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FACULTY OF ENGINEERING AND  
TECHNOLOGY

# Lecture- 27

## Water conservation



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# Water conservation

Water being one of the most precious and indispensable resources that needs to be conserved. The following strategies can be adopted for conservation for water:

1. Decreasing run off losses
2. Reducing evaporation losses
3. Storing water in soil
4. Reducing irrigation losses by using sprinkling irrigation or drip irrigation, irrigating in early morning or late evening, etc.
5. Reuse of water i.e., using treated effluent for irrigation, watering gardens, washing cars, etc.
6. Preventing wastage of water by closing taps when not in use, repairing any leakage from pipes.
7. Water bill or tax should be taken as per usage i.e., consumer those has higher water consumption should pay higher bills.



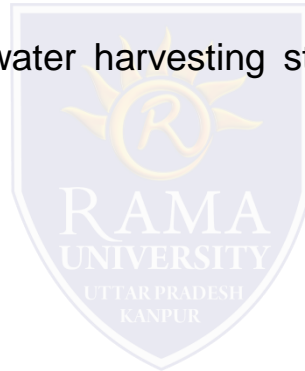
# Rain water harvesting

Recharging groundwater artificially can facilitate to conserve water.

Rainwater harvesting is a technique of increasing the ground water recharge by capturing or collecting and storing rain water.

Rainwater harvesting prevent run-off of water and preserve it for future use.

This is done by constructing special water harvesting structures like dug wells, percolation pits, lagoons, etc.



## Objectives

- To reduce runoff loss
- To avoid flooding of roads
- To meet the increasing demands of water
- To raise the water table by recharging ground water

## Rain water harvesting techniques

### Traditional method:

Traditionally rainwater is collected from roof tops and stored in open storage bodies such as lakes, ponds, and tanks.

It is still practiced in villages.

In rural areas the harvested rainwater is stored in underground tanks or embankments.

In foot hills, water flowing from springs are collected by embankment type water storage. In Himalayan foot hills people use the hollow bamboo as pipes to transport the water of natural springs to long distance.

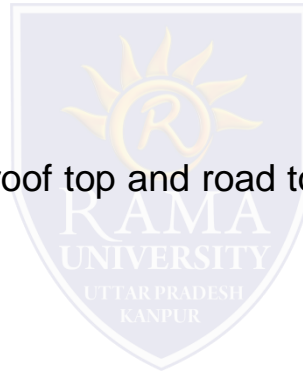


Modern method:

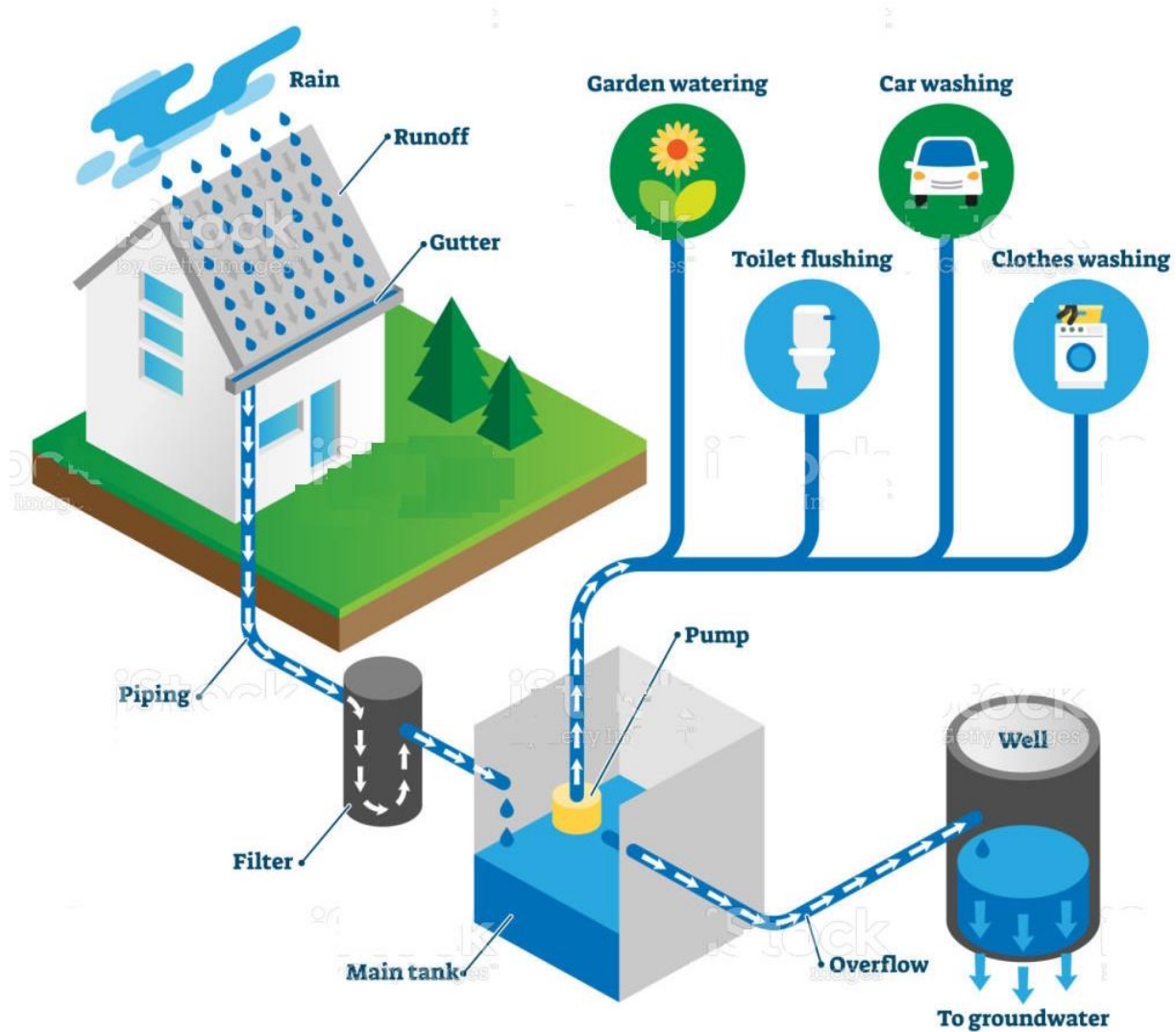
Recharge of ground water is a recent concept and the structures used for the purpose are -

- Pits
- Trenches
- Dug wells

In addition to these, the urban areas roof top and road top collection of rainwater is also used to recharge aquifers.



