

March 2015

Progress report of Coca-Cola Department of Regional Water Studies

**Progress report
January 1- March 31, 2015**



Highlights

- Student assessment for First Semester complete.
- Start of the Second Semester with 14 new taught courses.
- Participation in external events with significant presence of the Department
- Lectures delivered by faculty members of the Department in various events outside TERI University.
- Field trips organized for the students
- Start of lecture series and posting on “You tube”
- Organized annual department event “SWASH” on March 20, 2015

1. Student performance in First semester

All students have satisfactorily completed the first semester course work. Of the 8 MSc WSG students, 3 students could score SGPA (on a scale of 10) above 8.0 and another 3 scored between 7 to 8. Similarly, of the 11 M Tech students, 3 students have SGPA above 8.

2. Start of the second semester teaching program

Second semester teaching started from January 7, 2015 with 14 different course options offered to students. Of these 14 courses, 7 courses are being taught by faculty members of the department, 4 course by adjunct faculty member from TERI and TERI university and 3 course by external faculty members. In addition, lectures by external experts on specific themes are being organized in various courses. For e.g. Col P K Gautam from IDSA took eight lectures covering inter-state water issues between India and its neighboring countries. Dr Brijesh Yadav from IIT Rorkee delivered 16 lectures on ground water quality modeling. Mr R K Khanna, Ex Chief Engineer delivered a lecture on EIA of water infrastructure projects.

3. Participation in external events with significant presence of the Department

By Faculty Members

1. Prof. Arun Kansal participated in “ Groundwater sanitation research workshop” organized by Arghyan, Bangalore.
2. Prof. Arun Kansal chaired a session on “Role of water in Green economy” at YUVA meet on February 2, 2015.
3. Prof Arun Kansal chaired a session in the workshop “Safe water for underserved communities in urban india’ 17 Januray, 2015 at IIT Delhi.
4. Ms Ranjana Chaudhuri attended workshop titled “Better India through better water” organized by AWWA, February 3, 2015.
5. Ms Ranjana Chaudhuri participated in two day “water modeling training programme” (12th and 13th February,2015) at Department of Civil Engineering, IIT Delhi.
6. Ms Ranjana Chaudhuri participated in workshop on “Urban Water Systems in India-A Way Forward” organized by ICRIER 23rd February, 2015.

7. Prof Prateek Sharma chaired a session on “ Particulate apportionment and health” in a workshop organized by IIT Delhi, University of Birmingham, UK and Desert Research Institute USA and supported by UKIERI on January 8, 2015.

By Students

1. Session on Role of Youth in Sustainable Water Management in India Water Week at Pragati Maidan. Our students raised the following points in the event:
 - a) Create incentives for Youth to participate in sustainable management of resources - more job opportunities and pay-scales are most important
 - b) Make the knowledge of sustainability available in local languages and focus the section of 'youth' that is not able to go to school and college.
 - c) Include young students and professionals in the policy space along with the experienced bureaucrats and expert.



Photo: WSG student speaking in India Water Forum, 2015

2. Attended address by President Obama on January 27th, 2015

4. Lectures delivered

1. Prof Arun Kansal delivered a lecture on “Innovative method for biomethanation of canteen waste” at IIT Delhi on January 16, 2015
2. Prof Arun Kansal delivered a lecture on “Water-energy-climate nexus” at American Water Works Association on February 3, 2015.
3. Prof Arun Kansal delivered a lecture on “Sustainable Cities and Water Resources Management” at VNIT, Nagpur on February 27, 2015.

5. Field trip for students

During the first week of March, MSc students went to Keoladeo National Park, Bharatpur and MTech student went to National Institute of Oceanography at Goa. In addition, students visited IARI, New Delhi. Annexure I gives the details of the study trips undertaken by Students.

