

June 2016

Coca-Cola Department of Regional Water Studies

Progress report
April 1- June 30 2016



Highlights

1. Academic

- a. **Graduating batch:** The first batch of M.Sc/M.Tech Water Science and Governance students shall pass out on 15 Jul 2016. The batch had 08 M.Sc students and 11 M.Tech students. The convocation ceremony for these students shall be held in the first quarter of 2016. The final placement status of the students as of date is as follows:

S.no.	Name of the student	Internship organisation	Placement Status
1	Akash Purohit	GE Power and Water	Working as intern with GE, Placement confirmation awaited
2	Anurag Prakash	TERI on USAID Project	Working on Urban WASH Project, Placement confirmation awaited
3	Deepali Goyal	Vyakti Vikas Kendra India (The Art of Living)	Placed with Vaykti Vikas Kendra
4	Manas Awasthi	VA TECH WABAG LTD.	Not placed. Not interested to continue with WABAG
5	Mohd Zeeshan	The Energy and Resources Institute (TERI)	Intern at TERI. Placement confirmation awaited
6	Praveenkumar Subramani	DHAN Foundation	Placed with Dhan Foundation
7	Priyank Jain	TERI University & GE Water	Working as intern with GE, Placement confirmation awaited
8	Qazi Syed Wamiq Ali	Coca Cola and TERI University	Placement awaited
9	Rajesh Ramamoorthy	TERI University and Clearford Water Systems	Intern at Water Resource Group, Placement confirmation awaited
10	Ruchika Satish	Hindustan Coca-Cola Beverages Private Limited	Placement awaited
11	Vishal Singh	TERI	Placement awaited
12	Aparna Gupta	TERI University	Placed as Intern with NIUA
13	Bedashree Choudhury	TISS & TERI University	Internship to continue till Sep 2016
14	Himanshi Gupta	TERI and Water Health India	Placement awaited
15	Niyati Seth	The Energy and Resources Institute (TERI)	Intern at TERI. Placement confirmation awaited
16	Pallavi Kharbanda	Coca-Cola India Pvt. Ltd	Placed with CSE
17	Prapti Verma	TERI and GE Water	Working as intern with GE, Placement confirmation awaited
18	Sakshi Chawla	Coca-Cola India Pvt.Ltd.	Placement Awaited
19	Shoobhangi Tyagi	Coca Cola & Environmental Pollution Laboratory , Department of Environmental Studies, University of Delhi	Placement awaited

Some of the research projects carried out by the students as part of their Master's projects are as follows:

- i. **Comparative study of urban slums of south Delhi-Water availability and sanitation issues**

Abstract: This project is about various water related problems faced by today's population living in the urban slums. The project was carried out in a comparative manner where three different slums namely; Ekta Vihar Slum, Ghousiya Colony and Vasant Vihar slum, located in the South Delhi region of India, face many similar water and sanitation related problems and few very different problems. The case in all these three slums is a mixture of political issues, gender inequality, lack of knowledge and inadequate availability of resources. Water testing was done in each of the slum for four different parameters namely; Alkalinity, TDS, Total coliform and Nitrate, to get a scientific idea about the condition of drinking water in these localities. Results of these tests as well as of the survey carried out are depicted in tabular and graph forms to give a clear image and the thesis concluded by ranking 10 different issues/problems occurring in the lives of the slum dwellers living in these slums and final comparison done based on these rankings using spearman rank correlation coefficient system. The study of these slums give a very different picture to today's water conditions as it shows that water availability is not the only issue to be looked into but proper disposal of waste water and sanitation waste should also be a major part of our concern.

Student: Aparna Gupta

ii. Comparison of water use pattern at two major railway stations in Delhi

Abstract: Decreasing per capita water availability in India, due to increasing population and living standard of people, water use pattern in every sector needs to be revised. Efficient water management is needed to be implemented in present scenario by all the sectors. Industries being second largest in consumption of water after agriculture sector, needs efficient water management due to increasing pressure on them because of increasing population, degradation and over exploitation of water resources. Water being primary raw material for industries, it is very necessary to develop an integrated industrial water management strategy for them. Water audit is one of the ways for effective water management. Water audit helps in optimizing water uses, zero discharge, and reduction in water losses hence resulting in increasing water use efficiency and helps in finding new solution for water conservation activities.

