December 1, 2015

First two days of the training will be on **Urban Rainwater Harvesting (URWH)** and will focus on urban rainwater harvesting (RWH) and the potential it holds in augmentation of water availability by using public spaces to recharge their groundwater or store and reuse the rainwater. The training will also showcase examples to bring in required laws to enable individuals to undertake rainwater harvesting. The participants will get the opportunity to plan and design a rainwater harvesting system.

December 2-3, 2015

Training on **Decentralised Wastewater Treatment Including Reuse**, the two days programme will focus on decentralised wastewater treatment (DWWT) including recycling and reuse. The training will provide hand on experience in planning, designing implementation of DWWTS and monitoring.

December 4, 2015

Following training programme, one day field **Exposure Visit** is planned to demonstrate decentralised water management at residential or institutional scale. The visit will provide an opportunity to interact with implementers of rain water harvesting and decentralised wastewater management system.

Both the trainings are conducted based on state of the art teaching – learning tools consisting of interactive sessions, experiential learning using detailed case studies, working in groups on planning and designing and class room lectures/instructions.

Faculties and Organisers

 **Suresh Kumar Rohilla** Programme Director, Water Management Unit, Centre for Science & Environment, New Delhi Email: srohilla@cseindia.org	**Dr. Rohilla,** is steering the capacity building of urban local bodies (CBULB) programme sponsored by Ministry of Urban Development, Government of India at Centre for Science and Environment (CSE). He has a vast experience in planning and also for infrastructure projects in the area of water and environmental sustainability especially in urban areas. He has been nominated as the Expert Member of many committees set up by Central / State Governments for water programmes and international professional bodies. He holds a doctoral degree from Queen's University Belfast, UK. He was a Fulbright Fellow affiliated at University of California, Berkeley, USA and is a Visiting Fellow at School of Planning, Architecture and Civil Engineering at Queen's University Belfast, UK.
 **Dr. Leunita A. Sumba** Acting Director, Kenya Water Institute, Nairobi Email: l_sumba@hotmail.com	**Dr. Sumba** is the Acting Director of the Kenya Water Institute and has served in Kenya Water Institute for last 20 years at various capacities. She holds a PhD in Biology and a postgraduate Diploma in Integrated Water Resources Management. Previously she was a lecturer, Principal Water Research officer and the Head of the Water Resources Management Department. Her academic and research interests include: Drinking Water Quality; Environmental Water Quality, Integrated Water Resources Management; Rainwater harvesting; interaction between Water, Environment, Health, and Sanitation including the epidemiology of waterborne and water-related diseases and Gender and Water governance. Dr. Sumba is currently working on Ceramic filters as household water treatment solutions.
 **Mahreen Matto** Deputy Programme Manager Centre for Science & Environment, New Delhi Email:mahreen@cseindia.org	**Dr. Matto** is doctorate in Environmental Biochemistry from Aligarh Muslim University, India. She has published 9 international research articles in the area of industrial wastewater treatment by enzymes in reputed journals like Journal of Hazardous Materials, Chemosphere, and Journal of Molecular Catalysis B: Enzymatic, etc. She also has experience in journal production and research. She has supervised post graduate students in their summer research projects at Department of Biochemistry, Aligarh Muslim University, India from 2005-2008. Presently she is engaged in research and capacity building of various stakeholders in the area of sustainable water management. Dr. Matto has also been involved in the documentation of case studies on decentralized wastewater treatment systems across India and rainwater harvesting: Case studies from different agro-climatic regions.

 **Shivali Jainer** Senior Research Associate Centre for Science & Environment, New Delhi Email: shivali@cseindia.org	**Ms. Jainer** is Graduate in Architecture and Post Graduate in Environmental Planning from School of Planning and Architecture, Delhi. She is trainer in Urban Water Management training programs for municipal functionaries, practitioners, academicians, policy makers, architects. She is mainly working in area of water sensitive urban design and planning and is involved in development of tools for designing sustainable urban drainage system options in urban areas. Her previous experience includes training and research on urban metabolism and growth with field of research focusing on evolving strategies for storm water drainage and resource management in urban areas.
 **Chhavi Sharda** Senior Research Associate Centre for Science & Environment, New Delhi Email: chhavi@cseindia.org	**Ms. Sharda** is post graduate in Environmental Engineering. She holds PG Diploma in Urban Environmental Management and Law. She has been conducting technical sessions in capacity building programs for municipal functionaries, practitioners, academicians, policy makers on decentralized wastewater treatment for water sensitive planning and urban lake conservation since two years. She has documented various case studies on decentralized wastewater treatment systems across India. She also supports technical consultations to support implementation of decentralized wastewater treatment projects. She has keen interest in improving her knowledge on sustainable water/ wastewater management approaches.
 **Eric K Wamiti** Ag. Head of Short Course Kenya Water Institute Email: ewamiti@yahoo.com	**Mr. Wamiti** is currently head for short courses at KEWI. He is also currently pursuing PhD at Nairobi University undertaking a research project titled Application of Bayesian Models to Improve Estimate of Precipitation. He holds a master's degree in social statistics and BEd in Science. In addition, he has undergone a post graduate course in Earth Observation and GIS to support IWRM.

