

Abstract

“Backwashing” -Injection of harvested rainwater into Open Wells for enabling water quality improvement

Domestic water sourced from household open wells is a common practice linked with culture of India since centuries, and in Kerala State there are over 250 such open wells per sq. km, highest in the world, totaling to 5.8 million wells. More than 80% of the population living in coastal areas draws water for domestic needs from these shallow wells.

However, fresh water availability in these wells especially in coastal and shallow water table areas are rapidly declining and these fresh water aquifers are replaced by saline and brackish water. There are incremental cases reported in water borne diseases, increased drudgery for women in fetching potable water from long distance. Many fresh water open wells and traditional ponds are gradually turning saline and discarded.

Potentially, the State receives 3000 mm of annual rainfall in about 120 days. Innovatively, this high rainfall is now utilized for improving shallow aquifer water quality.

One major milestone achieved is improvement in the quality of water in shallow open wells, especially in coastal areas facing salinity threat; through rainwater harvesting and feeding into wells. Applying participatory approaches, issue based development initiatives were triggered within the selected homesteads in three locations since 2004.

Backwashing initiatives enabled in discovering the lost potential of traditional water bodies and we are still continuing the pursuit to further demystify, explore and concurrently contribute to the people’s science and art of water management. Moreover, the process is found to be simple enough for local level replication in similar such areas without external support.

PLANET Kerala conceptualized, applied and standardized this creative and sustainable solution to the most pressing water issue in the coastal areas. This process delivered results that can be very well expanded and replicated to many areas.



Contact Person: **Mr. M. J. Joseph**, Executive Director

Post address: PLANET Kerala
St. Mary's Building Complex, Pattom, Thiruvananthapuram 695004, India

Telephone +91 471 3295944, 2557516
Fax +91 471 2557516

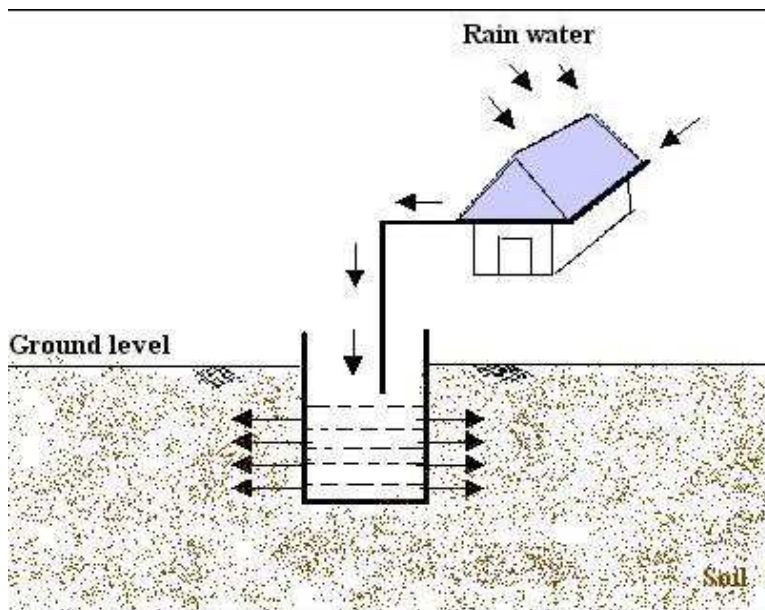
Email info@planetkerala.org
Website www.planetkerala.org

Descriptive narration

“Backwashing” -Injection of harvested rainwater into Open Wells for enabling water quality improvement

The process is simple which involves feeding rainwater, collected from rooftops using a gutter and feeding directly to the open wells located within the household premises. Back washing does not involve any additional storage structures as that of conventional rainwater harvesting units.

Entry of rainwater into wells results in temporary rise of water column. This water column is dynamic and temporary, thus exerts pressure to be in equilibrium with surrounding water table. In due process, it results in partial dilution of constituents and later dispersion into surrounding water table.



The area receives over 3000 mm of annual rainfall in about 120 days. Rainfall falling over an area of 30-45 sq.m. is collected and diverted into wells. Thus, gradually water surrounding the well is replaced with relatively soft rainwater. This process enables a speedier route for replacing existing contaminated ground water with soft water. **Essentially, backwashing enables exchange of contaminated hard water with soft water and in due course of time, fresh water zone is regenerated in the well vicinity.** More than 200 households in three districts now regained their water access. Salient points -

- **Backwashing does not need any water storage structure**
- **Very low one time cost Rs. 200-1500**
- **Reverses ground water pollution, increases distribution and access to fresh water sources**



The below table present the outcome in terms of changes that has been reported over improvement in water services due to adoption of Backwashing process in their respective household wells.

