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Rainwater Harvesting: Why It's Important and How to Do It

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Introduction:

The act of collecting rainwater during the monsoon season in order to use it later, when there is a shortage of water, is known as rainwater harvesting. In general, it's a method for gathering and conserving rainwater for human use. The ecosystem's most valuable, necessary, and abiotic component is water. Today, water is becoming increasingly scarce, and this is largely due to a lack of water conservation efforts and water body pollution. So let's start conserving water now so that we don't squander any of it. Everyday tasks including cleaning, washing, bathing, cooking, drinking, and other residential and industrial purposes all need the use of water. Potable water is in short supply in many nations due to rapid climatic change, rising global temperatures, and population growth. The continuous decline in water levels is a major source of worry since it not only results in a shortage of drinkable water but also generates an imbalance in the region's salinity in coastal areas. Industrialization at a rapid pace and the disposal of chemical waste into Water bodies contribute to pollution of lakes, rivers, and other waterbodies. This is an international issue that requires prompt resolution. There is no way to increase the amount of fresh water on this planet, so another solution must be found. Rainwater collection is one such technique.

There are different methods used for the rainwater harvesting.

Rainwater Harvesting techniques: The process of rainwater harvesting involves the collection and the storage of rainwater with the help of artificially designed systems that run off naturally or man-made catchment areas like- the rooftop, compounds, rock surface, hill slopes, artificially repaired impervious or semi-pervious land surface for use in the future.

1. **Surface run off harvesting:** Urban areas are best suited for surface run off harvesting. Here, rainwater runs off the surface and it can be collected for later use. Surface runoff rainwater in ponds, tanks and reservoirs built for this purpose. This can offer water for home use, for raising livestock, and for agricultural. Health and hygiene suffer significantly when there is not enough water. This causes more contamination of the environment. By diverting the flow of tiny creeks and

streams into reservoirs on the surface or below, surface water can be stored.

Fig. 1: Rainwater harvesting ponds A) Cemented Pond (B) Plastic pond

2. **Rooftop rainwater harvesting:** The rooftop becomes the catchments, and the rainwater from the building and houses are collected. The components of the rooftop rainwater harvesting are:

    1. First, flush: It is used to flush out the first spell of rain.
    2. Transportation: It is used to transport the harvested water from the catchment to the recharge zone.
    3. Catchment: Used to collect and store the captured rainwater
    4. Filter: Used for filtering the collected rainwater and removing pollutants

Both private residences and public institutions can use roof top water harvesting. The first condition for this is to stop the rainwater from flowing in a specific direction. Water should go through bamboo or wood pipes until it reaches a tank or bucket. PVC pipes are suitable for use in metropolitan settings. A bucket or other container can be kept just beneath the roof to collect rainwater. Typically, the first raindrops will carry with them dust, leaves, insects, and bird droppings. Therefore, the ideal way to direct the initial rainwater is to use a detachable downpipe. Rainwater can be collected in recharge pits. Depending on how much rain falls in the area, these can be of any size or shape. These pits must be filled with gritty sand, gravel, and boulders to act as a filter for the contaminants carried through the initial flow of water. Existing tube wells can be used to collect roof-top rainwater. Tube wells drill deeper into the soil for water in regions where the aquifer holding the ground water has dried up. These depleted tube wells can be used to collect roof-top rainwater in order to replenish the parched subsoil water table.

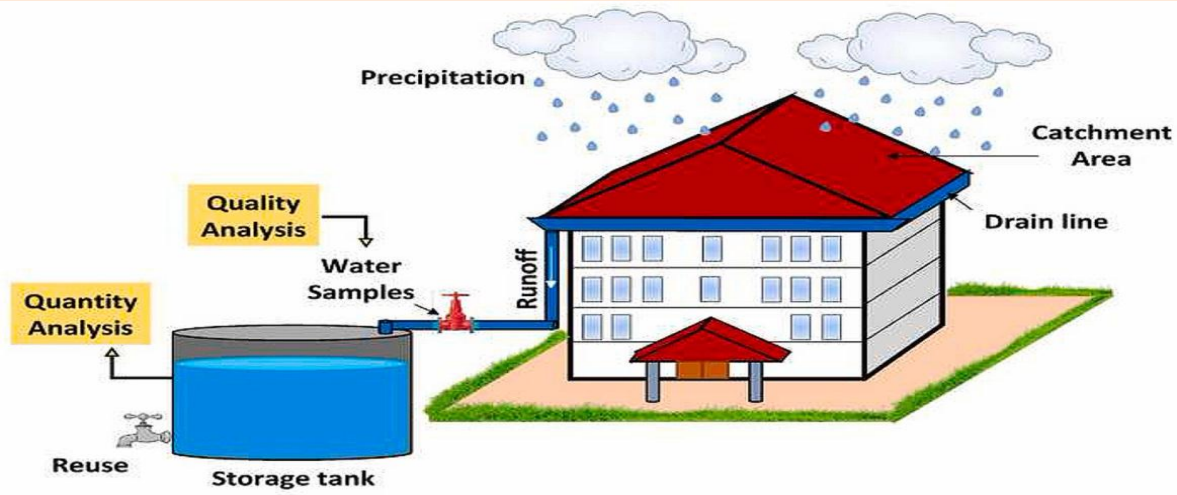

Fig. 1: Components of the rainwater harvesting through Rooftop
Source: https://doi.org/10.1016/j.clet.2021.100206

Several factors play a vital role in the amount of water harvested. Some of these factors are:

- ✓ The quantum of runoff
- ✓ Features of the catchments
- ✓ Impact on the environment
- ✓ Availability of the technology
- ✓ The capacity of the storage tanks
- ✓ Types of the roof, its slope and its materials
- ✓ The frequency, quantity and the quality of the rainfall

The speed and ease with which the rainwater penetrates through the subsoil to recharge the groundwater.

Uses of rainwater:

Household uses:

- ✓ Drinking water if properly filtered and sanitized
- ✓ Laundry
- ✓ Washing of vehicles
- ✓ Washing of garage or sidewalks
- ✓ Cleaning of toilets
- ✓ Swimming pool refills
- ✓ Fountain or fishpond refills
- ✓ Fire protection

Agriculture use:

- ✓ Irrigation or sprinkler system
- ✓ Gardening
- ✓ Water for wildlife, pets or livestock
- ✓ Composting

Advantages of Rainwater Harvesting: The benefits of the rainwater harvesting system are listed below.

- ✓ Cost effective system of water conservation.
- ✓ Does not require a filtration system for landscape irrigation
- ✓ Improves the quality and quantity of groundwater

- ✓ This technology is relatively simple, easy to install and operate.
- ✓ It reduces soil erosion, storm water runoff, flooding, and pollution of surface water with fertilizers, pesticides, metals and other sediments.
- ✓ It is an excellent source of water for landscape irrigation with no chemicals, dissolved salts and free from all minerals.
- ✓ Helps in reducing the water loss.
- ✓ Decreases the demand for water.
- ✓ Promotes both water and energy conservation.

Disadvantages of Rainwater Harvesting:

The rainwater harvesting system has some drawbacks in addition to its many benefits, such as irregular rainfall, the lack of an adequate storage system; it may attract mosquitoes and other waterborne diseases.

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