GPCB

Netherlands Enterprise Agency

CEE
Centre for Environment Education

Wetskills: India 2015

An innovative approach of experimental learning and networking

Programme Report

Knowledge Partner

P P SAVANI
KNOWLEDGE CITY

Support Partners

Holland.

DUUR ZAAM DOOR

Wetskills: India 2015

An innovative approach of experimental learning and networking

Programme Report

This document is a project report/summary of the two week long programme, Wetskills India 2015, which was held on the CEE Ahmedabad Campus from November 28, 2015 to December 11, 2015. A detailed day wise report is contained in the document along with learning and inferences.

Table of Contents

Acknowledgements

It is a genuine pleasure to express a deep sense of thanks and gratitude to the mentors, Kartikeya V. Sarabhai, Director, Centre for Environment Education (CEE); J.K. Vyas, Head, Industrial Pollution Prevention (IPP), CEE Ahmedabad; and Madhavi Joshi, Programme Director, DESD, Youth Programmes and Waste Management, CEE Ahmedabad. Their timely advice and meticulous scrutiny helped accomplish the programme successfully.

We owe a deep sense of gratitude to the Green Environment Services Co-op Society Ltd. (GESCL), Machtelijn Brummel, Advisor, Learning for Sustainable Development, Netherlands Enterprise Agency (RVO); Johan Oost, Director, Wetskills Foundation; Swastik Gajjar, Director, Research and Planning, P. P. Savani Knowledge City; Job Glass, Jolly Joseph of the Netherlands Business Support Office (NBSO), Gujarat Pollution Control Board (GPCB).

We wish to express our appreciation to the speakers and resource persons of the programme, Mahesh Singh, IFS, CEO, Water and Sanitation Management (WASMO); Deepak Davda, CEO, GESCL – CETP; D.M. Thaker, Environment Engineer, GPCB; Darshana Patel, Environment Engineer, Ahmedabad Municipal Corporation (AMC); Matthijs van Oostrum, Urban Planner, Vastu Shilpa Consultants; Janki Shah, Programme Officer, Rural Programmes Group, CEE Ahmedabad; and Parthesh Pandya, Programme Coordinator, CEE West.

We extend out special thanks to the facilitators during the brain hurricane sessions, Ap Verheggen, Owner, Artistic Director and Project Developer, Sun Glacier; Jaap Feil, Director, H2O-job; and Priya Romal, Assistant Professor, College of Architecture, Trivandrum.

We are grateful to the jury, :V.R. Ghadge, Senior Environment Engineer, GPCB; Maya Acharya, Senior Policy Advisor – Economic and Commercial Section , Embassy of the Kingdom of Netherlands; Dilip Surkar, Director, Viksat; Suchit Dekivadia, Head – Sales and Marketing, Paques Environmental Technology India Pvt. Ltd.; and J.K. Vyas, Head, Industrial Pollution Prevention (IPP), CEE Ahmedabad.

We thank Kedar Champhekar, Programme Officer, CEE Ahmedabad for the pre-programme campus walk; Ketki Gadre, Programme Officer, Waste Management Group, CEE Ahmedabad; Nandan Kumar, Project Officer, IPP, CEE Ahmedabad; and Ayub Shersiya, CEE Halvad, for coordination of field visits. This programme would not have been possible without the efficient management and coordination by Snehal Bhatt, Deputy Admin Officer, Director's Officer, CEE Ahmedabad; Ramesh Savalia, Programme Coordinator, Rural Programmes Group, CEE Ahmedabad; Sarita Thakore, Programme Coordinator, CEE Ahmedabad; Bindu Prashanth, Programme Coordinator, Corporate Communications, CEE Ahmedabad; Seeja Sajeev, Executive Assistant to the Director, CEE Ahmedabad; Pankaj Gorana, Designer, Children's Media Unit, CEE Ahmedabad; Padma G. Coordinator CEE, Ahmedabad, Priya Nair, In Charge, IFC; Bijoy Goswami, Programme Officer, Director's Office, CEE Ahmedabad; Mudita Vidrohi, Project Officer, Nehru Foundation for Development (NFD); Shweta Kaushik, Project Officer, Director's Officer, CEE Ahmedabad; Gaurav Verma, Office Assistant, Director's Office, CEE Ahmedabad; Abhilash Sarasia, Hostel Warden, CEE Ahmedabad; Balwant Kosambia, Attendent, Director's Office, CEE Ahmedabad; Divika Hinger, Project Officer – Corporate Communications; and Moushumi Das, Project Officer – Writing and Editing, Director's Officer, CEE Ahmedabad.

We apologise if any acknowledgement has inadvertently been missed.

Preface

The 7th Vibrant Gujarat Summit, which took place from January 11-13, 2015 at Mahatma Mandir, Gandhinagar, Gujarat, India, was organised by the Government of Gujarat. The summit, which takes place once in every two years, aims at inclusive and sustainable development by providing enormous prospects to the State to display its strengths, progressive stand, initiatives taken to improve governance, investor friendly climate, and art and culture of Gujarat. The Summit gradually has evolved into a round-the-year investment promotion exercise with events scheduled well in advance.

The prime focus of the Government of Gujarat is Inclusive development and the key areas for development identified and included are Innovation, Sustainability, Youth & Skill Development, Knowledge Sharing and Networking. Also, this Summit is an ideal convergence for other states and other countries to showcase their strengths, highlight business opportunities, and to facilitate knowledge dissemination. It provides an attractive opportunity to its participants to understand the potential of Gujarat in various sectors. Besides, it provides a platform to interact with policy makers, industry leaders, and renowned academicians from all over the world.

During this summit in 2015, Centre for Environment Education (CEE) and the Netherlands Business Support Office (NBSO) were among the participants while the Wetskills Foundation was amongst the visitors. Through a realisation of similar ideas and approaches, a collaboration was sought between the two, namely, CEE and Wetskills Foundation.

In January 2015, a Memorandum of Understanding (MoU) was signed between the Centre for Environment Education (CEE) and the Netherlands Enterprise Agency (RVO) in which CEE's role is to forge linkages with Indian colleges, universities and professionals in the developmental sector on water and related issues. At the same time, RVO, which is a Dutch Government Agency for international cooperation, education and learning, is interested in a bilateral student exchange on water with CEE. In close cooperation with Wetskills, RVO will interest Dutch students and companies in the water sector for the programme.