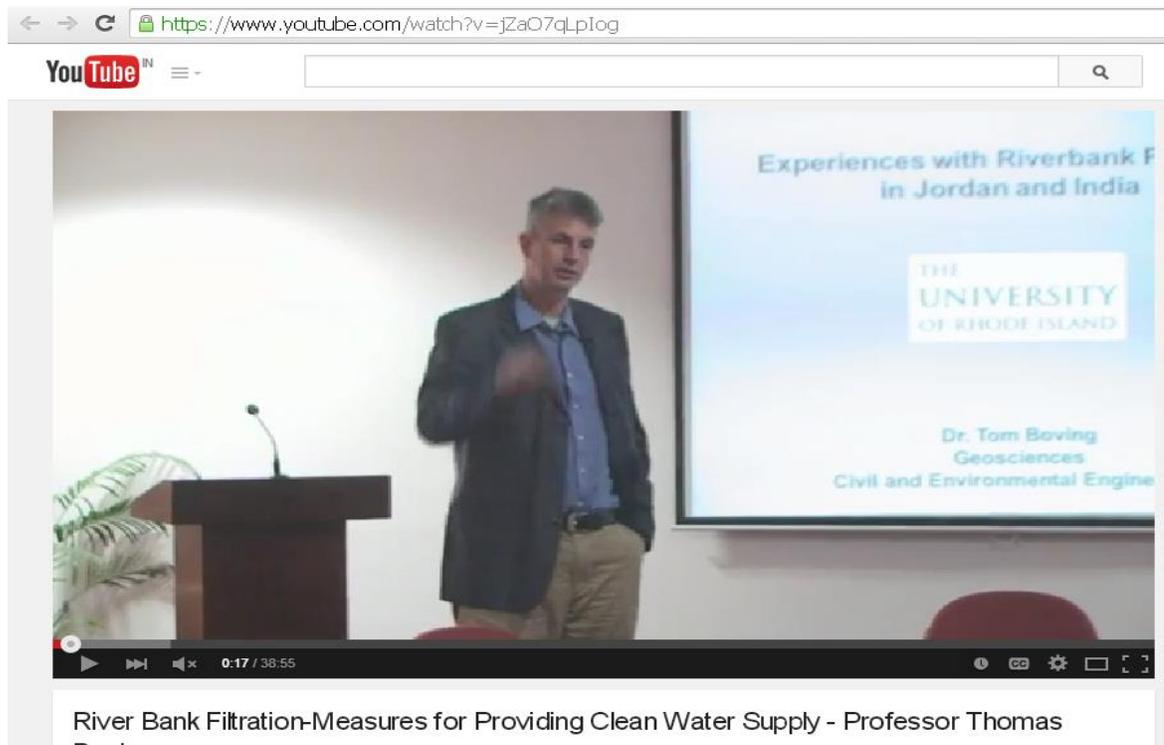
6. LECTURES SERIES

Two lectures have been conducted under lecture series and posted on You Tube.

Lecture I-River Bank Filtration-Measures for Providing Clean Water Supply

By Professor Thomas Boving, 17th February, 2015

Prof Boving from The University of Rhode Island, USA interacted with students of Coca-Cola Department of Regional Water Studies, TERI University and delivered a talk on *River Bank Filtration*. While presenting his experience with the technology at Jordan and in Karnataka in India, he illustrated the advantages that the technology offers for safe and assured drinking water supply to rural communities. He presented the results of the improvement in the health status of the community where the method was applied and the satisfaction level of the community benefited from the work. It will be a technology which can be adopted in the rich alluvial plains of the Gangetic belt as well as where unconfined aquifers are present.



Lecture II-Challenges in the Sanitation Sector-The Way Forward

By Mr. A.K. Sengupta, 23rd March,2015

Mr. A.K. Sengupta, Director General, International Academy of Environmental Sanitation and Public Health interacted with students of Coca-Cola Department of Regional Water Studies, TERI University and delivered a talk on *challenges of total sanitation in the urban sector in India*. He discussed his experience with innovative low cost sanitation technologies in urban India where safe disposal of solid wastes and waste water for urban communities in informal settlements is a major challenge. He emphasized that achieving targets of Swachh Bharat Mission in the next few years will need cost effective, innovative technologies to solve sanitation issues. It is imperative to achieve this if we are to save our rivers, protect fresh water sources and provide healthy habitat.

