

RAINWATER HARVESTING

Rainwater harvesting is the simple process or technology used to conserve Rainwater by collecting, storing, conveying and purifying of Rainwater that runs off from rooftops, parks, roads, open grounds, etc. for later use.

Rainwater harvesting systems consists of the following components:

How to Harvest in Rainwater?

- Catchment- Used to collect and store the captured Rainwater.
- Conveyance system – It is used to transport the harvested water from the catchment to the recharge zone.
- Flush- It is used to flush out the first spell of rain.
- Filter – Used for filtering the collected Rainwater and remove pollutants.
- Tanks and the recharge structures: Used to store the filtered water which is ready to use.

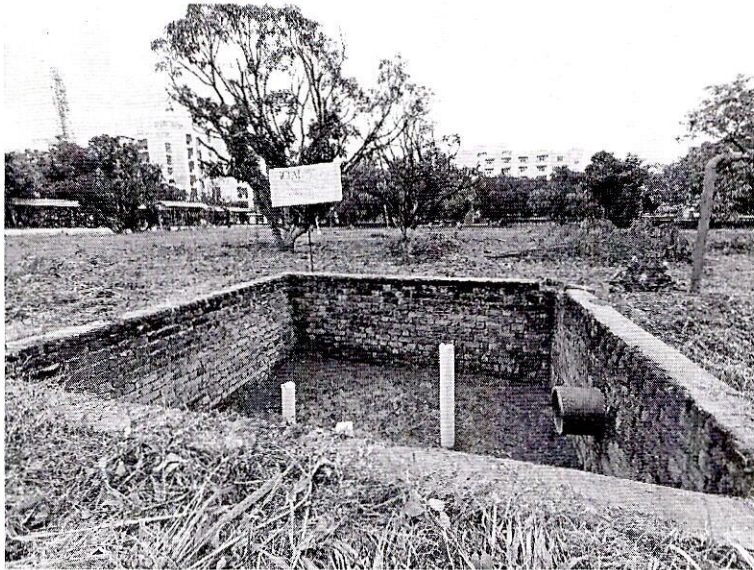
The process of rainwater harvesting involves the collection and the storage of rainwater with the help of artificially designed systems that run off naturally or man-made catchment areas like- the rooftop, compounds, rock surface, hill slopes, artificially repaired impervious or semi-pervious land surface.

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.

Why do we Harvest Rain?

The rainwater harvesting system is one of the best methods practised and followed to support the conservation of water. Today, scarcity of good quality water has become a significant cause of concern. However, Rainwater, which is pure and of good quality, can be used for irrigation, washing, cleaning, bathing, cooking and also for other livestock requirements.



BOREWELL

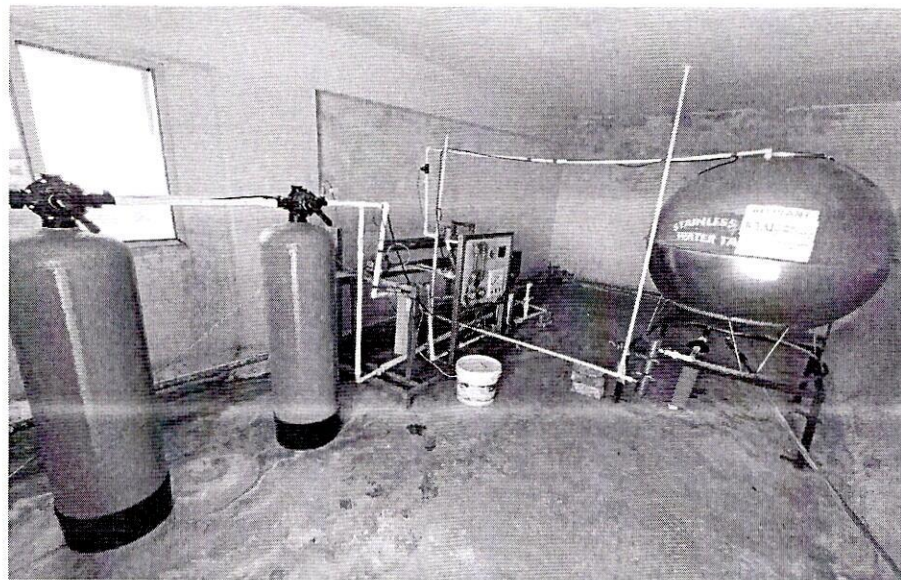
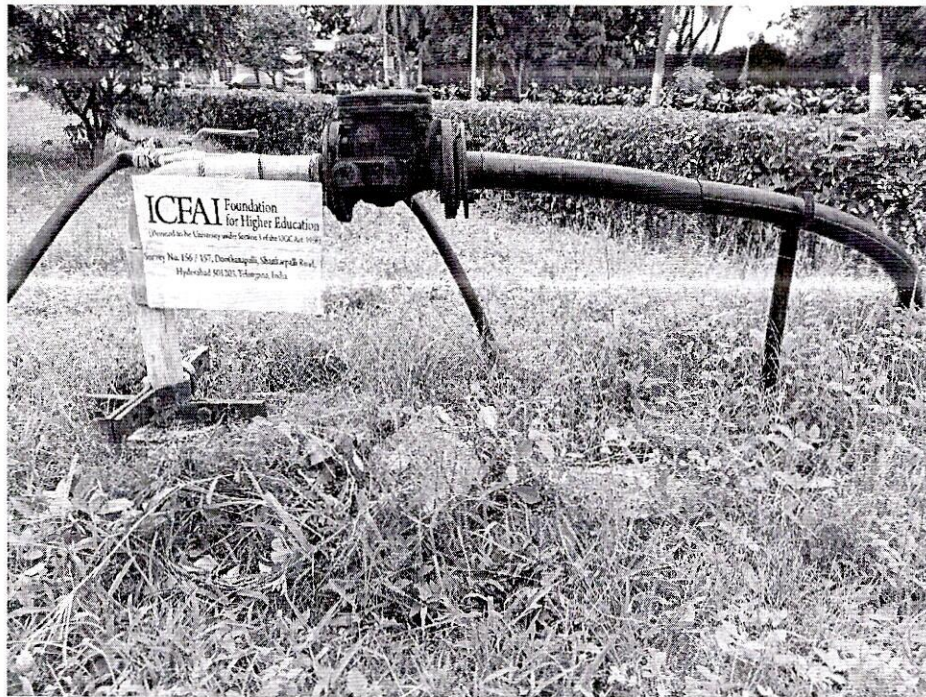
Bore water or groundwater is the most common source of water in India, assessed by drilling the ground and pumping water from the aquifers. An aquifer is a water-holding permeable rock or clay that holds groundwater. When such water is pumped out, it carries dissolved salts, chemicals, and microorganisms which can be potentially harmful to a human body.