Two railway stations were the focus in this study from the world's largest rail network i.e. Indian Railways. By performing water audit in these two stations, water consumption in their different areas were calculated and we tried to find out interventions that can be implemented to increase their water use efficiency and find out different opportunities to increase water utility function. In order to increase or promote water use efficiency within the Indian Railways, there can be incentives or disincentives based on their water use pattern, Indian Railways plans to implement the recommendations of the water audit report submitted by TERI.

Students: Niyati Seth, Vishal Pratap Singh, Mohammad Zeeshan

iii. Study of Infiltration Rate Based on Soil Profiles in Urban Areas of South-West Delhi

Abstract : The Vasant Kunj and Vasant Vihar area of South West Delhi was taken up for studying infiltration rate in urban soil profiles. The top soil was studied to understand the particle size distribution using dry Sieve Analysis and Double Ring Infiltrometer to determine the rate of infiltration. On the basis of data analysis at 30 locations it was revealed that some locations have loamy sand soil and others have sandy loam soil. The infiltration rate varied from 0.30 cm/hr. to 5.45 cm/hr. Variation in infiltration rate depends upon vegetative cover, level of compaction, soil porosity and presence of dust particles and availability of plastic material/debris in top soil. Vehicles movements and fields where gardening activities are not pursued would compact the soil surface and reduces infiltration. Standard empirical infiltration models such as Horton model, Green-Ampt model, Philip’s model and Kostiakov model for various soil types at different locations were used. It has been found that for urban compacted soil for most of the locations Horton’s model was the best mode to be adopted. As per USDA hydrological soil classification, soil appear to fall at some locations under Group A category having high infiltration rate and also under Group B category having moderate infiltration rates when systematically wetted and comprises loamy sand and sandy loam soil types. On the basis of given soil properties such as bulk density, soil moisture content based on various particle grain sizes (gravel, coarse sand, medium sand, fine sand, silt and clay), an attempt has been made to develop a soil infiltration rate by using multivariate multiple linear regression model (MMLRM) through matrix method.

Student:Syed Qazi Wamiq Ali

b. **Syllabus Revision:** Based on the feedback received by the various stakeholders the syllabus and structure of the M.Sc/M.Tech Water Science and Governance programs have been revised and approval of the same has been received both by the board of studies and the academic council. The new structure of the program is as follows:

Semester	M.Sc – Courses with credit	M.Tech – Courses with Credit
First	Gender, Rights and Equity perspective for sustainable water management(3)	Gender, Rights and Equity perspective for sustainable water management(3)
	Water Quality Monitoring and Assessment (3)	Water Quality Monitoring and Assessment (3)
	Applied Hydrology and Meteorology(3)	Applied Hydrology and Meteorology (3)
	Geo-informatics for Water Resources (4)	Geo-informatics for Water Resources (4)
	Water Planning and Management(3)	Water Planning and Management(3)
	Social Research Methods (4)	Research Methodology(4)
	Water Resources Institutions and Governance(3)	Water Resources Institutions and Governance (3)
	Hydraulics (3)	Advanced Hydraulics (3)
	Environmental Statistics(3)	Stochastic Modelling (4)
	Field Trip (1)	
	30 Credits	31 Credits
Second	M.Sc (with credits)	M.Tech (with credits)
	Technical Writing (A)	Technical Writing (A)
	Water Resource Economics (4)	Water Resource Economics (4)
	Water Security and Conflict Management (2)	Water Security and Conflict Management(2)
	Irrigation Water and Drainage Management (4)	Irrigation Water and Drainage Management (4)
	Water Audit and Demand Management(3)	Optimization Techniques for Water Management (4)

	Aquatic Eco-system Management(3)	Water Quality Modelling and Application (4)	
	Integrated Watershed and River basin management (3)	Advanced Geo-informatics for Water Resources (3)	
	Water Supply and Sanitation(3)	Design of Water Supply and Sanitation Systems (4)	
	Field Trip (1)		
	23 Credits	26 Credits	
Third *	M.Sc (with credits)	M.Tech (with credits)	Elective/ Core
	Water Law (3)	Water Law (3)	Core
	Industrial Pollution Control (3)	Industrial Pollution Control (3)	Elective
	Glacier Hydrology (3)	Glacier Hydrology (3)	Elective
	Integrated Impact Assessment (4)	Integrated Impact Assessment (4)	Elective
	Climate Change Water Resources and Agriculture (3)	Climate Change Water Resources and Agriculture (3)	Elective
	Groundwater Hydrology and Pollution (3)	Groundwater Quality Modelling (4)	Elective
	Project Work Report (6)	Project Work Report (6)	Core
Fourth	Project Work Dissertation(16)	Project Work Dissertation (16)	Core

