International Training Programme

Decentralised Wastewater Treatment including local reuse

Centre for Science and Environment

GAMA-SWP

Ministry of Local Government and Rural Development

Organised by
Centre for Science and Environment (CSE), New Delhi, India

In partnership with local host
Sanitation Directorate, Ministry of Local Government and Rural Development, Ghana under Greater Accra Metropolitan Area, Sanitation and Water Project (GAMA-SWP)

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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 4 Training Programme on Mainstreaming Sustainable Urban Water Management 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 longterm 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 Programmeinvolving 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 onfaecal 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 Ministry of Local Government and Rural Development (MLGRD)

The Ministry of Local Government and Rural Development, Ghana exists to promote the establishment and development of a vibrant and well resourceddecentralised system of local government for the people of Ghana to ensure good governance and balanced rural based development.

MLGRD is the lead agency in the sanitation sector, responsible for:

(a) Co-ordination and formulation of environmental sanitation policy including monitoring and evaluation;
(b) Developing and issuing technical guidelines on environmental sanitation services and their management;
(c) Promulgation of national legislation and model bye-laws;
(d) Direction and supervision of the National Environmental Sanitation Policy Co-ordination Council
(e) Facilitating the mobilization of funds for sector plans and programmes

Within MLGRD, the Environmental Health and Sanitation Directorate (EHSD) plays the leading role in supporting environmental sanitation. EHSD has units for Environmental Health and Management, Technical Services and, Environmental Education and Applied Research. The functions of the EHSD include:

(a) Provision of guidance to MLGRD on environmental sanitation sector planning, policy and legislation;
(b) Provision of technical assistance to District Assemblies and service providers;
(c) Co-ordinating and disseminating the results of research in the environmental sanitation field;
(d) Regulation of all service providers both public and private

According to the Environmental Sanitation Policy, the Metropolitan, Municipal and District Assemblies (MMDAs)through their Waste Management Units/Departments are responsible for implementation of liquid waste and solid waste management functions.The District Assemblies are mandated to regulate, control, and co-ordinate the activities of all agencies involved in liquid waste management services.

Institutional strengthening and capacity enhancement of all frontline and allied service providers is recognized as the number one priority for achieving sustainable services in the Policy.

The Government of Ghana, acting through the Ministry of Local Government and Rural Development, is implementing the Greater Accra Metropolitan Area Sanitation and Water Project (GAMA-SWP), funded through an IDA grant. The institutional strengthening component of the project provides technical assistance to MMDAs, including the promotion of private sector initiatives. It also provides leadership and training Public health engineers seconded to the WMDs in GAMA and countrywide.

About the training programme

This training is organized by Centre for Science and Environment and is part of efforts made by the Environmental Health and Sanitation Directorate (EHSD) and the Greater Accra Metropolitan Area Sanitation and Water Project (GAMA SWP) Capacity Building Team to develop the capacity of the 2012/2013 batch of Public Health Engineers.

The training:

- Provides knowledge, skill development and attitude change of participants towards sustainable decentralised wastewater management.
- Builds capacity ofparticipants in the area ofplanning, designing and implementation of low cost decentralised wastewater treatment systems at different scales.
- Provides a platform to share experiences on existing and upcoming policies and practices from India and South Asia on wastewater management.
- Builds south-south network of practitioners for mainstreaming sustainable wastewater management practices.

Structure and duration

The three days training programme will have two days of classroom sessions that will focus on improving understanding on the need of decentralised wastewater management, planning and designing of decentralised wastewater treatment (DWWT) structures and will provide hands-on experience to do so. The training will also talk about enabling policy framework including probable reuse options.

Following the classroom sessions, one day field exposure visit (optional) is planned that will demonstrate decentralised waste-water management at residential or institutional scale. The visit will provide an opportunity to interact with implementers.

Training methodology

The training is 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.

