

# Issues related to implementation of Roof Top Rainwater Harvesting

Dr. D. Gnanasundar

Senior Hydrogeologist

**Central Ground Water Board**

Ministry of Water Resources, River Development and Ganga Rejuvenation

**Government of India**

## Rooftop Rain Water Harvesting

- is the technique through which rain water is captured from the roof catchments and stored for use.
- Harvested rain water can be recharged into sub-surface or aquifer by adopting artificial recharge techniques to meet the requirement.

How to proceed...

There should be a good understanding

- of the issues (**Problem**)
- as well as the history (**Historic situation**)
- and various reasons that have contributed to the current situation. (**Present situation**)

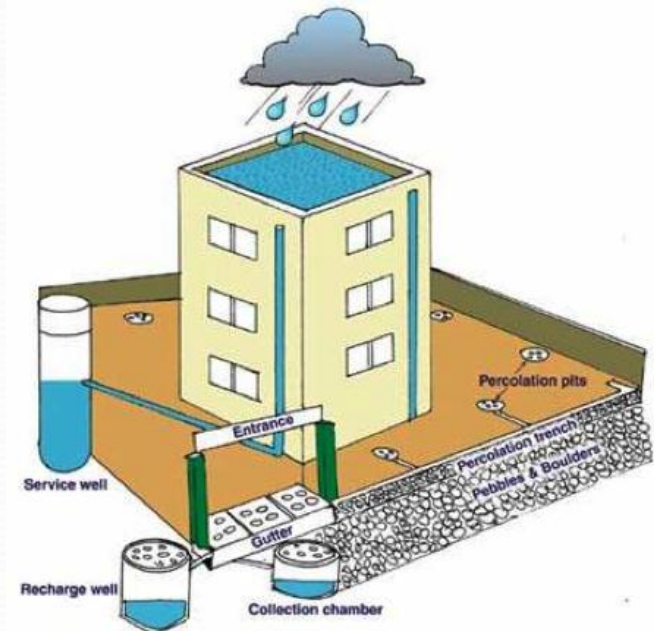
Issues related to implementation of Roof top Rainwater Harvesting

- **Proper technique** (as it is site specific)
- In many cases awareness/communication
- Also **policy changes** are **needed** to bring about the **required changes**.

## Issues related to implementation of Roof top rainwater harvesting

### Benefits

- Water harvested is right near the household.
- Clean water harvested can be used for domestic purposes.
- Contributes in reducing flood risks and the load on sewer systems.
- **Ultimately recharge the aquifer system.**
- Roof top rainwater harvesting system is the low cost and easy maintenance at the household level.



# Major Issues in implementation of Roof top rainwater harvesting

## Technical issues:

- Lack of information on the sub-surface geology  
(As it is site specific)
- **Pollution or contamination** (to be given utmost care) .
- Information on the groundwater regime  
(shallow or deep)
- Appropriate design for different geographic settings.
- Operation and Maintenance.
- Implementation monitoring.

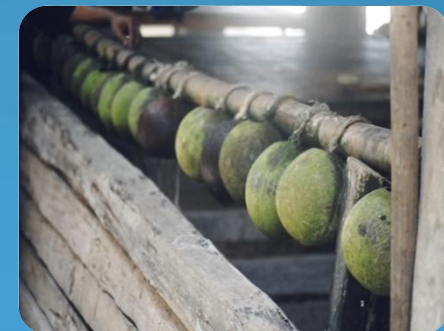
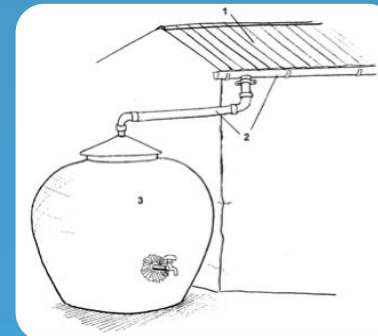


(More information required reg.- at what rate the rainwater collected by the roof top :

- percolates into the ground or the aquifer is required ).