Largely, borewell water is the rainwater that seeps deep into the ground and gets trapped between the rock layers. The level of contaminants in this source of water depends on how deep the borewell is. There are two types of borewells – Deep and Shallow.

When an aquifer is below 20 meters, deep bores are usually used. Shallow bores are under 15 meters. The quality of water in deep and confined bores can be affected by high concentration of naturally occurring hazardous chemicals and minerals. In case of shallow bores, the microbial and chemical contamination is high as it is not protected by thick layers of clay and soil, making it unfit for intake. Regions where borewell water is consumed, the water extracted may carry with it defecate and other substances that lead to water contamination

The Total Dissolved Solids levels of borewell water are also usually higher compared to other sources like Tank or Municipal. TDS levels of borewell water is generally around 500ppm or higher, which makes water taste very saline, making it difficult to consume.

To treat borewell water you need advanced purification technologies like Reverse Osmosis (RO) and Ultra Violet (UV) Filtration.



CONSTRUCTION OF TANKS AND BUNDS

Water tanks are used to provide storage of water for use in many applications, drinking water, irrigation agriculture, fire suppression, agricultural farming, both for plants and livestock, chemical manufacturing, food preparation as well as many other uses. Water tank parameters include the general design of the tank, and choice of construction materials, linings.

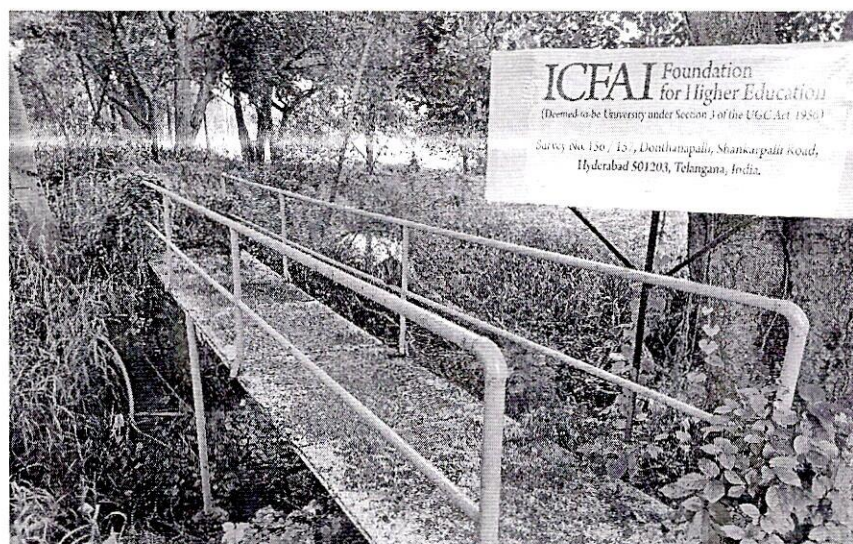
Various materials are used for making a water tank: plastics (polyethylene, polypropylene), fiberglass, concrete, stone, steel (welded or bolted, carbon, or stainless). Water tanks are an efficient way to help developing countries to store clean water.^[1]

Bunds provide a 'second line of defence' for controlling hazards events. They are a form of enclosure that surrounds drums or tanks, providing emergency containment in

the event of a failure. Bunds can help to stop hazardous materials such as flammable or toxic liquids leaking onto the ground or into surface water, protecting the environment from chemical spills.