7. Start of student led annual event “SWASH”

The theme of this year’s event was “**Water and Sanitation- Ensuring quality, availability and accessibility**”. The event was organised on March 20, 2015 at TERI University. For media coverage see <http://www.thehansindia.com/posts/index/2015-03-21/Teri-celebrates-World-water-day-138784>

Context

Millions of people in our country are exposed to risk due to lack of access to safe drinking water and sanitation. Basic facilities like water and sanitation services are not only vital to human health but also have other important benefits – some of which are easily identifiable and quantifiable in terms of cost and time while others provide intangible benefits like convenience, well-being, dignity, privacy and safety.

Coca-Cola Department of Regional Water Studies, TERI University celebrated its annual event S.W.A.S.H (Save Water and Save Humanity) on 20 March 2015. The theme of the event was “*Water and Sanitation- ensuring quality, availability and accessibility*”. This theme was chosen because it is not only in line with Prime Minister’s Swachh Bharat Mission (SBM) but is also one of the priority areas of concern in India. The objective of this one day event was to motivate the youth to creatively participate in debates, deliberations and competitions to highlight the problem and come up with innovative ideas on the issues related to water and sanitation.

The TERI University has always endeavoured to engage in problem solving process related to environment and natural resource management. At present, it is leading a USAID funded project titled “**Strengthening Water and Sanitation in Urban Settings**” focusing on capacity-building at various levels across India. The project also includes behavioural analysis and interventions in cities of Chennai and Kolkata.

The Event

The event was inaugurated by Ms. Kathryn Stevens, Deputy Mission Director, USAID, Ms. Neelima Khetan, CSR and Sustainability Head, Coca-Cola India and South West Asia, Dr. Leena Srivastava, Acting Director General, TERI, Dr Rajiv Seth, Acting Vice Chancellor, TERI University and Prof. Arun Kansal, Head of the Department, Coca-Cola Department of Regional Water Studies. Ms. Kathryn Stevens emphasized on the need to address the problem of water and sanitation in India and enumerated ways in which USAID had been partnering with different

organisations to alleviate the issue. She also launched the USAID-TERI University- Coca-Cola, Urban WASH Alliance project website. This website has been designed to provide a dynamic interface with the public and keep them engaged. The website provides all information related to project objectives, its various activities and the past and the upcoming events. The address of the website is www.teriuniversity.ac.in/WASH/. Ideas, suggestions and feedback for improvement can be mailed and the progress on the work can be viewed by visiting this website. The other esteemed members also spoke on water and sanitation challenges, the magnanimity of which is highly underestimated. They encouraged the participants to think differently and be a part of change they wish to see.

Student Activities

The inaugural session was followed by a series of competitions related to the theme of S.W.A.S.H. The event drew a good response from the youth and over 60 students took part in various competitions. While panel discussion gave ten teams an opportunity to discuss, deliberate and come up with innovative ideas to improve water and sanitation in public places; whereas poster, picture, multimedia and poetry gave youth a chance to creatively represent the problem and influence the thoughts of public. The winning entries under each segment have been uploaded



on University's official Facebook page to acknowledge the contribution of youth and extend our appreciation and motivate them to link the problem solving process in large numbers.

Some of the suggestions that emerged from this event were:

1. Collaborative approach to managing waste water and providing access to sanitation.
2. Practice water harvesting irrespective of resident type- independent bungalow or apartment or hut.
3. Maintain a safe distance between water resource and toilets and waste disposal and treatment plants.
4. Create awareness and behavioral change by collaborating with schools and media houses.
5. Combine traditional knowledge with latest technologies for managing water and sanitation.
6. Public Private Partnership (PPP) along with fast-track allocation of funds by the government to Municipal Corporations.
7. Organizations to take up these issues on priority under the Corporate Social Responsibility (CSR) initiative.
8. Building community toilets through private sector partnership.

9. Enhancing resource utility and reducing resource wastage through adequate training and use of technology.
10. Providing subsidy and incentive for building structures that would help in conserving water and improving sanitation.