The programme was able to seek support from the the Green Environment Services Co-op Society Ltd. (GESCL), Gujarat Pollution Control Board (GPCB), Gujarat Water Supply and Sewerage Board (GWSSB), Water and Sanitation Management Organisation (WASMO), and Water Resources Department to address issues of water quantity and quality and try to dovetail and enrich the programme with their efforts.

The objective of the programme is to provide a platform to share, exchange ideas, knowledge, and innovation, and develop social entrepreneurship models, thereby building social cohesion among various sectors of society vis-a-vis water issues.

Wetskills: India 2015 was the first edition of the programme in India which was conducted on the CEE Ahmedabad campus from November 30, 2015 to December 11, 2015 with 25 students and young professionals from India and the Netherlands.

Kartikeya V. Sarabhai
Director, CEE

Project Profile

Title: Wetskills India 2015

Mentors: Kartikeya V. Sarabhai and Machtelijn Brummel

Supervisors Bijoy Goswami (India), Johan Oost (Netherlands)

Project Advisory: Madhavi Joshi, J.K. Vyas, Sarita Thakore, and Ramesh Savalia

Support: Shweta Kaushik, Bindu Prashanth, Snehal Bhatt, Seeja Sajeev, Ketki Gadre, Nandan Kumar, Kedar Champhekar, Abhilash Sarasia, Ayub Shersiya, and Moushumi Das.

Partners: Gujarat Pollution Control Board (GPCB), Netherlands Enterprise Agency, Green Environment Services Co-Op Society Limited, P. P. Savani Knowledge City, and Netherlands Business Support Office

About Wetskills

Wetskills Water Challenges is an innovative approach to real-life learning and networking. This involves a two-week pressure-cooker programme for students and young professionals with a passion for water from all over the world. They meet in a country and work in transdisciplinary and transcultural teams on water-related topics. The main challenge is to develop, as a team, innovative and out-of-the-box solutions for water challenges in the changing world. The case studies are provided and formed by study case owners, companies and organisations with a dedicated challenge in a local situation. These concepts are presented during the formal event through an ice-breaking and energising session, when the cooperation between the Dutch water sector and the partner-country is showcased and positioned. It provides a floor to integrate generations, water challenges, disciplines and cultures.

Wetskills focuses on real-life challenges, strongly linked to the sector. The case owners are small and large companies, governments, knowledge institutes and NGOs or a consortium of more than one organisation from the water sector of Netherlands and/or the partner-country. The organisation formulates the case study for one of the Wetskills teams. Each case describes a water-related challenge, based on the regional challenges of the country where the programme is held. The team is then challenged to find an out-of-the-box and applicable solution for the case owner and present it at the formal water-related event.

This networking and knowledge exchange event has been organised in more than ten countries all over the world. Since 2010, Wetskills has attracted over 250 participants from more than 50 international universities and organisations in the Wetskills events held in China, Indonesia, Oman, Israel, Egypt, Morocco, South Africa, Mozambique, Romania, Netherlands, United States and Canada.

Wetskills is part of the Human Capital agenda of the Dutch water sector. It has been built up as a corporation under the umbrella of the Human Capital of the Netherlands Water Partnership (NWP), Royal Dutch Water Network (KNW), H2O-job and H2Oost. Many other partners have also been involved as well. Since September 2015, Wetskills has been an independent foundation for which KNW is the financial administrator for this Foundation.

Wetskills India 2015

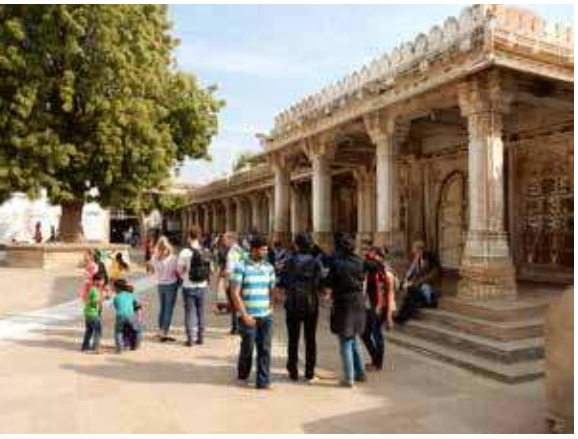
The Wetskills India 2015 programme, which is a collaboration of the Wetskills Foundation, Netherlands; the Netherlands Enterprise Agency (RVO); and the Centre for Environment Education (CEE), was held on the CEE campus in Ahmedabad from November 28, 2015 to December 11, 2015.

Pre-Programme – November 28 and 29, 2015

Agenda: To familiarise the participants with the city and one another.

Key Highlights:

- Campus Walk
- City Tour
- Heritage Walk



After the arrival of the participants from the Netherlands and other parts of India, they along with the supervisors were involved in pre-programme activities such as a campus walk of CEE Ahmedabad; a city tour which included visits to the Sarkhej Roza, Adalaj Step Well, Sabarmati River Front, and Sabarmati Ashram; and a heritage walk.

The visits aimed to give the participants a glimpse of the city as well as giving them a chance to interact with and know one another.

Day 1 – November 30, 2015

Agenda: To gain in-depth knowledge about the case studies from industry experts.

Key Highlights:

- Welcome Address by Kartikeya V. Sarabhai
- Introduction of Students
- Talk on Water Challenges in Gujarat by Mahesh Singh
- Introduction to Wetskills by Johan Oost
- Introduction to Case Studies
- Brain Hurricane

The first day began with a welcome address by Kartikeya V. Sarabhai, Director, Centre for Environment Education, which was followed by a formal introduction session of the participants as well the supervisors. As a part of the ice-breaking session, the participants were shuffled in terms of their seating arrangement in a way that no participant from the same background was allowed to sit next to one another.