Training Programme Schedule

Time	Module	Session Details	Faculty
Day 1 (30th November 2015)			
9:00 - 10:45	**Introduction to the training programme**	Introduction of participants	**MM and KN**
		Introduction of CSE and KEWI / Training Programme	
		Tea break (10:30 to 10:45)	
10:45 - 12:30	**Urban Water Challenges & BMPs**	Urban water challenges in developing countries: Special reference to urban rainwater harvesting (URWH)	**MM**
		Urban water challenges and need for RWH in Kenya	**KN**
		Water Sensitive Design: Introduction of Best Management Practices (BMPs)	**CS**
12:30 -16:15	**Planning of URWH systems**	Introduction to RWH through Documentary film: "Rain Catchers"	**CS**
		Lunch break (13:30 to 14:30)	
		Components of URWH & Data collection requirements	**SJ**
		Tea break (16:00 to 16:15)	
16:15 - 17:30	**Tools and Techniques to design URWH**	Designing of URWH: Storage and recharge	**SJ**
17:30- 17:40	Feedback: Day 1		**MM**
Day 2 (1st December 2015)			
9:00 - 15:30	**Tools and Techniques to design URWH**	**Reflection Session**	
		Do it Yourself: Plan & Design URWH	**SJ and MM**
		Tea break (11:00 to 11:15)	
		Do it Yourself: Plan & Design URWH	**SJ and MM**
		Group Presentations	
		Lunch break (13:30 to 14:30)	
		Operation and Maintenance and economic for URWH	**MM**
15:30 - 17:30	**Surface Runoff/Flood Management Practices**	Documentary film: Designs that hold water - Sustainable drainage systems explained	**MM**
		Tea Break (16:00 to 16:15)	
		WSUD&P options at various scales	**SJ**
		Swales and Bio-retentions Ponds	**SJ**
		Group Exercise - Swales and Bio-retentions Ponds	**SJ**
17:30- 17:40	Feedback: Day 2		**MM**

Time	Module	Session Details	Faculty
Day 3 (2nd December 2015)			
9:00 - 11:00	**Urban Wastewater Challenges & BMPs**	Urban waste water challenges in developing countries: Special reference to decentralised waste water treatment (DWWT)	**MM**
		Urban wastewater challenges and need for DWWT in Kenya	**KN**
		Decentralised waste water management: Introduction to BMPs	**MM**
		Tea break (10:45 to 11:00)	
11:00 - 14:00	**Planning of DWWT systems**	Introduction to DWWT through Documentary film "Clean your Act"	**CS and MM**
		Group Exercise – Centralised and Decentralised Wastewater Treatment Systems	
		Wastewater characteristics and data collection	**CS**
		Lunch break (13:300 to 14:30)	
14:30 - 17:30	**Tools and Techniques to design DWWTs**	Designing of DWWT systems	**CS**
		Tea break (16:00 to 16:15)	
		Construction, costing and economics for implementing a DWWT system	**MM**
		Operation and Maintenance of DWWT systems	**CS**
17:30 - 17:40		Feedback : Day 3	**MM**
Day 4 (3rd December 2015)			
9:00 - 15:30	**Tools and Techniques to design DWWTs**	**Reflection Session**	
		Do it Yourself: Plan and design of DWWT system	**CS**
		Tea break (11:00 to 11:15)	
		Do it Yourself: Plan and design of DWWT system	**CS**
		Lunch break (13:30 to 14:30)	
		Group Presentations	**MM**
15:30 - 16:00	**Natural Treatment Systems in DWWT**	Constructed wetlands and Bio-remediation	**MM**
		Tea break (16:00 to 16:15)	
16:15 - 17:30	***	Feedback, certificate distribution and closing ceremony	**SR**

SR- Dr. Suresh Kumar Rohilla, MM-Dr. Mahreen Matto, SJ- Ms. Shivali Jainer, CS-Ms. Chhavi Shrarda, KN- Kenya resource person from KEWI and Kenya Water for Health Organisation (KWAHO)

Day 5 (4th December 2015)

Time	Module	Site Name	Facilitators
8:30 onwards	**Field Exposure Visit**	CEMASTEA, Karen	Ms. Carol, KEWI

List of Reading and Reference Material

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FOLDER 2- RWH

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FOLDER 3- DWWT

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CSE Publications & Reports

CSE publishes books, manuals and reports on environmental issues for knowledge dissemination. Some of recognized publications related water and sanitation are shown below. For more information on the publications visit CSE Store.