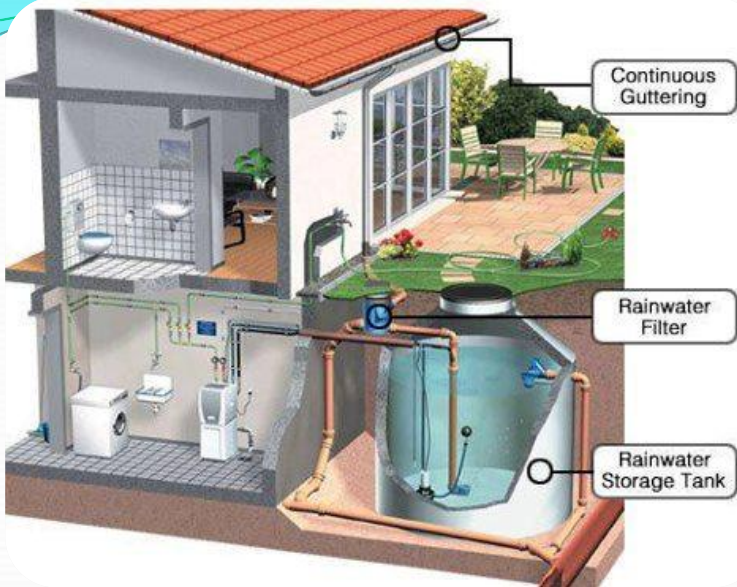
## Awareness & Policy related issues

- More awareness required to train the skilled or semi-skilled persons
- **People still feel it is not necessary.**



Reviving the traditional knowhow

## Components



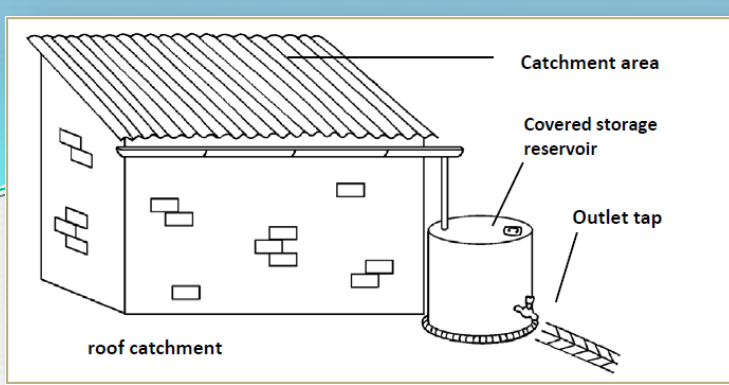
**Rooftop catchments:** Roofs with metallic paint or other coatings are **not recommended** as they impart tastes or colour to the collected water.

Should be cleaned regularly to remove **dust, leaves & bird droppings.**

**Irrespective of the complexity**, rainwater harvesting systems will have 5 basic components:

- **Catchment** : the surface from which rainwater is collected for storage. i.e rooftop.
- **Gutters and Downtake pipes:** lead the water from the catchment surface to the storage tank.
- **Filters and first flush devices:** remove grit, leaves and dirt before the water enters the storage tank.
- **A first flush device** diverts the water from the first rain so that it does not enter the storage tank.
- **Storage tanks:** Can be above the ground or below the ground.





Perception;

- Why should I do & **will the water I recharge come back to me.**
- When I get bottled water why I need to adopt Roof Top RWH.