Based on a sample size of 20 households which were continuously monitored	Well water usage level			
	Drinking and Cooking	Cleaning needs	Bathing	Washing clothes
Pre project (December 2004)	5%	85%	15%	15%
Post project (December 2005)	35%	95%	95%	100%
Increment in access due to Backwashing processes	30%	10%	80%	85%

All the partnered households listed in the above table invested between Rs. 4000- 18000 for constructing their open well. The average age of these wells is 6 years. Households received 2-5 years of service before they had severe quality declination as discussed earlier.

In the short range, the outcome of backwashing clearly confines to restoring water services for non-potable needs. **Evidently, over 80% changes in access were observed in terms of water used for washing and bathing needs. The next major segment witnessing restoration is water access for drinking and cooking needs at 30%.**

Explicitly, feeding of rainwater directly into wells resulted in bringing about, restoration of water access, resulting in substantial reduction in bulk water that is being hauled from neighboring sources earlier.

Primarily, women stands benefited as these activities is entirely carried out by them in almost all households. The material used for installation comprises of locally available PVC pipes and gutters and can be easily fixed with minimum expertise. Along with technical guidance and with the help of community volunteers including participating households the pilot demonstration units were installed. There were four types of households based on roof condition, which necessitated location specific criteria. The one time capital cost per household depend on roof type and distance between well and collection point.



**Tiled house
Rs. 1000-1300**



**Flat terraced
house Rs. 300-750**



**Slope terraced house
Rs. 200- 1000**



**Thatched
house Rs. 1000**

**Is there enough
Rainwater for
Backwashing?**

Given an average roof area of 40 Sq. meters, with a rainfall of 3000 mm and assuming collection efficiency of 90%, it adds to **108000** liters of water. On an average a household draws 350 liters of water from their well. Thus summer (6 months) withdrawal totals to 63000 liters of water, this means there is more supply of free rainwater than demand.

A functional backwashing system does not incur any monetary operational and maintenance cost, except for occasional cleaning. The installation takes around two hours, and a day in case of thatched roofs. The first showers after long gap are let off to enable self cleaning of the roof area and later rains are collected to the full extent. A mesh filter is provided at the end of the pipe for enabling collection any debris.

Simplifying further - Community level impact and innovations

Backwashing initiatives enabled in discovering the lost potential of traditional water bodies and we still continue with the pursuit to further demystify, explore and concurrently contribute to the people's science and art of water management. Moreover, the process is found to be simple enough for local level replication in similar such areas without external support as visible in the few of the local level replications witnessed since June 2005.

Alternate to PVC gutters, a cement mortar ridge is constructed (12 cm height and 5 cm width) along the lowest line of the tile roof, for water collection. This brings about cost reduction by 75%. Cement gutter costs on Rs.33 per meter



The end filter fabrication is made easier by attaching the mesh with a PVC pipe piece and secured by rivets. The whole filter cost on Rs., 40 per piece and dust accumulation



Mr. Latheef, at Kadalundi, Calicut, further simplified the water collection process by laying a plastic sheet in between his house and well. The sheet slopes towards the well, thus enabling water collection.



Existing over flow pipe from the Ferro cement tanks is simply extended into the open well- scene from Kadalundi in Calicut

Activities initiated did enable PLANET Kerala and our stakeholders to initiate substantial community actions, which eventually resulted in generation of knowledge, through iterative processes which throw open immense potential over actions that can address the water issues prevailing in coastal and backwaters regions in the state. Key knowledge contribution includes **-Revival of traditional water sources** - Wells constitute the most common and accessible domestic water source in the state. It is the most preferred source, most commonly distributed and a skilled labour segment exist on digging wells in various terrains. There are over 5800 000 wells distributed in the state, while is the state is having around 65 00 000 families. Hence, nearly 70% of the households in the state is having access to this form of private water supply (*any water sector investment or process cannot ignore this factor*).The project did initiate experimentation in two small coastal areas, and now the outcome generated is very much applicable for the entire coastal communities spread over in the coming years (Kerala state alone has 600 km coast line). *END*