Details of winning entries are given in Annexure II.

FIELD TRIP TO KEOLADEO NATIONAL PARK , BHARATPUR, RAJASTHAN

The students of MSc, Water Science and Governance went for a field trip to Keoladeo National Park, Bharatpur in Rajasthan during 28th February – 3rd March 2015. The objective of the field trip was to be apprised of the migratory bird diversity of the national park and the issues related to the park management.

In preparation to visit to the park, the students studied the Management Plan of the Keoladeo National Park. They also studied the research papers on Economic valuation of the park.

During the Field trip the following activities were undertaken

1. Participation in the Bird Fair.

On reaching the park on 28th February, 2015, the students participated in the seminar organized by the park authorities. Amongst others the participants learnt from the presentations by the keynote speaker, Prof B.C. Choudhury, an eminent scientist from Wildlife Institute India on the biological and economic value of the park, from WWF – India on the concept of water schools in vicinity of the park and on water flows, from park management and from scientists of the Bombay Natural History Society.

2. Field Visit.

On March 1st, 2015, the participants visited the park to learn about the migratory bird species. They also visited the Ajan Dam location which is one of the sources of water supply to the park.

To better understand the concept of ‘Satellite Wetland’ , the students visited the wetland of Bandh Baretha.

3. On March 2nd 2015, the students revisited the park and studied the issues related to the park management. They divided themselves into three groups viz., Ecological, Economic and Social and interacted with different category of stakeholders. In the evening they made a presentation and sought the comments of officials of WWF.

Post visit, the students undertook an assessment of effectiveness of the park management using the tracking tool of Ramsar Convention. Barring some facilities like ticketing and cycling in the park, the students graded the park management high.



FIELD TRIP TO GOA

Students of MTech WSG went to Goa to understand the work done by TERI for protecting coastal ecosystems through community participation. They visited sites coastal Sand Dunes constructed for protection against Tsunami. Students also visited salt field, pig farming and crab farming. Other places visited by students include NIO, Salim Ali bird sanctuary. They learned interaction of mangroves and birds along with other species like crocodiles.





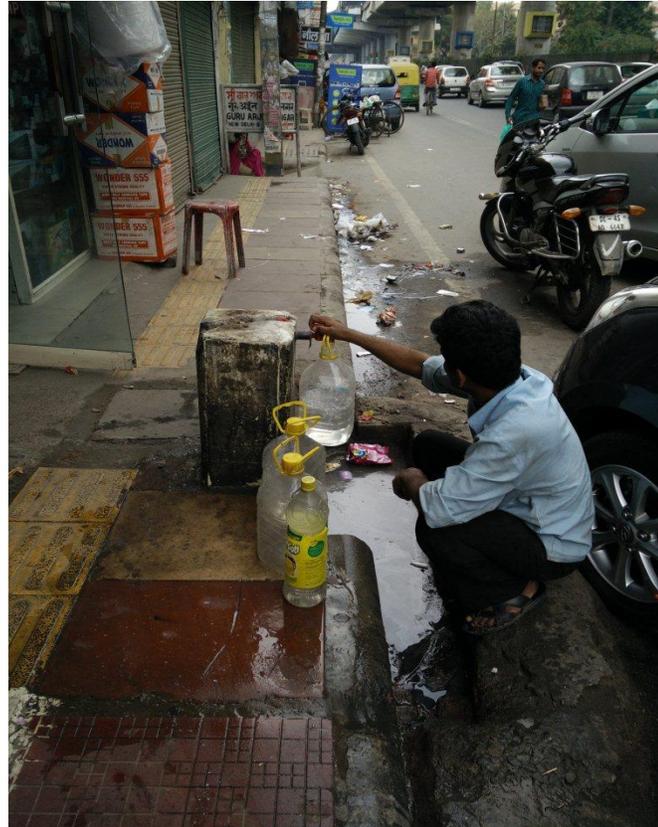
Field visit by students of Irrigation Water Management to Indian Agriculture Research Institute, Pusa Road, New Delhi

Students were exposed to latest state of the art technologies used to improve irrigation efficiencies in field and control irrigation demand. They visited the Water Technology Centre and the Centre for Protected Cultivation Technology. Students were given an insight into research projects undertaken in the field to increase water productivity of crops.