Lack of

- **Willingness** -
  - Lack of information on water stress.
- **Finance** - due to
  - lack of willingness.  
(corporate buildings/industries/institutions)
- **Techniques** - due to lack of willingness.  
(institutions/public institutions)



Benefits of Roof Top Rainwater Harvesting



Actually a virtual freshwater reservoir is created every year



# Issues in implementation of Roof top RWH

## Technical issues (How to reach/convince people ...)

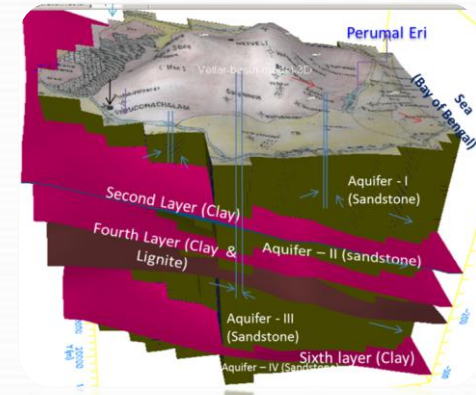
### • In Urban areas - Acute shortage of water

- Increase in demand for water (Domestic & Industrial)
- Less groundwater availability
- Floods during monsoon.

## On Implementation of Roof Top Rainwater Harvesting



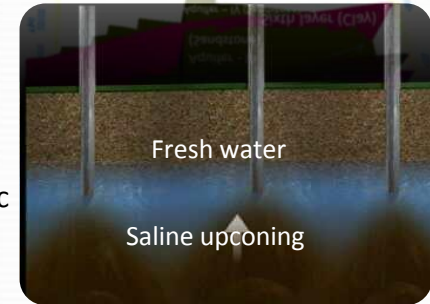
- Arrests flooding.  
(immediate effect)
- Augments the demand for water.



### • Coastal regions - Seawater intrusion

- Reversal in hydraulic gradient
- or by Up-coning

- Arrest further Up coning/lateral sea water intrusion.  
(immediate effect)
- Then reversal in hydraulic gradient.  
(on long term)

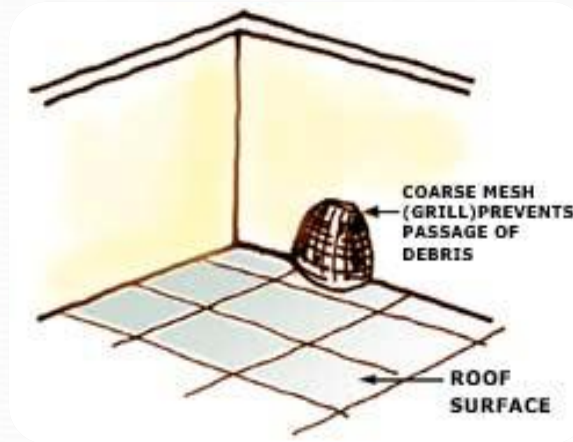
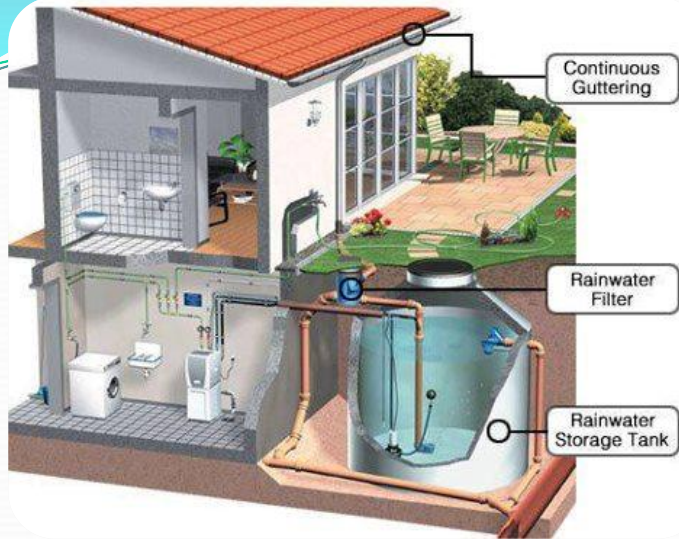


### • Rural area - Decline

- in groundwater level
- In yield of groundwater abstraction structures

- Increase in yield of DW/TW/BW  
(immediate gain)
- Raise in Water Level  
(on long term)



