A Report on Training Programme on
“Urban Rainwater Harvesting”
June 16 to 19, 2014, Savar, Dhaka, Bangladesh
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1. INTRODUCTION:

Water unit of Centre for Science and Environment (CSE) conducted a training programme on Urban Rainwater Harvesting (URWH) from June 16 to 19, 2014 organized by WaterAid, Bangladesh. The programme was funded by Water Aid Bangladesh (WAB) under the Sector Capacity Building – SCB project. Aim of the training programme was to enhance the skill sets of the practitioners and government officials in the area of URWH.

2. TRAINING PROGRAMME

The programme was held in the training centre of BRAC at Savar, near Dhaka. The four day programme from June 16 to 19, 2014 involved technical sessions, practical sessions and field visit to urban rainwater harvesting project site. In the practical session, participants worked in groups on given projects on RWH project involving design and costing of rainwater harvesting system. A video film on the subject were used to share the learning’s from successful rainwater water harvesting projects including the implementation of various stages in developing a rainwater harvesting system – baseline conditions, technical knowledge, maintenance and successful case studies.

Urban centres in Bangladesh are mainly dependent on groundwater supply. However, with uncontrolled and unplanned development, groundwater is not able to sustain the increasing demand resulting in lowering of water table as well as deterioration in the groundwater quality. Apart from this the country also faces the problem of Arsenic contamination in the shallow aquifers. Hence, the present training programme aimed to provide a technical understanding of urban rainwater harvesting to resolve the problem of groundwater source augmentation in terms of quantity and quality– leading towards sustainable water management.

2.1 Participants

The workshop participants were from different regions of Bangladesh and included practising engineers, architects, academicians and also participants from government agencies like Dhaka Water Supply and Sewerage Authority (DWASA), Local Government Engineering Department (LGED), Khulna Water Supply & Sewerage Authority (KWASA), Department of Public Health Engineering (DPHE) [Annexure 1].
2. 2 Course Modules
The course modules included sessions on overview of urban water challenges in Bangladesh and importance of rainwater harvesting in urban areas, basic concepts for URWH, tools and techniques used in planning and designing of rainwater harvesting structures. The sessions were also followed by intermediate exercises so that participants can understand the sessions. A session was organised for practical exercises named “Do It Youself”, in which participants designed the RWH system for given project sites and prepared presentation in groups. A field visit was organized by WaterAid, Bangladesh to understand the URWH system installed on ground.

2.2.1 Training sessions

The following section provides day wise details of the training programme.

DAY 1 (June, 16 2014): INTRODUCTION AND WELCOME ADDRESS

- **Session 1 –Introduction**
  Participants, WaterAid and CSE representatives provided their self introduction. The participants indicated their professional background, areas of interest and expectations from the present training programme.

- **Session 2- About Water Aid Bangladesh (WAB) Programme**
  This session was presented by Ms. Hasin Jahan, Programme Director, Water Aid, Bangladesh (WAB), on the activities conducted by WAB in the water sector especially urban rainwater harvesting within the country. She explained the timeline of efforts and initiation taken for RWH implementation at different levels throughout the country. She also provided an overview of CSE – WAB partnership on capacity building and knowledge dissemination since 2010.

- **Session 3- About Centre for Science and Environment (CSE)**
  Dr. Uday Bhonde, Deputy Manager, Water Unit, CSE provided an overview ‘About CSE’ where he focussed on the water programme of the organisation. He further gave an overview of CSE’s activities in India as well as South Asia, over the years.

- **Session 4- Welcome address**
  Dr. Khairul Islam, Country Representative, WAB welcomed the participants and gave his opening speech. In his speech he inspired and motivated the participants to contribute towards work in water sector. He introduced this training programme as a platform for positive results in
knowledge dissemination on planning, designing and implementation of RWH throughout Bangladesh in future.

Ms Hasin Jahan of WAB presenting an overview of rainwater harvesting in Bangladesh and initiatives taken by WAB.

Dr. Uday Bhonde, CSE presenting “About CSE”

Welcome address by Dr. Khairul Islam, Country representative, WAB at the inaugural session
DAY 2 (June 17, 2014): URWH OVERVIEW AND TOOLS &TECHNIQUES

- **Registration**
  The second day started with formal registration and kits distribution to all the participants.