Thereafter, Mahesh Singh, IFS, CEO, Water and Sanitation Management (WASMO) shared his inputs about the water challenges in Gujarat. He gave an overall view of the problems and obstacles in the state and the measures being taken to combat them. He emphasised the fact that Gujarat has scarce resources

and that there is a need to shift from ground water to surface water at the community level. At the same time, he highlighted that there is a huge quantity of waste water, which is almost as much as the quantity of water needed, thus making sewage treatment a major challenge. Though sewage treatment plants have been installed, their use and monitoring is a matter of concern. Added to this, since Gujarat is a coastal state, the issue of salinity also needs to be looked at along with evolving and returning to traditional knowledge.

Johan Oost, Director, Wetskills, then introduced the students to programme and gave the participants an in-depth idea about the programme schedule and plans. The participants were then engaged in a game conducted by Parthesh Pandya, Programme Coordinator, CEE West. The game involved giving 25 beans to each participant and exchanging them with each other through a process of identifying more or less in each person's hand. At the end of the game, a count was carried out and it was observed that the number of beans with the participants varied from zero to a hundred per person.

An additional ten beans were handed over to the participants with zero beans after round one. Another round of the game was then played, followed by a count which gave equally varied results. The key idea of the game was to differentiate between the idea of subsidy and capacity building, thus highlighting that merely giving subsidy will not help and focusing on the need for capacity building in developing countries, especially in case of the marginalised groups, is the need of the hour. In the context of water policy, this applies to the disparity between the policy makers and those on the receiving end, which needs to be bridged.

Post lunch, the case studies were introduced by the respective industry experts. Darshana Patel, Environment Engineer, Ahmedabad Municipal Corporation (AMC) introduced the Sewage Treatment Plant (STP), Ahmedabad and gave information about the processes involved and coverage. Janki Shah, Programme Officer, Rural Programmes Group (RPG), CEE Ahmedabad, discussed the origin and evolution of the CEE Halvad campus. She emphasised key areas such as livelihood and capacity building, terrains, salt production and salinity issues, and irrigation, urging the participants to come up with practical implementable solutions.

Matthijs van Oostrum, Urban Planner, Vastu Shilpa Consultants, introduced the participants to the traditional water harvesting systems of the city with emphasis on the need to redevelop lakes and to understand the numerous informal settlements coming up around the lakes. Following this was a session by Deepak Davda, CEO, Common Effluent Treatment Plant (CETP), Vatva, during which he discussed the various kinds of chemicals, dyes and pigments from industries in Ankleshwar, Vapi and Vatva, which pollute the water bodies and the process of automation and sampling of such industrial wastes.

The last leg of the day involved the participants being divided into five teams of five members each and assigned a specific case study. While doing so, their backgrounds and preferences were kept in mind. The case studies were:

1. Common Effluent Treatment Plant (CETP), Vatva
2. Sewage Treatment Plant (STP), Surat
3. Sewage Treatment Plant (STP), Ahmedabad
4. Water Resources Management (WRM), CEE Halvad
5. Traditional water harvesting structures, Ahmedabad

Based on the sessions conducted throughout the day, the teams then engaged in a session of 'brain hurricane' wherein experts went from team to team discussing what the teams had in mind in terms of questions to be asked during the field visits and probable solutions for the same. The panel of experts included Johan Oost, Director, Wetskills; Machtelijn Brummel, Advisor, Learning for Sustainable Development, RVO; Ap Verheggen, Owner, Artistic Director and Project Developer, Sun Glacier; Jaap Feil, Director, H2O-job; and Priya Romal, Assistant Professor, College of Architecture, Trivandrum. The day ended with a welcome dinner organised on the CEE campus by the Netherlands Business Support Office (NBSO).

Day 2 – December 1, 2015

Agenda: To enable participants to understand the industrial processes involved in waste management and the obstacles faced during the same.

Key Highlights:

- Visit to Envirotech Asia 2015

The participants and supervisors visited Environtech Asia 2015 which was held at Mahatma Mandir, Gandhinagar. It was jointly organised by GPCB with the Confederation of Indian Industries (CII). The exhibition was organised by Radeecal Communications, supported by GPCB, and Holland as its partner country. It hosted 102 exhibitors from seven different countries showcasing a wide range of industrial solutions including machinery, equipments, and technology for waste management and pollution control, storage, and other such concepts. The event offered unrivalled opportunities to network with likeminded individuals and to catch up with existing practices and progress.

The participants attended sessions concerning industrial practices, techniques, the costs involved, the results and the challenges faced

in the process. The speakers of the sessions also included Kartikeya V. Sarabhai, Johan Oost and Ap Verheggen among other industry experts. The participants of Wetskills India 2015 were then called upon to introduce themselves and their cases to the industry experts present in the audience.

Day 3 – December 2, 2015

Agenda: To make the participants aware of the existing environmental laws and analysing the final plans to be implemented during the field visits.

Key Highlights:

- Screening videos – SECAS and a TED talk on water
- D.M. Thaker's discussion on environment protection laws
- Final discussion of plan of action for field visit
- Departure for field visits

The day began with the screening of two films, one on the Science Express Climate Action Special (SECAS), and the other a TED Talk on water by Anupam Mishra, Indian Gandhian, author, journalist, environmentalist, and water conservationist. The participants were keen and inquisitive about the video on SECAS and asked several questions which were promptly answered by Bijoy Goswami, Programme Officer, Director's Office, CEE Ahmedabad.

D.M. Thaker, Environment Engineer, GPCB, then discussed environmental laws in detail and Gujarat's current status with regard to implementation and practice of these laws. He further elaborated on the kinds of wastes the state produces, the facilities in place to deal with the same and the need for monitoring. He ended his session stating that protection of the environment cannot be restricted by rules and norms but is, in fact, a matter of common

sense and conviction. The participants were very attentive through the session and had several questions and clarifications which were addressed very well by Mr. Thaker.

After this informative session, the participants were involved in discussions with their respective teams about their course of action during the field visits and the probable questions they had in mind that needed clarification. The teams then discussed these ideas with Machtelijn Brummel and Johan Oost who helped them further shape their plans. The teams visiting CETP, Vatva and STP, Ahmedabad also interacted with J.K. Vyas, Head, Industrial Pollution Prevention (IPP) and Nandan Kumar, Project Officer, IPP, in order to get industry specific knowledge.

The teams working on case studies on CEE Halvad campus and STP, Surat then departed for their respective sites while the other teams stayed in Ahmedabad.