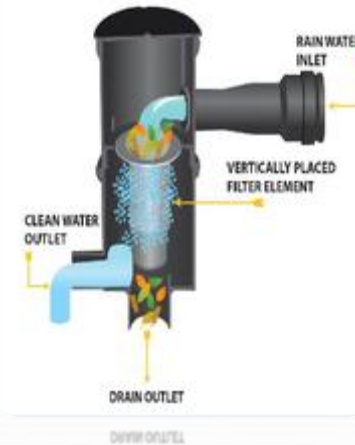
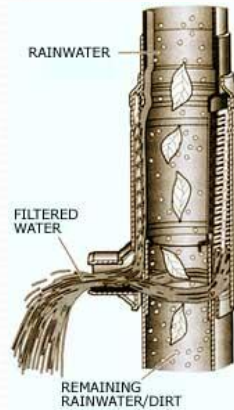


### Coarse Mesh/Grill

- Has to be given prime importance.
- **Lack of its importance**



### Dual Intensity Online Filter



### Filters

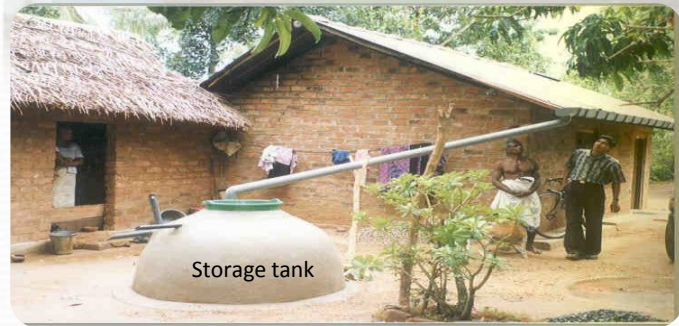
- Many designs available from simple to complex but limited access to public
- **But not easily available in markets/shops.**



## Storage tank



Storage tank



Storage tank



Storage tank

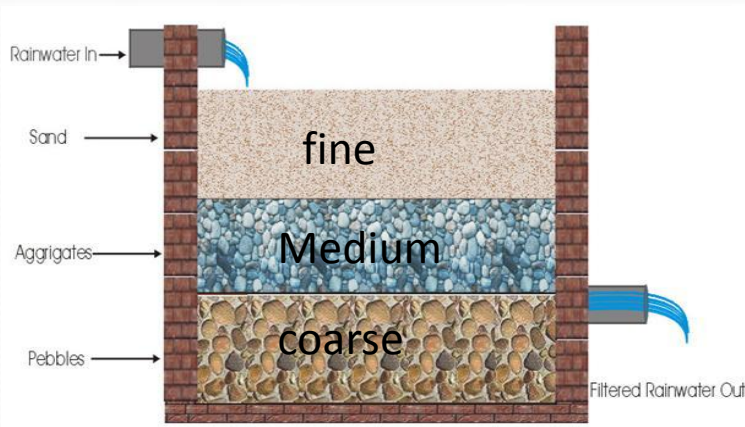
- The benefit of the tank is strictly not proportional to its size.
- A tight cover to prevent algal growth and the breeding of mosquitos.
- **Periodic cleaning is required.**

The storage capacity of the tank should be calculated to take into consideration of:

- the length of any dry spells,
- the amount of rainfall,
- and the per capita water consumption rate.