TrainingProgramme Schedule

Day 1 (March 14, 2016)		
Time	**Module**	**Session Details**
9:00 - 9:45	**Introduction and Overview**	Welcome and introduction of participants
		About MLGRD, welcome address
		About CSE and the training programme
9:45 - 13:00	**Urban Wastewater Challenges**	Tea/ Coffee break – 15 mins
		Urban waste water scenario: Key issues, challenges, existing policy framework, regulations (DWWT) in Ghana
		Urban wastewater scenario: SFD as a tool for decision makers
		Introduction to DWWT through Documentary film "Clean your Act"
		Group Exercise – Centralised and Decentralised Wastewater Treatment system
13:00 -17:30	**Tools and Techniques to design DWWTs**	Wastewater characteristics and data collection-I
		Lunch break (13:30 to 14:30)
		Wastewater characteristics and data collection-II
		Introduction to DWWT system
		Tea/ Coffee break – 15 mins
		Designing of DWWT system
		Feedback
Day2 (March 15, 2016)		
9:00 - 16:00	**Hands on experience**	Reflection session
		Operation and maintenance of DWWT system
		Construction, costing and economics for implementing a DWWT system
		Do it Yourself: Plan and design of DWWT system
		Tea/ Coffee break – 15 mins
		Do it Yourself: Plan and design of DWWT system
		Lunch break (13:30 to 14:30)
		Group Presentations
16:00 - 17:30	**Natural treatment systems for DWWT – Case studies**	Tea/ Coffee break – 15 mins
		Best Management Practices at various scales – case studies from India at various scales
	***	Feedback, certificate distribution

***** Optional Field visit on Day 3 that showcases a decentralised wastewater treatment practice in Accra.

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.
 **Henrietta Osei-Tutu** Public Health Engineer, Ministry of Local Government and Rural Development, Ghana Email: henriettaot@gmail.com	**Ms. Osei-Tutu**is a Sanitary Engineer at the Environmental Health and Sanitation Directorate of the Ministry of Local Government and Rural Development, Ghana. She is responsible for providing strategic direction and technical assistance to Metropolitan, Municipal and District Assemblies (MMDAs) in the sustainable liquid waste management.Shehas assisted in coordinating a number of sanitation projects such as the Ghana Netherlands WASH Programme and the GAMA Sanitation and Water Project. MsOsei-Tutu has keen interest in building the capacity of Public Health Engineers in the MMDAs. Prior to that, she worked as Water & Sanitation Officer for Global Communities and the Head of Laboratories for an Industrial Wastewater Treatment Company in Ghana. She has also written number of research publications in integrated urban water management. She holds a Master of Science degree in Sanitary Engineering and is a member of the Ghana Institution of Engineers (Civil Division).
 **Bertha Darteh** Capacity Building Coordinator Greater Accra Metropolitan Area Sanitation and Water Project, Ministry oof local Government and Rural Development	**Ms. Bertha Darteh** has over 14 years post qualification experience as a Civil Engineer with specialising in water supply, sanitation and environmental engineering. She is a member of the Ghana Institution of Engineers (Civil Division). She has extensive experience in project management, technical audit of projects, capacity building, training and research in water, sanitation, environmental assessment, climate change, integrated urban water management, gender and social inclusion issues. Bertha currently works with the Environmental Health and Sanitation Directorate (EHSD) of the Ministry of Local Government and Rural Development as a Capacity Building Coordinator. This is as part of the World Bank supported Greater Accra Metropolitan Area (GAMA) Sanitation and Water Project. As part of her work, Bertha is responsible for providing technical assistance and capacity development support for the EHSD and other Metropolitan and Municipal Assemblies (MMAs) including 11 MMAs in GAMA. Her previous experiences include working as a lecturer and also as a facilitator of the SWITCH Accra Learning Alliance.

 **Chhavi Sharda** Training Coordinator& Senior Research Associate Centre for Science & Environment, New Delhi Email: chhavi@cseindia.org	**Ms. Sharda** 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 three years.She also supports technical consultations to support implementation of decentralized wastewater treatment projects. Previously, she has documented various case studies on decentralized wastewater treatment systems across India. She is an Engineer with her post graduation in Environmental Engineering and also holds PG Diploma in Urban Environmental Management and Law. She has keen interest in improving her knowledge on sustainable water/ wastewater management approaches.
 **Shantanu Kumar Padhi** Research Associate Water Management Unit, Centre for Science & Environment,New Delhi Email: shantanu@cseindia.org	**Mr. Padhi**has experience in research in the SFD promotion initiative. He is also involved in capacity building for municipal functionaries in the subject of septage management. He holds a Masters degree in Environmental Engineering and Management and B.E in Environmental Engineering. He is involved in extensive research on septage management. He is also involved in training and capacity building of various practitioners and stakeholder on subjects related to septage management. His field of interest includes sanitation, water and wastewater treatment (conventional/ non-conventional methods).

List of Reading and Reference Material (DWWT)

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2. Jacobsen, Michael, Michael Webster, and KalanithyVairavamoorthy, eds.*The future of water in African cities: Why waste water?*. World Bank Publications, 2012.
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9. Robbins. D.,Strande L., &Doczi J. (2012): Sludge Management in Developing Countries:experiences from the Philippines, Water21, Issue 4

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Website links for Reference Readings

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2. Shit Flow Diagrams of the various cites (SFD Worldwide) - http://sfd.susana.org/sfd-worldwide

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.