Photography Competition

Ayesha Akhtar (Winner)

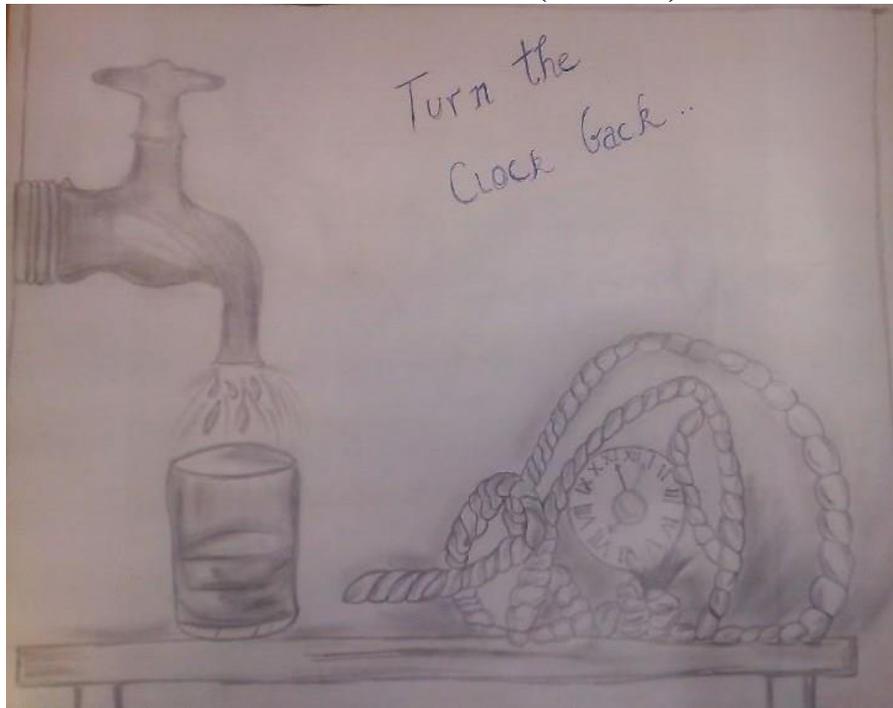


Piyush Kumar Tonk (Runner)