### Filter Bed

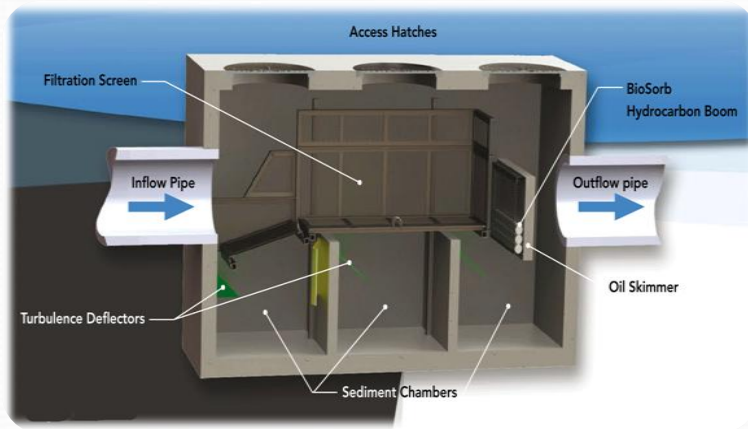


- Periodic cleaning of filter bed/filter material is must.

- Periodic maintenance is almost a neglected component.

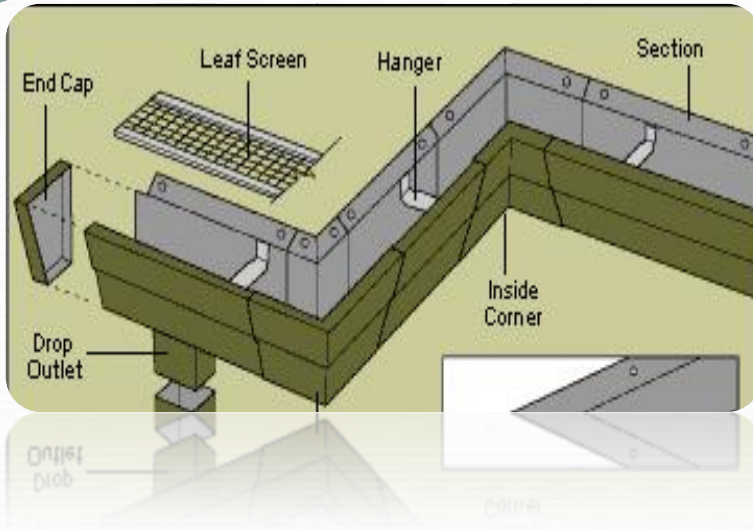
- Confusion exists amongst public regarding the filter material.

- Fine, medium and coarse.



## Issues pertaining to quality:

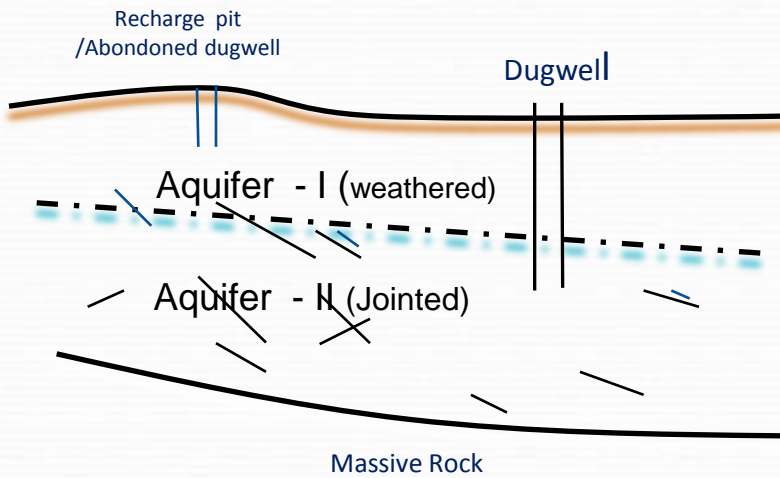
### First-flushing:



A first flush device – **is a valve** which ensures flushing out of first spell of rain away from the storage tank that **carries a relatively larger amount of pollutants** from the air and catchment surface.