Typically, bunds are constructed using concrete or masonry, which may be reinforced and lined depending on the volume and nature of the material being stored. They wrap around single tanks or a group of tanks and provide secondary containment should the primary containment fail.

Generally, bund capacity should be 110% of the largest tank or 25% of the total tank capacity, whichever is the greater. Space can be limited on many sites, so a small footprint can be desirable. The higher the bund walls the smaller the area required for the same bund capacity. However, there are limits as to how high the bund walls can be in order that they do not prevent firefighting or more general access and to allow natural ventilation. As a consequence, they are typically 1 to 1.5 meters high. However, in some circumstances they may be as high as the tanks themselves.





WASTEWATER RECYCLING

All water is recycled and reused as a part of natural water processes such as the hydrologic cycle. Man-made water recycling, also known as water reclamation or water reuse, centres on using treated wastewater.

Recycling wastewater can extend water supplies, improve water quality, reduce discharge and disposal costs of wastewater, and save energy. Most recycled water comes from treated municipal wastewater or sewage, though other sources include domestic gray water.

Cities, farms, and industries are using recycled water as an alternative for a wide variety of not-potable and potable uses (treated drinking water for consumption). Non-potable uses include:

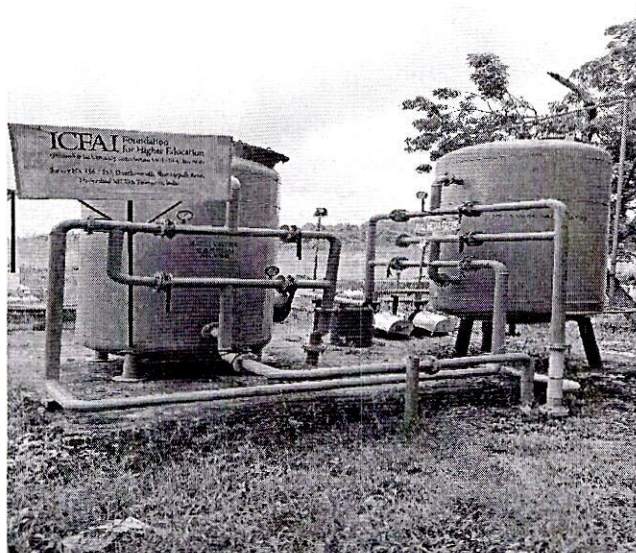
- landscape and crop irrigation
- stream and wetlands enhancement
- industrial processes
- recreational lakes, fountains and decorative ponds
- toilet flushing and gray water applications
- as a barrier to protect groundwater supplies from seawater intrusion
- wetland habitat creation, restoration, and maintenance
- groundwater recharge

Using recycled water for such applications reduces reliance on increasingly scarce and expensive surface water. It can also minimize groundwater overdraft and reduce discharges of treated wastewater into rivers and oceans.

For different uses of water, there are different levels of treatment. The extent of treatment—secondary, tertiary or advanced—is determined by the initial quality of the water, the end-use application and state. However, water recycling is not without drawbacks.

The need for treatment and storage facilities and a delivery system separates from the potable supply involve relatively high costs. Water quality can be an issue, as well.

Recycled water, which generally contains more salt than traditional sources of water, and can damage salt-sensitive crops, plants or groundwater basins.



SL No	Water Conservation Facilities	Number Present in the Campus
1	Rainwater Harvesting • Backside ABCD hostel • Backside CMD • Backside Faculty Club • Backside H -Hostel • Beside AC plant • Beside FST • Mango and sapota Garden • Mess-1 Backside • Near IBS • Opposite ABCD • Opposite AC plant • Opposite car parking • Opposite G-Hostel • Opposite H-Hostel	14 1 1 1 1 1 1 1 1 1 1 1 1 1
2.	Borewell	24
3	RO Plant • RO plant ABCD Hostel • RO plant EF Hostel • RO plant FOL • RO plant FST • RO plant G-Hostel • RO plant IBS • RO plant Mess-1 • RO plant Mess-2 • RO plant QRS Hostel • RO plant S1 Hostel	11 1 2 1 1 1 1 1 1 1 1 1
4	Construction of Tanks and Bunds	1

	• Lake with Bund	<u>3</u>
5.	Water waste Recycling (STP)	<u>3</u>