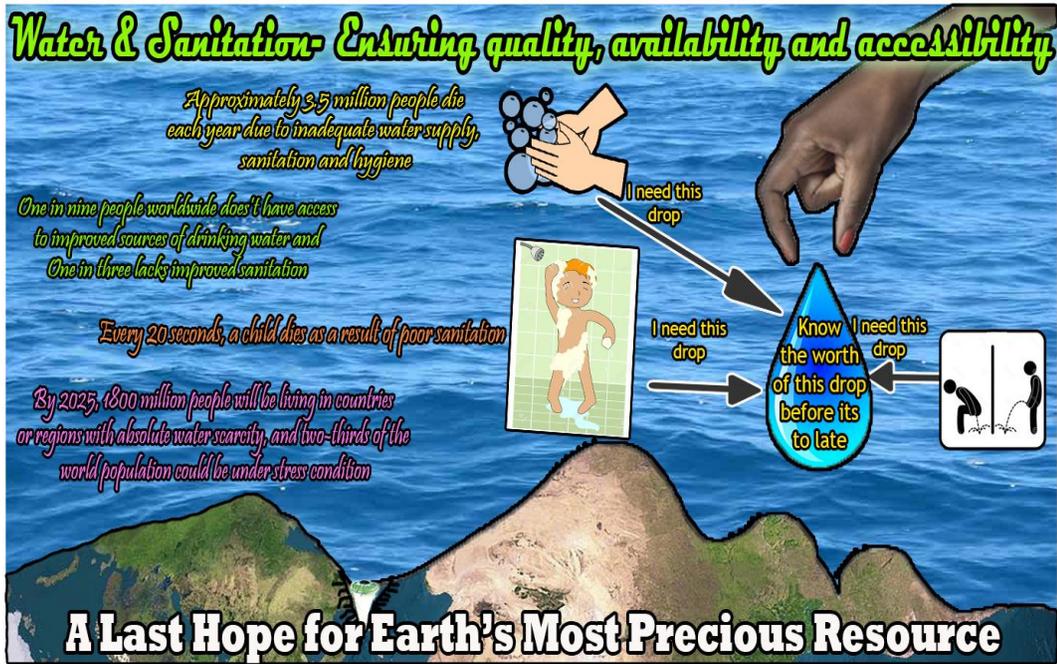


Poster Competition (Hand – Drawn/ Written)

Rashmi Srivastava (Winner)



Manmohan Singla (Runner)



Research Poster

Mohd Zeeshan (Winner)

SMART WATER LEAK DETECTION SYSTEM

With Real Time Coordinate Location of Leakage Point

Mohd Zeeshan¹, M.Tech
Department of Regional Water Studies, Water Science & Governance, TERI University, Vasant Kunj, New Delhi

The Problem:

- Distribution losses due to leakage 40%
- 9000Km long water pipeline network
- People get 3 hr of less Tap Water supply

The Reason:

- Undetected leakage point and fracture in supply network. It occurs due to:
 - Old structure
 - Corrosive activity
 - Damage due to other construction work
E.g. laying of cables, roads

Detection of Leakage: Current System

- Bursting of pipe
- Change in pressure difference across pressure gauge
- Presence of undesirable particle in water

The Maintenance: Current System

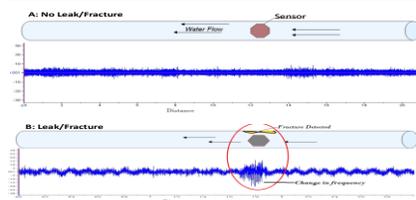
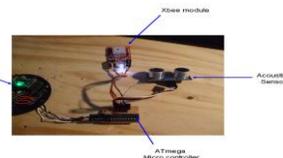
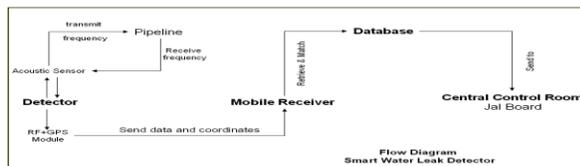
- Digging of Road to locate leakage
- Road block, traffic diversion
- Addition of suspended particle in atmosphere
- Costly process

Working Principle

- Uses the **Sound wave** to locate the Fracture by detecting **change in frequency**
- Sends the **Input data** to Receiver along with transmitting the coordinates (x,y) in real time.
- Also gives the information about the Internal Health of the pipeline.

Components

- Acoustic Sensor:** An electronic device that can measure sound levels.
- XBee RF Module:** Communicating Device for sending and receiving data.
- ATmega Micro-processor:** central processing unit for device
- GPS module:** to locate the real time location of the device



Prospective Outcomes:

- Saves Water which moves undetected from leakage points through the supply network.
- Provides the **xy coordinates** of the leakage/fracture
- Reduces the cost of maintenance by municipal department.
- Environment friendly Technique.

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Palla Lakshmi Prasanna & Team (Runner)



WATER AND SANITATION IN SHIMLA

-BY
W.Sugandhita K.Srividya P.L.Prasanna



INTRODUCTION

Shimla, the capital of Himachal Pradesh, is a hilly town situated in the Himalayas. It is at an average altitude of 2434 m. It lies at latitude 30°46' N and longitude 77°11' E. The municipal area of the city is 31.6 sq.km.

Irrigation and Public Health Engineering Department (I&PHED), Himachal Pradesh (HP) looks after the O&M of water treatment plants Shimla Municipal Corporation (SMC) is the agency for water supply and distribution.

WATER SUPPLY IN SHIMLA

There are seven surface water sources, which supply raw water to four water treatment plants.

