

Rain Water Harvesting: Methodologies and Risks

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International Conference on Water
Harvesting, Storage and Conservation
23-25 November 2009, IIT, Kanpur

Some general remarks

- The truth is that whatever water we draw for any use is rain water harvested at some stage
- However, the connotation of rain water harvesting is threefold:
 - rain water is collected for a specific purpose
 - specific devices and structures are installed and
 - water is optimally utilised by storage and withdrawal
- Rain water flowing out to the sea or a large lake is viewed as wasted
- It is often not realised that runoff increases two to three times due to urbanised development of a site

Some questions arise

Questions

- Does the quality of water collected suit the purpose for which it is collected? (*pH, first wash*)
- Is the carrying capacity of the conveyance system adequate? (*peak hourly flow*)
- If the harvested water is stored, is the storage capacity adequate to avoid spillage? (*peak daily flow*)
- If the harvested water is to be charged into ground, will water back up and overflow? (*permeability of soil*)
- Will groundwater quality be threatened due to recharging it with runoff? (*pesticides, industrial effluent*)
- If there are threats and risks, which agency, organisation or authority is to address them?

Some weird applications

- Adopting a standard drawing of rainwater harvesting structure for all soil profiles and groundwater conditions
- Showing a submersible pump on the bore well below the pit
- Basing the runoff on average rainfall per day or on one-quarter of peak hour rainfall
- Harvesting without any pre-treatment of runoff to arrest suspended solid matter and oil & grease
- Placing a perforated pipe vertically below the harvesting structure reaching up to the aquifer
- Assuming that water harvesting involves no cost for maintaining the system

And the winner is

- Rainwater harvesting pits over sheet rock in a large building project at Hyderabad

Suggested Methodology

- Calculate the increment in the runoff
- Segregate roof water from surface runoff
- Provide for
 - Pre-treatment to remove pollutants, such as suspended particulate matter, oil and grease
 - Discarding the first wash
 - Removal and disposal of sludge
 - Monitoring of water quality
- In water scarce areas, encourage use of roof water runoff but ensure sterilisation before reuse
- If groundwater can and need to be recharged, safeguard the quality of groundwater

Safeguards

- Check peak hour rainfall and peak day rainfall with relevant data of Indian Meteorological Department
- Design conveyance, including recharge into ground, on peak hourly runoff
- Design storage capacity based on peak daily runoff
- Keep a buffer of 3 to 5 meters between the bottom of harvesting structure and the highest known level of groundwater table
- Maintain strict vigilance against surreptitious disposal of wastewater for recharging groundwater

Regulatory agencies

Existing

- Central Ground Water Authority
- Central and State Pollution Control Boards
- National Water Quality Authority

Potentially new

- Health Surveillance Organisation
- National Environmental Protection Authority

Risks

- Lack of co-ordination
- Severe damage to groundwater quality
- Too many regulators; no one to do remediation

Thank you

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