Day 4 and Day 5 – December 3 and 4, 2015

Agenda: To give the participants a firsthand experience of the theoretical knowledge gained during the past few days, for enhanced understanding.

Key Highlights:

- Field visits
- Group discussions

The participants visited the sites for their respective case studies. Each team was accompanied by a CEE member and/or industry experts. The team wise details of the visits and their respective observations have been stated below:

Team 1: CETP, Vatva

Concern: How to remove non-biodegradable COD (Chemical Oxygen Demand) by commercially viable and easy to operate method from CETP to achieve discharge norm of250 mg/lit COD?

Team Members: Deepak Hiremath, Mrunalini Rana, Suhail Khuraishy, Sebastiaan Oudendijk and Evelien Martens.

Date of Visit: December 3, 2015
Accompanied by: J.K. Vyas, Head, IPP; Nandan Kumar, Project Officer, IPP; and Johan Oost, Director, Wetskills Foundation.
The following were their key observations during their visit:

- Safety regulations for factory workers dealing with hazardous waste materials and/or processes, such as gloves and shoes, were dealt with.
- Chemical Oxygen Demand (COD) levels from CETP are not brought down to the required level of 250 mg/L. It is instead assumed that after flowing for some distance, the level is reached and this is what is accepted.
- The stream where CETP discharges its effluents contains only waste water. This influences the environment and the human settlements around it.
- Everyone tries to blame the other. Since there are multiple reasons behind the problem, people say contradictory things, thus not revealing the truth. Though industries present a fairly positive picture, the teams' observations did not seem to match with these. Nobody seemed to be taking up responsibility for all that has been happening around.
- There existed a certain level of ignorance. For example, not all parameters that exist have been tested, such as those for heavy metals.

Team 2: CEE Halvad Campus

Concern: What can be the potential cost effective solution for reducing salinity in water used in agricultural practice and thereby reclaim soil fertility in rural areas of Halvad?

Team Members: Kashyap Patel, Thomas van Veelen, Stefan Holtland, Vidhi Bhavsar and Iris van der Meer.

Date of Visit: December 4 and 5, 2015
Accompanied by: Bijoy Goswami, Programme Officer, Director's Office, CEE Ahmedabad.

The team interacted with the project manager at the office, Ayub Shersiya, as well as some community members. The key findings of the field visit are:

- The depth of the groundwater is already at 200 meters below ground level and is receding even further down.
- Flooding irrigation occurs on a large scale, however some of them have already begun using drip irrigation systems.
- A large percentage of agriculture is comprised of cash crops and the farmers are not ready to lose their income from cotton crops.
- Owing to the socio-economic differences that exist within the society, the farmer runs the farm but the owner is the one who decides which practices to adopt.
- Given the current scenario, farmers didn't seem to struggle with the issue of salinity but at the same time, they are completely unaware of what the future could possibility look like.

- Some farmer co-operatives exist and they work together to adapt their farming strategies, such as those for water and channel agreements with the government.

Team 3: STP, Ahmedabad

Concern: How to remove excessive foaming in aeration tanks of STP through commercially viable technology?

Team Members: Amita Shah, Natasja Fraters, Darpan Patel, Vishnupriya R., and Maarten Klaversteijn.

Date of Visit: December 4, 2015

Accompanied by: Ketki Gadre, Programme Officer, Waste Management Group, CEE and Johan Oost, Director, Wetskills Foundation.

The team also visited a textile industry during their field visit. They gathered the following points:

- The treated water at the outlet near the river didn't seem to have achieved the desired norms. This was observed from the colour, smell and texture of the effluents.
- The industries did not seem like they had a bigger picture in mind with regards to the usage of waste and wastage.
- A blame game between the industries and treatment plant authorities seemed to prevail but no awareness seemed to exist about the constant harm being caused to the environment by both parties. Also, the law enforcement is not very effective.
- The textile industry visited used hard chemical dyes. Though the solution to the problems was very evident and easily achievable, it has not been implemented.
- There wasn't any long term plan in place working towards conserving the environment. They seemed to lack an awareness or reason for any necessary changes.

Team 4: Surat Municipal Corporation (SMC) - STP

Concern: How can the efficiency of STP systems be enhanced in case of accidental mixing of industrial effluents in the Sewage Treatment Plant?

Team Members: Viraj Parekh, Roy Pasman, Dipanjali Patil, Ruben van Berk and Aneri Shah.
Date of Visit: December 4 and 5, 2015

Accompanied by: Swastik Gajjar, Director, Research and Planning, P.P. Savani Knowledge City and Machtelijn Brummel, Advisor, Learning for Sustainable Development, Netherlands Enterprise Agency (RVO).

Their observations are as below:

- The STP serves an area which comprises of 5.5 lakh households and 27 industries. The total collection is that of 97 MLD, which, after tertiary treatment gives 40 MLD of clean water.
- There is a substantial quantity of illegal untreated dumping taking place from industries.
- Five pumping stations are in place but these stations do not indulge in the process of tracing the exact origin of the industrial effluents.
- Value re-collection through biogas, sludge and water re-selling, takes place.
- The plant seemed to be running very efficiently.

Team 5: Traditional Water Harvesting Structures

Concern: How can the traditional water harvesting systems be renewed to be used in the current scenario?

Team Members: Vivek George Sanu, Manisha Jhingoer, Akruti Patel, Bas Krewinkel and Karin van Dijk.

Date of Visit: December 3, 2015

Accompanied by: Moushumi Das, Project Officer, Director's Office, CEE and Matthijs van Oostrum, Urban Planner, Vastu Shilpa Consultants.

The team visited several lakes within the city of Ahmedabad as well as heritage structures located in old Ahmedabad city (pols). During their day long visit, the team made the following inferences:

- The age old techniques are still functioning. However, the functioning and maintenance is chiefly dependent on the will of the owners/community/care takers.
- A lot of these traditional systems only seemed to exist for the sake of it. For instance, the ground water refilling pits are neither functional, nor are they being monitored.
- The houses in the slum areas have not been built well enough for the monsoon season.
- Social activities must be incorporated in and around the reservoirs in order to make the reservoir multifunctional.
- The designs must be easy to maintain. At the same time, the community members must be willing to partake in the maintenance activity of these structures.