Sl.no	Source	Maximum Flow Available for Dev. (MLD)	Average Flow Available for Dev. (MLD)	Average Flow Available in peak period (MLD)
1	Stop Catchment Area	0.23	0.25	0.25
2	Cherai Nallah	3.88	2.83	2.5
3	Cherai Nallah	2.5	0.6	0.5
4	Nuan Khad (Oman)	24.6	13	13
5	Ashvini Khad	10.8	9	5
6	Giri River	20	12	9.5
Total		61.99	37.68	30.75

Source: I&PHED, Water supply DPR
Note: May-June are considered as lean period

WATER RESERVOIRS

SR.NO	LOCATION	CAPACITY (ML)	ZONES SERVED
30	Samdoli Chalkar	0.9	Chalkar
31	Hill (Oman)	0.9	University
32	Taru (Taru be taken up)	1.6	Taru
Total		3.33 ML	

Source: Water Supply & Sewage Department, MC Shimla.

WATER SUPPLY AND WATER DEMAND

The City receives water supply daily in the morning for around 1-1.5 hours. During lean periods the water is supplied every alternate day. In some of the areas, the supply is only every 2-4 days.

Water Supply 2010 (MLD) ¹	Water Demand 2010 ² (MLD)	Demand Supply Gap (MLD)
20-30 MLD (lean period)		4-6 MLD
22-25 MLD (lean period)	34.8 ³	9-11 MLD

Source: Water Supply DPR
Note: Water supply available for use after deduction of 15-20% unaccounted losses

Water ATM:
It is installed on Mall road



WATER SUPPLY SYSTEM MAP



2009 — 2013 — Benchmark

Benchmarks for water supply

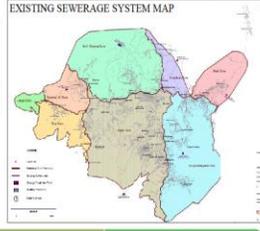


Cost recovery: 100%
Quality of supply: 100%
Complaints reduced: 100%
Continuity: 100%
Consumption metering: 100%

Sl. No.	Storage Treatment Plant (MLD)	Treatment Technology	Average Flow (MLD)	Plant Cost (MLD)
1	15.0	UVB followed by activated carbon	1.05	2.06
2	10.0	Extended aeration	0.50	3.20
3	6.0	Extended aeration	0.87	11.40
4	5.75	Extended aeration	0.05	1.00
5	4.40	Extended aeration	1.05	2.41
6	7.30	Extended aeration	0.05	11.40
Total	38.45			34.47

Source: Shimla Municipal Corporation, 2010
Note: The entire cost of storage generated as per the MC's Policy 10 is not covered by selling 10% as mandated by the Government of India.

EXISTING SEWERAGE SYSTEM MAP



SWOT Analysis

Strength	Weaknesses
1. Surface water sources in form of natural streams 2. Natural slope is a advantage to store rain water	1. Water supply is erratic, especially during summer High inflow of tourism and other floating population affects the water supply to local residents. 2. Shortage of manpower 3. Lack of proper consumer data
Opportunities	Threats
1. Rehabilitation and modernization of water facilities under major program 2. Water awareness campaigns are very help full due to high literacy	1. Growing population and unplanned development 2. Proximity of water supply network to sewer lines is a critical issue. This is evident from the fact that Hargreaves and E. cones, which are caused due to contamination of water are on the rise

CONCLUSIONS:

- Shimla city was awarded as "BEST CITY" in the category "PUBLIC SERVICES" in 2014.
- How ever there is lot of potential for the city to improve it's water supply and sanitation services

Poetry Competition

Preeti Khatana (Winner)

Water

*Some people waste me
And throw me down the drain,
While other love me,
By drinking me and dancing in the rain,*

*What do I do when I
Go down the drain?
I head to the sewers,
A water treatment takes my remains*

*I go through the settling basin
With sedimentation too,
Coagulation and flocculation
Where I am filtered just for you*

*So the next time you turn on the faucet,
I will come rushing out,
Remember to use less of me
There is not enough to go about*

*As you have noticed
I am reduced day by day,
By adults and small children
WATER is the name to say.*