3. Events, Workshops and Seminars

a. **SWASH** – Save water and Save Humanity: The students and faculty of the Coca Cola Department of Regional Water Studies, TERI University organized their annual event, SWASH (Save Water and Save Humanity) on 06 April 2016. The theme for this year’s programme was “SWASH- InSOULs of WE- In search of Urban Leaders of Water and Environment”. The event was organized keeping in mind to involve young leaders who wished to be a part of the ‘World We Want’ by developing information education communication (IEC) material to address urban water and environment issues preferably aligned with the National Water Mission, SDGs, and the Government of India’s flagship programme such as Swachh Bharat Mission, Smart Water Management under AMRUT and Smart City. The event started with the inaugural session with the lighting of lamp by our dignitaries. The welcome address of the event was delivered by Dr. Leena Srivastava, Vice Chancellor, TERI University. She brought out the ensuing water crisis and the challenges that are there ahead of us in managing our water resources. She further highlighted how Coca Cola agreed to support the Water Science and Governance program as they truly believed in an inter-disciplinary approach to managing water. Priyank Jain, student of the department talked about “Water and Jobs”. His focus was on two areas -“Acceptability of students with skills in niche areas like water management” and the “Prospects of the organizations working in niche areas.” This was followed by the keynote speech from Mr. Ishteyaque Amjad, Vice President; Public Affairs & Communication, Coca Cola India. He threw light on the fact how information communication technology has changed the entire world in just one generation. He also emphasized on how there is a first mover advantage for students who have started early in the water sector. As water professional,



they can be the trend-setter in this field. He also added that there is a possibility of civil war for water if the water scarcity is not managed.

b. **School University Network (SUN):** The Department of Regional Water Studies at TERI University organized two water awareness and sensitization programmes for school children under School University Network (SUN) programme institutionalized by TERI University in the month of April 2016. As part of this programme students from Kendriya Vidhyalaya and Pathways visited TERI University and learnt about different aspects of water sustainability over two hours of highly interactive activity-based session. The students from both the schools very highly energized and actively engaged in all the exercises that they were asked to do. The fervour with which they participated was evident from the creativity that emerged in their presentations. It also gave us the confidence that youth of today is willing to learn and engage if presented with an opportunity. At the end of the session, the students were assigned projects on water use efficiency, water conservation, water treatment and economic and social aspects of water revolving around the Sustainable Development Goals (SDGs). The same batch of students shall return back to TERI University after three weeks to present their study.



c. **National Symposium on Geogenic Contamination of Ground Water:** TERI University in association with USAID organised the National Symposium on “Geogenic Contamination of Groundwater” GCG 2016 on 22 April 2016. The event was inaugurated by Mr. Paul Seong from USAID and Prof. J McArthur, Lead of Arsenic Research Group, University College London was the keynote speaker. The event also had oral presentations and poster presentations by scientists and researchers working in this field across the country.



4. USAID- Institutionalized Seminar Series

This seminar series is designed to address key issues in the WASH sector, so that wide range of students and working professionals get exposure to the latest techniques, innovations and interventions, in continuation, we held the following expert lectures.

a. **Technologies for Water Treatment and Reuse: Advanced Oxidation Processes (AOP)**

Dr. Hadas Mamane, Faculty of Engineering and Water Research Center (TAU-WRC), Tel-Aviv University, Ramat Aviv, Tel Aviv, Israel

Wastewater reuse is one of the promising and most sustainable solutions to address global water scarcity. As such, wastewater reuse provides a major alternative to fresh water for the growing needs of water for food production. Soil-Aquifer Treatment (SAT) improves water quality during the percolation of treated wastewater through unsaturated soil. However, the use of reclaimed wastewater for irrigation is an important route for the introduction of organic compounds into the environment. Depletion of oxygen has been observed in the aquifer. Infiltrating more oxygenated water (via ozonation) has been suggested to enable using artificial recharge system in a more efficient way and provide high quality water from wastewater origin for reuse. She discussed another case study aimed at source treatment of hospital wastewater from the oncologic ward via a hybrid process of membrane bio reactor (MBR) and ozonation process, for organic micro pollutant (OMPs) removal. OMPs in hospital wastewater are toxic, mutagenic, concentrated up to several $\mu\text{g/L}$ and may provide a significant source of specific hospital originating compounds in domestic wastewater.