Day 6 and 7 - December 5 and 6, 2015

The participants from the Netherlands visited the lake city of Udaipur over the weekend. For the participants from other parts of the country, these days were utilised in exploring the city.

Week 2 – December 7 to 10, 2015

Agenda: To facilitate the participants to work on their pitch and poster presentations and guide them about the same.

Key Highlights:

- Group discussions and project planning
- Discussions with V.R. Ghadge (GPCB)
- Pitch and poster presentation training
- Mock pitch presentation

The teams were involved in discussions during this time and were also engaged in working on their presentations and designing their posters. To help them during these days, Machtelijn Brummel and Johan Oost were present all through. Along with them, Mr. V.R. Ghadge, Senior Environment Engineer, GPCB, also spent an entire day on December 8, 2015, with the students, discussing their proposed out of the box solutions and gave his inputs to make these solutions even better.

Johan Oost guided them on how to go about the poster preparation by giving them examples from the previous editions of Wetskills and solving their queries about what all to include in the pitch in order to make it as precise and concise as possible.

Following this, the participants were engaged in making presentations on December 9, 2015, which functioned as a rehearsal for their final presentations. Final finishing touches were given to the posters and sent in for printing in readinss for the presentations to be made the following day.

December 10, 2015, was concluded with a farewell dinner as the following day was the final pitch and poster presentation by the teams, where only one team would emerge the winner.

The Final Day – December 11, 2015

Agenda: To understand and witness the pitch and poster presentations by the participants and to decide on the best one amongst them.

Key Highlights:

- Introduction to Wetskills (general programme overview)
- Introduction to jury members
- Final pitch and poster presentations by the teams
- Declaration and felicitation of Winners

The final day of the programme began with an introduction to the programme by Johan Oost in general for the jury members and the audience. A short presentation prepared by CEE, giving a summary of the course of the programme, was also shown. V.R. Ghadge, who had formerly also engaged with the participants during discussions, was the chair for the event.

This was followed by an introduction to the jury members, which included:

Name: V.R. Ghadge
Designation: Senior Environment Engineer
Organisation: Gujarat Pollution Control Board

Name: Maya Acharya
Designation: Senior Policy Advisor - Economic and Commercial Section
Organisation: The Embassy of the Kingdom of Netherlands

Name: J.K. Vyas
Designation: Head
Organisation: Industrial Pollution Prevention (IPP), CEE Ahmedabad

Name: Dilip Surkar
Designation: Director
Organisation: VIKSAT

Name: Suchit Dekivadia
Designation: Head – Sales and Marketing
Organisation: Paques Environmental Technology India Pvt. Ltd.

The teams were to be judged on criteria such as innovativeness, social impact, and economic viability of the ideas. Each criterion was described in detail by the jury members for the clarity of the teams Next in line were the pitch presentations by the teams, which is a two minute description about their out of the box solutions. Each team was then asked questions by the jury members, industry experts as well as by the audience, which the teams answered promptly.

After a short tea break, the teams then presented their respective posters which detailed out their out of the box solutions with diagrammatic representations. The jury members went to each poster where the respective team elaborated on the processes involved, and how this is an appropriate solution to their respective case studies.
The audience present at the event also involved themselves and engaged in conversations with the participants about their ideas. The teams, through their interactions with industry experts and the jury, got ideas about working on their solutions even further and making them even better.

On the completion of the pitch and poster presentations, the jury members deliberated amongst themselves and finally came up with their decision. They admitted that it was very difficult to choose one as the winner as all the teams were equally good and that each team had worked to their fullest potential. The team working on the case study of STP, Surat, was declared the best. The winning team was awarded with certificates, notebooks from the Wetskills foundation, and pens from Paques Environmental Technology India Pvt. Limited. The Dutch participants of the winning team were also given a copy of Parampara: India's Culture of Climate Friendly Sustainable Practices, a publication by the Ministry of Environment, Forests, and Climate Change (MoEF&CC) and CEE.

As a token of gratitude, the participants gifted copies of the books on Wetskills to Bijoy Goswami and Shweta Kaushik, while the later gifted a copy of Parampara to Johan Oost and Machtelijn Brummel. Each of these books was signed by all participants with a personal message from every individual participant.

The programme concluded with a group picture being taken, followed by lunch and departure of all participants.

Case Solutions

As an outcome of the two week long programme, the Wetskills teams provided five solutions for the cases provided to them. The participants of the programme divided into five different teams to work on five different cases. The team came up with five solutions to tackle the problems faced by the case providers, where, they tried to take in to account of various aspects like environmental sustainability, social cohesion and participation, economic viability etc. Finally, the five teams presented their solutions through poster presentations.

Bottled waste!

Your waste is the new bottled water

Roy Pasman, Ruben van Berk, Aneri Shah, Deepanjali Patil and Viraj Parekh

RRResilient Solutions

Challenge

In Surat the mixing industrial wastewater with domestic wastewater leads to inefficient use of the STP. The challenge is to avoid or reduce accidental mixing of waste water, and bring the city of Surat one step further to their ambition of becoming a resilient city.

Methodology

The methodology is based on a triad approach with three different stages. The reduction of water usage, the reuse of water and eventually recovery of the environment towards a resilient city.

Reduce pollution → **Water Reuse** → **Recovery**

Automated Monitoring

- Place sensors at outflow points of large industries
- Monitoring grid for detecting illegal dumping of industrial waste water

Improve prior treatment

- Improve prior treatment by increased technologies
- Provide mandatory training of industries with a private STP coordinator

Waste water for drinking

The current discharge from the STP exceeds drinking water standards. This cleaned water could be used directly for drinking. This will save energy and other resources.

Zero liquid discharge

- Complete reuse of water from production process
- Enforce change to ZLD by local authorities
- Dry waste is used for energy production
- Water footprint labeling for industries to promote the sustainable way of business.

Recovery

Produce bottled water

- Drinking water from STP
- Bottle of Bio plastic from sludge
- 102,000 bottles per year

Raising awareness

- Reusable Bottle
- Phased packaging
- Open days/periodical tours
- Infographics website

Policy changes and awareness

To establish policy changes for making ZLD to a standard, or the see the results of raising awareness long timespans are required.