- **Session 5 - Urban water challenges in Bangladesh**
  The first session of the second day started with presentation by Dr. Tanvir Ahmed, Assistant Professor, Bangladesh University of Engineering and Technology (BUET). He provided an overview of the present water supply conditions, coverage, future projects and dependency of groundwater in the city of Dhaka. He also talked about the initiatives taken by DWASA for the sustainability of the sources of water supply. He highlighted the existing issues related to storm water management as well as sewage system of Dhaka city, with possible solutions and strategies for the same. This presentation formed basis of current water issues in Bangladesh and need for initiatives like Rainwater Harvesting in the country.

- **Session 6 - Importance of RWHS in urban areas**
  This was presented by Mr. Md. Ashraful Alum, Architect and Secretary, Rain Forum, Bangladesh. He emphasised on the need and importance of managing rainwater, especially in urban areas. He further explained the initiation taken by Rain Forum as a non-profit voluntary platform for promotion of Rainwater Harvesting. He highlighted the importance of collaboration among different professionals involved in urban RWH systems to further spread the practise in right direction.

*Dr. Tanvir Ahmed, BUET presenting on “Urban Water Challenges in Bangladesh”*

*Mr. Md Ashraful Alum, Architect and Secretary, Rain forum presenting on “Importance of RWHS in urban areas.”*
• **Session 7 – Components of Rainwater Harvesting**
  This session was covered by [Dr Uday Bhonde](#) from CSE. The session highlighted the basic terminologies used in rainwater harvesting and gave an introduction of various components involved in Rainwater harvesting system. He further explained data collection and analyses required to take decisions to opt for appropriate option for RWH and design the system based on local site conditions.

  ![Dr Uday Bhonde, Deputy manager, CSE – session on “Components of Rainwater Harvesting”](image)

• **Session 8- Case studies of RWH units/plants**
  The components of RWH, was followed by the brief description and details of case studies on urban RWH system based on Indian experiences. [Ms. Shivali Jainer](#), CSE, presented the three case studies from medium, low and high annual rainfall regions of India. The case studies gave insights on local conditions, planning details and implementation of different RWH components at the selected sites. The case studies highlighted the benefits of the RWH systems in terms of socio-economic to the participants.

• **Session 9- Plumbing of RWH systems considering urban context**
  This session focussed on plumbing design network for RWH projects. [Mr. Syed Azizul Haq](#), Additional Chief Engineer, Public Works Department (PWD), Dhaka presentation role of plumbing in the RWH system. He gave overview on appropriate planning, designing, installing, operating of pipes, fixtures and equipment for high performance of RWH system.
• Session 10- Volume/size of RWH unit/plants

This session was taken by Dr. Uday Bhonde, CSE. RWH system at different scale/size was explained. The volume/size of RWH unit/plants in terms of catchment size as well as community, institutional or neighborhood size/level was briefed to participants. He further highlighted the scale of interventions according to purpose of RWH project and water quality requirements (high and low quality).

Intermediate Exercise 1: whether to store or recharge

A quick exercise on how to decide for the storage or recharge structures for RWH was conducted. The exercise was based on assumed hydro-geological conditions on site. The exercise was interactive. The participants gave reasons for supporting the different selection/decision taken.

• Session 11- Planning and designing storage structures

Ms. Shivali Jainer, CSE explained the concept behind planning and designing of rainwater storage structures. The presentation gave a detailed insight of materials used, positioning of the tanks and different methods used for calculations for size of the storage tank. (For individual residential plot, housing colony, institutional building, commercial building, community centres).
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Shivali Jainer, CSE presenting on “Planning and designing of RWH storage structures”.

- **Session 12 - Planning and designing (First Flush Devices/Diverter) FFD/Recharge structures**

  **Dr. Uday Bhonde**, CSE presented the last session of the day explaining the role of FFD as well as types of FFD. It was followed by concept of groundwater recharge focusing on porosity/permeability/transmitivity with water table consideration in recharge process. The lecture ended with detailed explanation of recharge structures calculations and design.
DAY 3 (June, 18 2014): TOOLS AND TECHNIQUES (CONTD.)

The day 3 started with a brief recollection of the previous day of the training programme by the participants followed by the days programme.

- **Session 13 - Operation & Maintenance (O&M) of rainwater harvesting structures.**
  This session was covered by **Dr. Uday Bhonde**, CSE. In this session, he focussed on need of O & M for efficient RWH system. He talked about the primary and secondary requirements of O & M and illustrated the same with photographs and diagrams. He ended the presentation describing the roadmap for O & M for an individual owner as well as for a Community/Institution.

