Harvesting and Harnessing Rainwater

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The Indian subcontinent is blessed with an average annual precipitation of 1 meter, ranging widely from 100 mm in Jaiselmer to 11,000 mm in Cherrapunji. These along with perennial rivers fed from mountain glaciers and springs form the supply of fresh water for the subcontinent. According to a report by the UNFCC (United Nations Framework Convention on Climate Change) the Himalayas alone, with nearly 1500 glaciers spread over an area of 33,000 sq. km., supply nearly 8.6 billion liters of fresh water to the plains every day.

Despite our plentiful supply, shortages abound in most parts of India. Water related diseases such as diarrhea and hepatitis are common. Simple water conservation practices built into our traditional lifestyle have all but disappeared in the modern era, leaving us vulnerable to costly foreign technologies and systems that are hardly suitable for our region. The *Kunds* of Rajasthan, the *step wells* of Gujarat and the magnificent tanks built around temples of South India are examples of our traditional water harvesting systems. These systems were developed over history by people to conserve and utilize a very precious commodity – water. When water is supplied through a faucet in our urban apartment dwellings, unfortunately, we fail to conserve or value it since the supply is plentiful.

Rainwater harvesting:

Rainwater harvesting is a decentralized technology, which requires individual buildings or group of buildings to collect and utilize the rainwater during the monsoon period. The water can be stored in storage tanks and the overflow is usually used to charge the ground water by means of various techniques such as percolation pits, trenches or wells. It is estimated that nearly 97% of Mumbai is concretized; the runoff coefficient is almost

equal to 1.0, resulting in a heavy burden on the storm water system. This is increasingly the case in most mega-cities. As developmental activities – construction of more and more commercial and residential buildings – increases, the runoff is likely to increase, and lead to increasing floods in this coastal city.

There is a myth among urban dwellers that rainwater cannot be harvested in urban areas due to spatial constraints or owing to geology. However, there can be no excuse. The Municipal Corporation of Greater Mumbai made it mandatory in October 2002 for new buildings to harvest rainwater. These buildings will be supplied only 90 liters per day as against 125 liters. The Builder or architect must make provisions for the shortfall by harvesting rain and by recycling water. However, due to lacunas in the system, many new buildings have either got exemptions or have put into place rudimentary systems, which do not serve the purpose. Implementing a rainwater harvesting system requires a storage tank, which can be part of the underground water tank, or independent tanks on the surface, depending on space availability. This tank will collect the water falling on the building's rooftop or terrace. Further, innovative methods can be adopted to harvest the surface runoff either to charge the groundwater in the region or to utilize for non-domestic purposes.

The objective of a rainwater harvesting system is to collect and store the maximum possible rainwater falling on the site. If planned in the design stage of a building, the costs of implementing it are minimal. The long-term advantages of such a system make this system viable. Many buildings in Mumbai have become tanker free by resorting to rainwater harvesting.

Some of the successful rainwater harvesting systems implemented in the city include the Systems Department of the Naval Dockyard, Colaba, the Sophia college, Worli, St. Catherine's Home, Andheri, the Neelkant Apartments, Worli, Millionaire shopping Center, Juhu, the Asian Paints Factory, Kanjur Marg, etc. A design competition on rainwater harvesting organized in 2004/2005 had more than 40 entries. The best example is that of the rainwater harvesting lake constructed in the Maharashtra Nature Park, which

stores 2.45 crore liters of fresh water. This lake constructed atop a dumping ground, and situated next to saline Mahim creek, is a marvel of Nature. The Park relies on this lake for irrigating its trees during summer. These are examples of successful rainwater harvesting systems in the city which any city can adopt.

Education about Rainwater harvesting:

Rainwater harvesting is the technology of collecting and storing rainwater and utilizing it for useful purposes. However, architects who design and supervise the construction of buildings are hardly aware of the benefits or the techniques by which rainwater can be harvested. At the Rachana Sansad's Institute of Environmental Architecture, we provide both formal as well as non-formal training on rainwater harvesting. Through the one-year part time post-graduate diploma in Environmental Architecture (since 2002) recognized by the Maharashtra State Board of Technical Education, as well as the two years Masters Degree program in Environmental Architecture (since 2006) recognized by the Y.C.M.O.U, the Institute trains architects and civil engineers with techniques to conserve, harvest and manage water in buildings. The Institute provides local, national and international expertise in the field to provide inputs to the students, thus training a whole new generation of environmental designers.