- Complete policy change ± 50 years
- Raising awareness ± 5 years
- Water footprint labeling ± 10 years

Wetskills-India 2015 is supported by:

WEEDS TO THE RESCUE

A natural way of treating common effluent

Deepak Hiremath, Suhail Khuraishy, Evelien Martens, Sebastiaan Oudendijk, Mrunalini Rana

Common influent → Equalization → Flocculation → Dissolved air flotation → Aeration → Clarification

Vatva GIDC Ahmedabad, Gujarat, India

Common Effluent Treatment Plant (CETP) Vatva is designed to treat 16,000 m^3 of effluent per day from 680 industrial member units with primary treatment at their end. With a Chemical Oxygen Demand (COD) effluent concentration of 500 mg/L, CETP Vatva does not meet the standard of 250 mg COD/L set by the Gujarat Pollution Control Board. Influent mainly consists of waste waters from dye, dye intermediate, pharmaceutical, textile and rolling mill industries.

CETP outlet discharge on a tributary of river Sabarmati

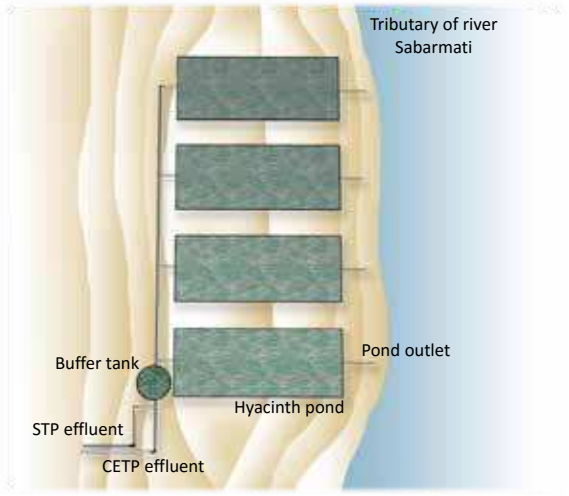
Water meets nature: Tributary existing of waste streams only

Water Hyacinth (*Eichhornia crassipes*)

- Contamination removal by root absorption and adsorption
- Water temperature: 20 – 40°C
- Root length: 10 – 30 cm

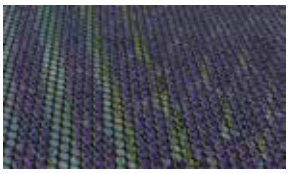
ConCETP

- Four excavated hyacinth ponds of 250 m length, 100 m width and 0.75 m depth each
- Buffer tank of 50 m diameter and 5 m height
- Water depth in hyacinth ponds is 0.40 m
- Per day 10,000 m^3 of CETP effluent is mixed with 200 m^3 of STP effluent in the buffer tank to provide the plants with nutrients
- Each day one of the hyacinth ponds is filled
- Hydraulic retention time in each pond is 4 days



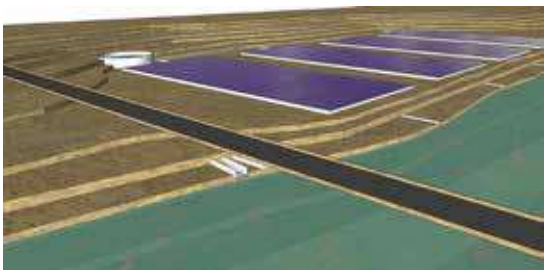
Harvesting water hyacinth

- 250 million plants per pond, 100 plants per square meter
- Periodical, automated harvesting of water hyacinths
- 5.9 percent daily reproduction, 12 days doubling time
- Harvest outsourced to biogas producer



Prevention of overgrowth

- Filtered inlet and outlet
- Ponds covered with nets
- Harvest before flowering
- Windscreens



Outcomes

- Removal of 80% for COD, 85 – 99% for heavy metals and 65% for TDS
- Average COD concentration in CETP effluent reduced from 500 to 250 mg/L
- 163 m^3/day biogas production, which translates into 1.35 crore INR/year

Drawbacks

- Large area required for hyacinth tanks
- Control required to prevent spreading of the water hyacinth
- Measures needed against flooding during monsoon

Advantages

- Removal of heavy metals etc. in addition to COD removal
- Low operation costs
- Investment return via biogas
- No experienced labor required
- No changes to existing plant needed

Wetskills-India 2015 is supported by:

Salty soil to Sweet solution

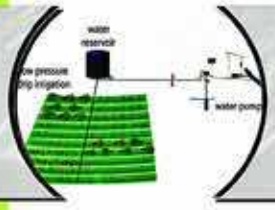
Strategy for sustaining agriculture under salinity circumstances

Salty Soldiers Group

The challenge

Water Resource management Halvad. A case for a semi – arid region in Gujarat containing saline land. Farmers are currently unaware and use practices that are unsustainable. The task is to come up with agricultural practices which are sustainable. Coming to their agricultural practices 90% of the crop is cotton.
We are proposing a strategy regarding water efficiency, soil management, cropping and awareness to provide a long-term solution in an efficient manor to preserve their lifestyle.

The solution



1. Water efficiency

- Drip irrigation: an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, soil, surface or root zone. Government provides 50% subsidy on drip irrigation.
- Canal water from river: per 400 ha of land if 100% drip irrigation is adopted, by forming agriculture cooperation. They can ask for the storage tank from narmada river to the government (i.e. patel community).

2. Soil management

- Mulching to retain soil moisture and temperature.
- Organic fertilizers from animal matter or vegetable matter.
- Easily available materials to increase soil fertility.

3. Cropping

- Rotational cropping: different crops in different seasons.
- Mixed cropping: two or more crops simultaneously in same plot.
- Improves soil structure and retains nutrients.
- Does not require additional material.

4. Awareness

- App helps farmers adopt sustainable agricultural practices.
- Actual information about prices and weather help farmers.
- Portal with personalized advice to support sustainable farming.
- Forum to strengthen community, start cooperations and provide help.
- Day-to-day addition to current trainings and education.
- If successful, export product to other regions

Benefits

- **Integral strategy that accounts for all aspects of the challenge**
- **Combination of proven techniques to sustain agricultural communities and new technology to raise awareness for the need to adapt**
- **Cost-effective strategy. Almost all the techniques and data are already available and the app could turn into an export product to other region.**
- **Water use decreased by up to 60%. This makes the strategy flexible to future changes.**

By: Iris van der Meer, Kashyap Patel, Thomas van Veelen, Vidhi Bhavsar, Stefan Hollland

Wetskills-India 2015 is supported by:

CEE Centre for Environment Education

KNOW YOUR SHIT!

