

HOW TO IMPLEMENT RAINWATER HARVESTING METHODS IN YOUR MONASTERY

What is Rainwater Harvesting?

Rainwater harvesting refers to techniques that collect rain as it first reaches the earth for human use. It often requires the construction of tanks and reservoirs to collect and capture the rainwater which can then be used for various purposes. However, it can also be as simple as putting out pots outside the household to collect water.

How is it useful to monasteries?

Rainwater harvesting is particularly useful to people in areas where drinking water facilities are not available or where water is scarce. Due to climate change, seasonal rainfall patterns are changing in the Himalayas and water is becoming less plentiful and reliable. At the same time, growing needs of people, agriculture and industry means that there is less water for everyone. Monasteries, which often house lots of monks and nuns, require consistent and plentiful supply of water. If it is situated in an area where water is not consistently available, harvesting rainwater is a good way of gaining an additional and more self-sufficient supply of water.

Depending on the quality of water, the monastery should decide what they would like to use the water for –watering gardens, washing clothes or after treatment, for drinking.

What are the different methods?

There are several types of rainwater harvesting systems. Generally, rainwater is either harvested from a roof or from the ground.

1. Roofwater harvesting system: Rain falls onto roofs and runs off either through drains or slopes. If the run-off is channeled into a tank, water can then be drawn from that storage area whenever it is needed. Typically, the tank can be located next to the building so that the roof water harvested is used to supply that very building. This also means that there is no need to pipe water from somewhere more distant.

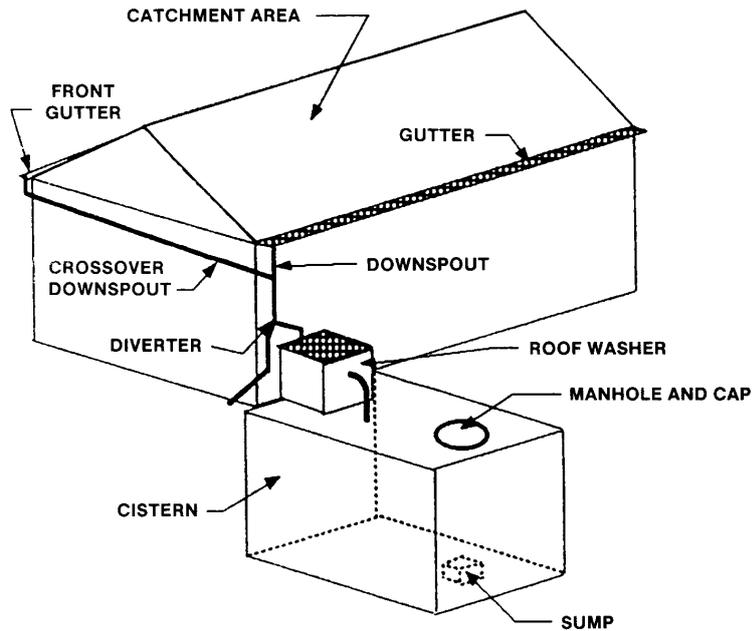


Figure 1. BASIC COMPONENTS OF A CISTERN

The main components of this consist of roof water collection system and a storage tank. The cost of the system will depend upon the cost of each of these components.

Rooftop collection system

Sloping roofs are the easiest since you can place a gutter (circular pipe) to bring the collected water to one common area. Flat concrete rooftops are more complicated but you can use all four corners to collect the water into drain pipes which are then brought to a common storage area through additional pipe lines. There is a need to keep rooftops clean to and to prevent people from dirtying the rooftops. Nearly 80% of the rainfall can be harvested once the early showers are allowed to flow away since they will contain the most dirt.

Storage tank

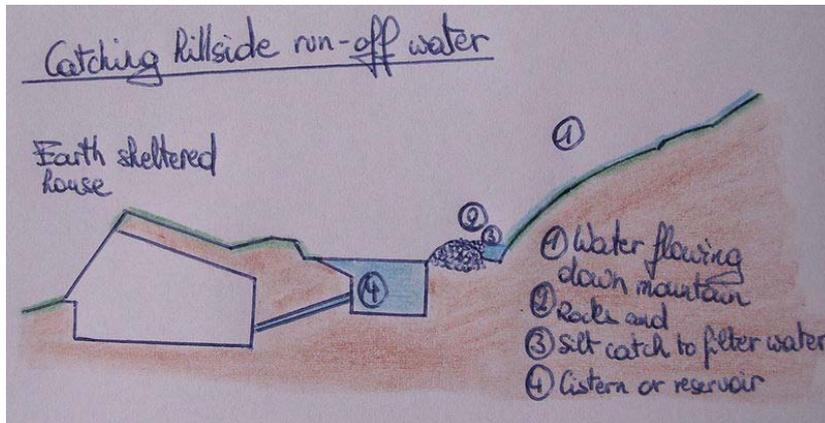
Storage tanks could be constructed underground or over-ground depending upon its size and how much land you have available. Storage tanks could be made of a) PVC b) Ferro-cement tanks and c) cement concrete tanks. Typically, PVC tanks store less than 5000 litres, ferro-cement tanks store less than 20,000 litres and cement concrete tanks can be made to fit the demand. Ferro-cement tanks are the cheapest - they are made by pasting cement over a tank structure made out of thin iron rods and chicken wire. Unlike cement concrete tanks, these are less prone to cracks and leakages.

If you are using a storage tank for drinking water, it should have a filter system at the entry point, and a water extraction system for taking out water such as a hand pump or a tap and a draining system such a man-hole that lets you clean the tank periodically.

2. Artificial Groundwater recharge: This system has been practiced traditionally all over India, and especially in places such as Rajasthan. When rainwater reaches the earth, it is allowed to seep deep underground and add to the water that lies there already. Usually, this underground water is beneath the area where the roots of trees and plants can reach to. Allowing this type of ground water recharging is especially beneficial in areas where natural groundwater recharge has been prevented by pavements, deforestation, or development.

Rainwater can be directed towards a **recharge structure** that could be either a pit or a well, which is filled with filter materials so as to purify the water as much as possible. This will work especially well in slope areas. Filter materials such as stones, pebbles, gravel and sand are layered to improve the quality of the water. Layering this pit will require some expertise since the filter layers will determine the quality of the water. If properly constructed and managed, the pit will serve as a recharge well during the monsoon period and supply well during the dry periods.

In slope areas, placing silt and rocks strategically at the bottom of a hill will naturally create a collecting vessel for water. This can then be allowed to enter a tank or a reservoir.



In flat areas, you can create a rainwater pond which is dammed on all sides or simply leave enough uncemented ground so that the water is able to penetrate the earth. Traditionally, these systems have existed for centuries and were often called *bawdi* or *jodhs* in India.



There are many expert resources online on the issue of rainwater harvesting in the Himalayas including:

- RAIN (Rainwater Harvesting Implementation Network) www.rainfoundation.org
- NEWAH: Nepal Water for Health (www.newah.org.np/)
- NGO Forum for Urban Water and Sanitation (www.ngoforum.net/)