  **Intermediate Exercise 2: O&M**

Before the practical exercise, a quick exercise on periodical maintenance of RWH site after implementation was taken. Participants were asked to advice actions to the client for maintenance of the system and in what should time for opting O&M for various components. The exercise ended with an interaction with the participants for discussing different activities for O&M at specified time intervals.

- **Session 14- Do it yourself: Practical session on designing rainwater harvesting system.**

  In this session, participants worked on examples where site plan and site conditions were given to them along with meteorological and water consumption data. Participants were asked to plan, design and estimate cost for their RWH project. Participants were divided into four groups consisting of five to six members in each for the exercise purpose.

  Four different projects (School, residential building (I,II) and club) layout along with basic data and RWH potential calculator (excel file) were given to the groups. Site plans were also given with hydro-geological conditions of Dhaka and Chittagong.
Each group worked on the planning and designing of rain water harvesting structures on the specific sites given to them. The participants came up with design proposals by the end of the session.

- **Session 15 - Do it yourself (Cont.): RWH potential calculator-Excel file**

  The participants were described on how to use the excel sheets to calculate the potential according to the demand and available rainfall. The calculator was explained by modifying few of the input values to get the analyses in the form of graphs and figures.
• **Session 16 – Do it yourself (Cont.):** Preparation of presentations by different groups on the RWH projects.

In this session the participants worked in groups and made presentations on the different site projects. While doing the analysis and calculations, various doubts were clarified; this further enhanced the understanding of the subject.
• **Session 17- Do it yourself (Cont.): Presentation by the participants**

In this session participants presented their design and planning of RWH. The outline of presented included data analysis and demand estimates, planning and designing of RWH structures at site, costing of the complete system and pay back analysis. The presentations were made using Microsoft excel, 3D software, power point. A representative from group gave presentations.

*Presentation of the participants followed by the group exercise in the ‘Do it Yourself’ session*

**DAY 4 (June, 19 2014) : FEEDBACK, CERTIFICATE DISTRIBUTION AND FIELD TRIP**

• **Session 18 – Summary, Way forward and feedback**

The training programme organised by WAB and conducted by CSE was summarised with feedback session, group activity, game among groups and finally certificate distribution.

“The training course is very effective in context of urban as well as coastal areas of Bangladesh. As I am an Engineer of Khulna WASA, this course is very useful for my organisation as well as for my career.”

*Md Ashekur Rahman, Assistant engineer Khulna WASA*

“According to me the training programme was very informative and the way it has been organised and delivered (course components) helped to understand the topic properly.”

*Saiqa Mustari Susmita, Lecturer, University of Asia Pacific*

“Overall this course made the ultimate reinforcement to my knowledge about RWH. Overall the entire training session was informative, effective and pleasant.”

*Ashiq Mohammad Bhuijan, Jr. Structural Engineer, Tarique Hasan and Associates*
“As an academician, I have to disseminate knowledge to the students and motivate them and also to the society regarding the system. I gained the detailed knowledge on RWHS and this training helped me a lot in this regard.”

Dr. Md. Shafiul Azam, Assistant Professor, UITS

• Session 19: Film: Rain catcher

After the feedback and certificate distribution, a film “Rain Catcher” prepared by CSE was screened for participants. The video summarised all the key points of how the urban rainwater harvesting is done, its dimensions, various filter products and technologies used, Operation maintenance of RWH project etc. from different geo-climatic zones in India. The film also had case studies implemented by CSE. Brief introduction of the project, its benefits were shown in the voice of owner off the projects.

Field visit to UITS, Dhaka on June, 19 2014.

Mr. Sanjoy Mukherjee of Water Aid Bangladesh guided participants on the field trip. The field trip was hosted by University of Information Technology & Sciences (UITS), Dhaka at their campus. The rainwater harvesting project at UITS is a pilot project taken up by the university in its upcoming campus at Dhaka. The technical support for the project was provided by WAB. The site showcases roof top rainwater harvesting system and use harvested water to be stored in a storage tank for reuse after filtration. The overflow from storage tank goes to a recharge structure constructed at distant for ground water recharge. A representative from civil engineering department, UITS who was involved in the implementation of project gave brief about complete system and also shared the experience in setting up the structures on site.
Photographs - Field visit to University of Information Technology & Sciences (UI TS), Dhaka.
ANNEXURE: 1

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