BACKGROUND

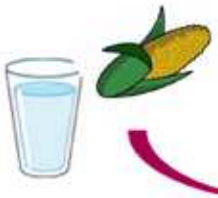
Wastewater treatment is required so that the waste produced by people does not harm their health or the environment. Despite efforts by the responsible organisations the STP's are not always able to meet effluent criteria. The Amdawadi are not aware of their influence and the risk on the future of the river Sabarmati, the overall environment and their health.

CHALLENGE

The political and economical situation are complicated and easy solutions for improvement at the STP are hard to find. Moreover there are several other discharge point of other STP's and CETP's that are also effecting the Sabarmati. Our challenge is to empower the Amdawadi to be able to take charge of the situation and work towards a brighter future.

AMDAWADI

1. Our life with water



The food we grow uses water from the river for irrigation, the water we drink also comes from natural water bodies like the Sabarmati river

All the household products we use for washing and cleaning end up at the STP, are treated and discharged on the Sabarmati

You are flushing your waste using water, this wastewater is transported to the STP, treated and discharged on the Sabarmati

2. Keeping track

Amrutam is a website and an app that will increase knowledge and awareness concerning environmental impacts on the Sabarmati and the relation between environment and human health.

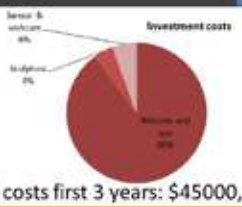
In **Amrutam** you can find personal stories about the history of the Sabarmati, water quality data, educational background and a fun water game! The app will also tell you about local water hazards based on your GPS location.

3. Life at the discharge

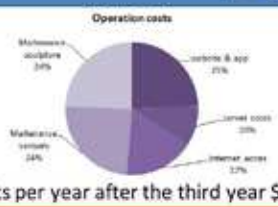
At the discharge point in the Sabarmati **a large sculpture** will be build to draw attention

A hidden webcam and online water quality sensors will be installed at the discharge and the results will be available on **Amrutam**

In time water quality of the Sabarmati will improve and the area can be developed by the Amdawadi



Total costs first 3 years: $45000,-



Total costs per year after the third year $2000

Wetskills-India 2015 is supported by:

CEE
Centre for Environment Education

GPCB

AWAKE THE LAKE

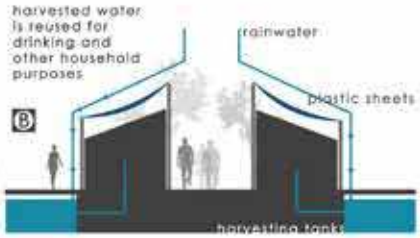
REVITALIZING THE URBAN WATER SYSTEMS

Challenge

Flooding with polluted water is increasingly a problem in lakes near urban neighbourhoods. This creates unpleasant places which are avoided, and encourages people to leave their own trash and waste near these lakes. This problem should be solved by preventing floods and changing behaviour. This allows urban lake areas to once again become healthy living spaces.

Methodology

Traditional water storage methods are combined with interviews of inhabitants of a regularly flooded area, namely the Thaltej area within Ahmedabad. Combined with rainfall data and costs estimations, this provides the four supporting pillars of the solution to the challenge.

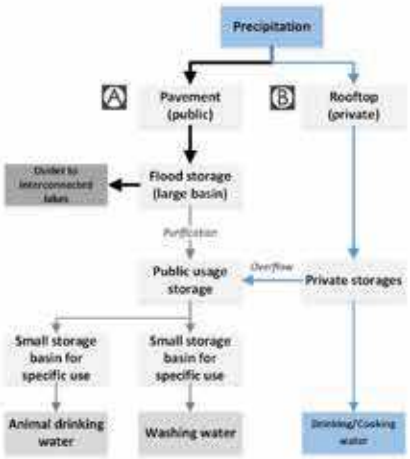


Solution

The lake is revived by flood protection embankments and by improving the quality of the area surrounding the lake. This is combined with private water supplies and sanitation for the inhabitants who live next to the lake. This is indicated on the cross-section below. The depth of the new lake is 6m, which results from a peak precipitation of 22mm during the monsoon season. As the quality of the lake improves, people will start visiting the area. This increases the connection of the inhabitants to the lake condition and to each other. Concluding, these ingredients are the components for a lively lake environment

Benefits

- No flooding
- Clean and healthy water
- Reliable supply of drinking water
- Cheap in maintenance
- Involved and aware inhabitants



BAS KREWINKEL
KARIN VAN DIJK
MANISHA JHINGOER
AKRUTI PATEL
VIVEK GEORGE SANU

Wetskills-India 2015 is supported by:

Way Forward

Wetskills: India 2015 is merely the beginning of an uphill journey. Water challenges are growing with passing time and these challenges cut across sectors. The expertise in our country coupled with various expertises from other countries would aid in tackling these challenges in a more efficient and effective way, thus making such collaboration essential. We look forward for another edition of Wetskills in 2017 along with other activities such as bilateral internships to facilitate knowledge sharing and exchange, and having universities onboard for the same.

About Partner Organisations

Centre for Environment Education (CEE) is a national institution of excellence for Environmental Education supported by the Ministry of Environment, Forests & Climate Change, Government of India, and is affiliated to the Nehru Foundation for Development. The main objective of CEE is to create environmental awareness among children, youth, decision makers and the general community. CEE develops innovative programmes and materials and field-tests them for their validity and effectiveness. The aim is to provide models that could be easily replicable to suit local conditions.

Netherlands Enterprise Agency (RVO.nl) encourages entrepreneurs in sustainable, agrarian, innovative and international business. The Agency works in The Netherlands and abroad with governments, knowledge centres, international organisations and countless other partners. The intergovernmental programme Learning for Sustainable Development- Duurzaam Door has been established to help individuals and organizations with knowledge behavioural insights and skills to make well informed choices for sustainability; the programme is executed by the Netherlands Enterprise Agency.

