TEXT BOX

Potential for well recharging through roof rainwater, to support desalination of coastal wells and recharging of unconfined aquifers

Country: India
City/region where project is based: Trichur district, Kerala State
Population (of area where the project is based): 3,110,327 (2011 Census data)
Key organisations /stakeholders involved in the project: Mazhapolima (Rain Bounty), District Rainwater Harvesting Mission (DRHM), Registered Society under Charitable Societies Act. District Collector (Executive Head of District), Government of Kerala.
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Water challenge

The coastal state of Kerala receives an average annual rainfall of 3000 mm, with 62% of households dependent upon homestead dug wells (a hole dug by shovel or basic machinery, distinct from drilled wells which are typically deeper) for their drinking and domestic water needs. Despite high rainfall during the rainy season, these wells go dry during summer. As a result of excessive pumping,water quality issues such as saline ingress and iron content are common in the coastal wells. Therefore, a solution is required to ensure water access in the summer months and to protect the water quality of these wells.

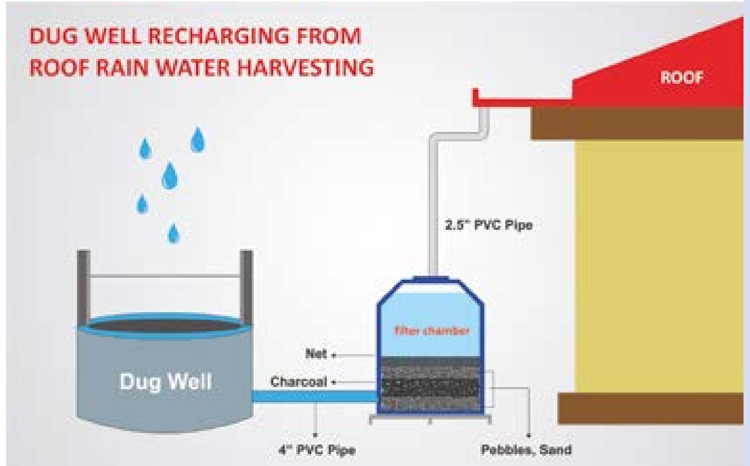
Project approach

To address this, the project works by diverting roof rainwater from homestead premises to a nearby dug well. In the coastal belt, the rainwater has to be directed to the mouth of the well whereas in the mid land and upper hilly terrains, it can be diverted towards a dug well. This results in the artificial recharging of the unconfined shallow aquifer where the well is located and with it the reversal of saline intrusion due to withdrawals of freshwater by human activities.

As of July 2018, the Well Recharging units consist of a 15 metre long PVC gutter and approximately 30 metres of down pipes-from rooftops directed towards the well. A filter unit is installed to reduce the impurities from rainwater flowing off the roof. Monitoring and communication about the quality of the water is currently completed manually. The cost of the Well Recharging unit per 1000 square foot roof is approximately US $ 100.

Results

A study conducted by the Centre for Water Resources Development and Management in Kerala to assess the impact of the project revealed that it significantly reduces saline intrusion into coastal aquifers while raising the water table across seasons. Since the beginning of the project in May 2008 more than 30,000 Well Recharging units have been installed by *Mazhapolima* in water poor households and institutions across Kerala. This has been made possible by the subsidized cost of all units by the Governments of Kerala and India. Countless households have also adopted this technology at their own cost. Sharing this water solution to poor countries of Africa, Asia and island nations could result in higher water access and security, provided it secures the financial and logistical support from international agencies.



SWM: Potential and support required

As of August 2018, the project has not yet involved smart technology. Instead, the assessment and communication of the project are conducted manually and the data is transmitted via SMS messages. This approach has its limitations. Firstly, communication through SMS is restricted to a minimum to save costs resulting in reduced communication. Secondly, water quality analysis is conducted manually in government laboratories that lack advanced smart technology and modern water quality testing methods, resulting in reduced accuracy and delayed results. While the private sector can provide faster and more accurate results, the cost for these services is very high.

Therefore, to improve the accuracy and reliability of the project, automated monitoring systems for the wells are required to detect real-time water level and water quality, with the data automatically transmitted to a central station. This data can then be relayed quickly to the community to improve awareness of the water quality and access for each well. This improvement will require financial support along with technical advice from smart water technologists.

In general, ample scope exists for installing smart technologies for rainwater filter management in India and other developing regions in the world. With the right research, development, market management and technical support smart technologies could provide a major step forward in supporting successful rainwater harvesting in these regions.