The Institute also conducts training programs for people from all walks of life. Several seminars and workshops have been conducted on a regular basis in collaboration with corporate bodies such as the Eureka Forbes Institute of Environment or the Lotus Suites, or government agencies such as the Municipal Corporations of Thane, Sawantwadi, Jaipur and Kalyan-Dombivli. It has also collaborated on a regular basis with the Indian Institute of Architects, the Confederation of Indian Industries (CII) and the Bombay Chamber of Commerce and Industry (BCCI) in creating awareness about rainwater harvesting to a larger and targeted audience.

Harvest to Harness Rainwater Harvesting Competition:

The Harvest to Harness rainwater harvesting competition was first launched in June 2004 by the Rachana Sansad's Institute of Environmental Architecture in collaboration with

the Lotus Suites, an ecotel hotel and the Eureka Forbes Institute of Environment. The objective of the competition was to document existing case studies of rainwater harvesting and to create awareness about this issue. However, given the limited know-how on this subject, the organizers had not hoped to receive more than a handful of entries in the first year of its launch. Surprisingly though, there were 33 entries – that is, those who had actually sent in their working models and design proposals. The participants' profile encompassed the whole cross section of society. Corporate entries included Godrej Industries Ltd., Hiranandani Constructions and Asian Paints. Entries came from NGOs, Charitable organizations, Government agencies, Industries, Students, Professionals, Villagers, House wives, even Gardeners. Since then the competition is organized every year. The case studies and design proposals are compiled in a report each year and distributed free of cost to schools and colleges.

Harvest to Harness was a huge success and ran from 2004 - 2007. The ripples of hope sown by Harvest to Harness have touched a large section of the society. Technical seminars, street skits and educational leaflets have reached out to the people of Mumbai and beyond. Not only new buildings for which the Municipal Corporation has made rainwater harvesting mandatory, but also many old buildings have begun to consider and implement rainwater harvesting.

Vinayak Darshan Co-operative Housing Society, Dombivili:

Inspired by the efforts taken up by the college in promoting rainwater harvesting in Mumbai, Dombivili-resident Suhas Pathak, Superintendent at the Rachana Sansad's Academy of Architecture, embarked on a project to set up rainwater harvesting at his building, Vinayak Darshan.

A small obscure housing society of 40 flats in the crowded and over-congested town of Dombivili, Vinayak Darshan hardly received 10 minutes of Municipal water supply in 24 hours. This was the time when tanks were filled in and water stored by residents for the rest of the day. A bore well provided with a submersible pump was the only savior fulfilling the flushing requirements of the close to 200 residents. Even this supply dwindled in the monsoon leaving the residents at the mercy of rain gods.

With the help of prominent local architect, Rajeev Taishete and guided by faculty of the Rachana Sansad's Institute of Environmental Architecture, Pathak planned the system despite opposition from building residents. Interestingly, most members of the society agreed to his plan. With technical assistance from Dr. S. K. Vadagbalkar, a geologist from Solapur, the Society has now installed a rainwater harvesting system which is capable of harvesting close to 13, 500 liters per day for the entire monsoon season. The cost of installation was barely Rs. 25,000.

The Institute has now provided rainwater harvesting consultancy to more than 100 residential housing societies and corporate in Mumbai including industrial estates, railways and corporate clients such as Petroleum House, HPCL.

Words of Wisdom:
The book, Dying Wisdom: Rise and Fall of India's Potential Rainwater Harvesting Systems, states: "Evidence of irrigation with water harvesting systems can be found in Kautilya's Arthasastra, written in the third century B.C. . .Wells were probably a Harappan invention... a recent archaeological survey of the Indus Valley Civilization revealed that every third house had a well."

Traditional methods and practices have profound scientific principles and wisdom. It is for us to understand and adapt them to the modern world.