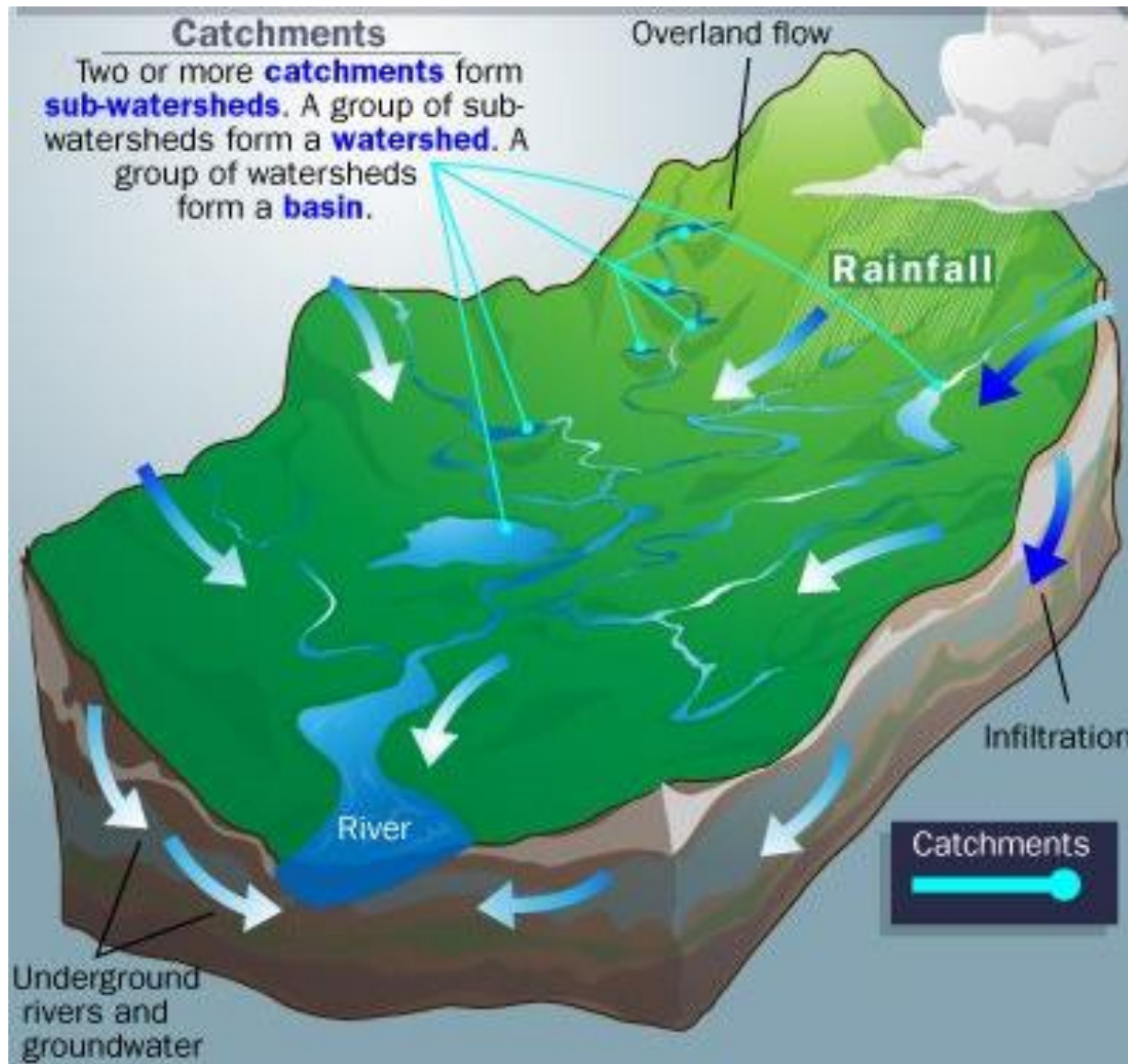
# RAINWATER HARVESTING SYSTEM



## Watershed

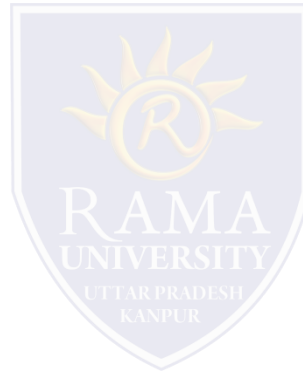
- Watershed is a geographic unit (a piece of land) that collects, stores, and releases water.
- The watershed is defined as the land area from which water drains under gravity to a common drainage channel like streams, rivers, lake, estuary, and even the ocean.
- Collected water comes from rain, snow melt & fog.
- The water is stored in lakes, ponds, sub-surface soil etc.
- The stored water is released through rivers, streams and ground water flow.
- A watershed ranges from few square kilometres to few thousand square kilometres in size.
- The watershed comprises complex interactions of soil, land, vegetation, land use activities and water.





## **Causes of Watershed Degradation**

- Overgrazing
- Deforestation
- Mining
- Construction activities
- Industrialization
- Soil erosion
- Shifting cultivation



## **Watershed management**

Logical utilization of land and water resources for optimum production causing minimum damage to the natural resources is known as watershed management.

### **Objectives of watershed management:**

- To promote sustainable economic development through optimum use of land, water and vegetation
- To restore ecological balance through sustainable development of natural resources
- Minimizing soil erosion and moisture retention
- To minimize the risk of floods, droughts, and landslides
- To manage watershed for the beneficial developmental activities like domestic water supply, irrigation, hydro power generation etc.



## Watershed management Practices:

- 1) **Water harvesting**
- 2) **Afforestation:** In watershed development, afforestation and crop plantation help to prevent soil erosion and retention of moisture.
- 3) **Mechanical measures to reduce run off losses and soil erosion:** Several mechanical measures are used to reduce run off losses and soil erosion that include:
  - Terracing
  - Bunding
  - Bench terracing
  - No-till farming
  - Contour cropping
  - Strip cropping



4. **Scientific mining and quarrying:** Improper or unscientific ways of mining affect stability of land in hilly areas that result in landslides, rapid erosion etc.

To avoid these effects following measures can be taken:

- Contour trenching at an interval of 1m on overburden dump
  - Planting some soil binding plants.
  - Draining of water courses in the mined area are recommended for minimizing the destructive effects of mining
5. **Public participation:** People's involvement like farmers and tribal are important for the effective soil and water conservation. Public participation involve:
- Motivation of communities for protecting planted areas.
  - Maintaining water harvesting structures implemented by government or NGO's.
  - Educating and enhancing awareness among people.