The Green Environment Services Co-operative Society Limited (GESCSL) was formed with the support of Vatva Industries Association and Gujarat Dyestuff Manufacturers' Association. The primary objective of the society is to provide comprehensive solution for treating the large amount of industrial effluents generated from approximately 1800 industrial units in the Vatva Industrial Estate. The society later in 1998 constructed the Common Effluent Treatment Plant (CETP) with a capacity to treat 16000 m3 of effluent / day.

Gujarat Pollution Control Board (GPCB) constituted under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 is entrusted with the task of execution of several environmental pollution control Acts and Rules. GPCB, having the responsibility of regulating environmental issues of one of the most industrialized states in India, has always given emphasis to capacity building of stakeholders such as industries, common facility operators, builders, NGOs, auditors, consultants, students and researchers.

P. P. Savani Knowledge City is a reputed organization in Gujarat, working in the field of education, medicine and various other verticals. The P P Savani Group renders its services in the education sector with the approach of Learning with a purpose, to bring out the best in our children catering their multiple intelligence and potential. P.P. Savani Knowledge City provides well-rounded, global education and tailored programmes for high-achievers.

Netherlands Business Support Office (NBSO) is an office of the RVO (Netherlands Enterprise Agency), The Hague. NBSO Ahmedabad, established in 1996, is one of the 19 offices worldwide, helping Dutch companies to find market access, potential agents, distributors, business partners and liaison on behalf of Dutch companies and organizations in Gujarat/India. NBSO also assists Indian companies to set up their offices in the Netherlands and Dutch companies to set up their business in foreign countries.

Name: Manisha Jhingoer
Area of Study/Profession: Bachelor of Civil Engineering and Building
University/Organisation: Rotterdam University of Applied Sciences

Name: Vivek George Sanu
Area of Study/Profession: Bachelor of Architecture
University/Organisation: College of Architecture, Trivandrum

Name: Akruti Patel
Area of Study/Profession: Assistant Professor
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Bas Krewinkel
Area of Study/Profession: Masters in Water Engineering and Management
University/Organisation: University of Twente

Name: Karin van Dijk
Area of Study/Profession: Masters in Water Science and Management
University/Organisation: Utrecht University

Name: Kashyap Patel
Area of Study/Profession: Bachelor of Technology (ICT)
University/Organisation: Ahmedabad University

Name: Iris van der Meer
Area of Study/Profession: Masters in Forest and Nature Conservation
University/Organisation: Wageningen University

Name: Stefan Holtland
Area of Study/Profession: Bachelors in Mechanical Engineering
University/Organisation: Windesheim University of Applied Sciences

Name: Vidhi Bhavsar
Area of Study/Profession: Assistant Professor
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Thomas van Veelen
Area of Study/Profession: Masters in Civil Engineering and Management
University/Organisation: University of Twente

Name: Aneri Shah
Area of Study/Profession: Bachelor of Technology
University/Organisation: CEPT University, Ahmedabad

Name: Deepanjali Patil
Area of Study/Profession: Assistant Professor
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Ruben van Berk
Area of Study/Profession: Bachelors in Civil and Water Engineering
University/Organisation: Rotterdam University of Applied Sciences

Name: Viraj Parekh
Area of Study/Profession: Assistant Professor
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Roy Pasman
Area of Study/Profession: Masters in Civil Engineering
University/Organisation: University of Twente

Name: Deepak Hiremath
Area of Study/Profession: Ph.d student
University/Organisation: Ahmedabad University

Name: Mrunalini Rana
Area of Study/Profession: Assistant Professor
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Sebastian Oudendijk
Area of Study/Profession: Bachelors in Mechanical Engineering
University/Organisation: Windesheim University of Applied Sciences

Name: Suhail Khuraishy
Area of Study/Profession: Bachelors of Architecture
University/Organisation: College of Architecture, Trivandrum

Name: Evelien Martens
Area of Study/Profession: Masters in Water Management Resources
University/Organisation: Delft University of Technology

Name: Darpan Patel
Area of Study/Profession: Bachelors in Technology ICT
University/Organisation: Ahmedabad University

Name: Maarten Klaversteijn
Area of Study/Profession: Bachelors in Mechanical Engineering
University/Organisation: Windesheim University of Applied Sciences

Name: Vishnupriya R.
Area of Study/Profession: Bachelors in Architecture
University/Organisation: College of Architecture, Trivandrum

Name: Amita Shah
Area of Study/Profession: Lecturer
University/Organisation: Silver Oak Engineering College, Ahmedabad

Name: Natasja Fraters
Area of Study/Profession: Process Engineer
University/Organisation: Groningen Drinkingwater Company

Name: Priya Romal
Area of Study/Profession: Assistant Professor
University/Organisation: College of Architecture, Trivandrum

The programme brought together two generations; mother Amita Shah and daughter Aneri Shah, both of who were equally enthusiastic about the programme.

Wetskills in media

citylife SUNDAY 06 DECEMBER 2015

વોટર હાર્વેસ્ટિંગ વિષય હેઠળ ડચ અને ભારતના સ્ટુડન્ટ્સે અમદાવાદના કુવાઓનું સંશોધન કર્યું

અમદાવાદની પોળના કુવાઓ પર ડચ સ્ટુડન્ટ્સનું રિસર્ચ

Sandesh Newspaper
Date: 6th Dec 2015

Meet on water to tackle salinity, high TDS levels & more

12 participants from Netherlands and 14 from India to come up with solutions to water challenges under Wetskills-India 2015 programme

CASE STUDY & CHALLENGES

DNA Newspaper
Date: 8th Dec 2015

ahmedabad

Weeds, sensors & apps to solve your water woes

Centre for Environment Education (CEE) and Wet Skills Foundation of Netherlands are working together to identify problems and find solutions on issues related to water in Gujarat

DNA Newspaper
Date: 10th Dec 2015

Centre for Environment Education
Nehru Foundation for Development
Thaltej Tekra, Ahmedabad 380 054
For Generic Inquiry Contact:
Phone: 91-79-26858002 to 05
Fax: 91-79-26858010
E-mail: ceedo @ceeindia.org
www.ceeindia.org