### A great concern..

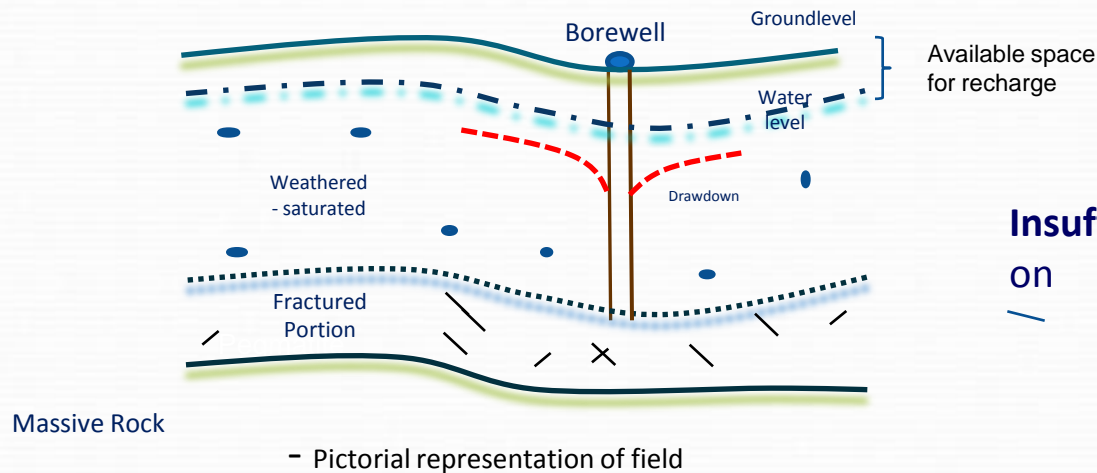
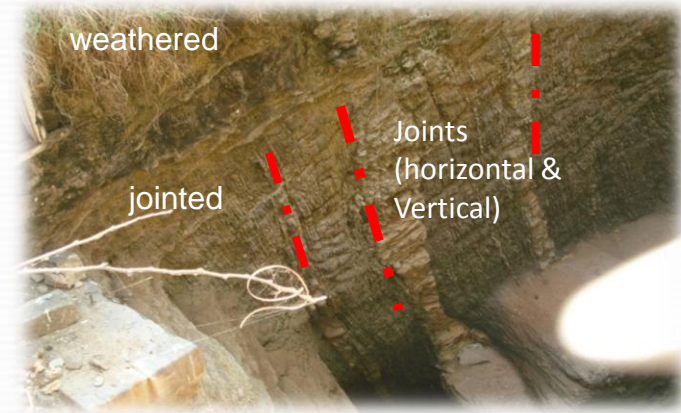
- **Identify the User aquifer.**
- **Ensure the rainwater collected by roof top, is not contaminated or polluted before recharging the aquifer system.**



Because once the aquifer is contaminated, it is **difficult to recover.**

## Technical/Scientific issues

- **Insufficient information on the sub-surface geology.**
- Appropriate structure and its design (site specific)
  - Recharge Pit
  - Recharge Trench
  - Recharge shaft
  - Dugwell/borewell recharge

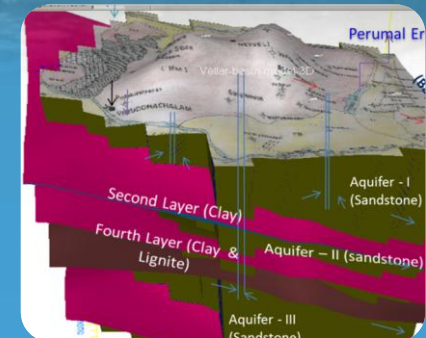


### Insufficient information on

- Pre-historic water level &
- space available for recharge.



- Roof top rainwater harvesting should be **made mandatory for all buildings** in major cities and urban towns.
- All new buildings should have the roof top rainwater harvesting including the existing buildings.
- To ensure food security – Water security is must.
- **As Groundwater** is a vital player in water security, **efficient & timely management** of groundwater resources/Aquifer is must.
- **Understanding/knowing the aquifers** through Aquifer Mapping shall certainly address the major issues in implementation of **Roof top rainwater harvesting in our country.**



Thanks.....