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A STUDY ON RAIN WATER HARVESTING

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Introduction

Rainwater systems come in all shapes and sizes, from simple catchment system like the water butt to large above and/or underground cisterns with complex filtration systems that can store thousands of liters of water. Most rainwater collection systems are comprised of the following basic components:

Catchment area is a surface from which rainwater can be collected. Roofs are the obvious catchment area. However, general paved areas such as paths, roads and car parks can be made suitable.

- **Gutters and drainpipes** channel the water from the catchment area to a holding container such as a barrel, cistern etc.
- **Initial filtration** removes or catches debris such as leaves before it enters the storage tanks.
- **Storage tanks** can be above-ground or underground. Storage tanks can be constructed in a variety of materials and designs. To inhibit the growth of algae, storage tanks should be opaque and preferably placed away from direct sunlight. The tanks should also be placed close to the areas of use and supply line to reduce the distance over which the water is delivered. Also consider placing the storage at an elevated area to take advantage of gravity flow. The tank should always be placed on a stable and level area to prevent it from leaning and possibly collapsing. The size of the storage tanks is very important as the balance between the water volume that can be supplied and the demand for use of water needs to be considered. There may also be a requirement for a high-level header tank that is usually pump filled from an underground tank.
- Delivery systems can be gravity-fed or pumped to the landscape or other end use areas such as a high level header tank. All pipe work carrying rainwater from the underground tank to the header tank and from the header tank to water fittings must be clearly marked as a non - potable water supply.
- Mains water top up is also required for the system in the event of a prolonged period with no rainfall.
- Purification/treatment system such as UV may be required depending on the end-use.

Literature Review

The Pacific Institute has published similar data based on a study of water use in California; in addition to residential use, this study also considers water use at commercial, industrial, and institutional facilities (Pacific Institute, 2003). Section of the Pacific Institute Report provides a detailed discussion of end use of water in the commercial, industrial, and institutional (CII) sector. The study considers a broad range of development types, including hospitals, hotels, office buildings, and manufacturing facilities. For the CII sector as a whole, end use and their respective percentages of total use are provided as follows: landscaping (35%), kitchen (6%), cooling (15%), restroom (16%), process (17%), laundry (2%), and other (9%). Toilet flushing is estimated to account for 72% of restroom water use in the CII sector (Pacific Institute, 2003). It should be noted that these values represent averages over a variety of development types. The figure below summarizes the proportion of total water use attributed to different end uses as a function of development type.

Methods of Rain Water Harvesting

There are different ways by which rain water harvesting is carried out. Some of the important methods are discussed one by one as discussed in coming paragraphs.

1. Utilizing Rainwater for Dewas Roof Water Filter

Dewas is the name of the city located in Madhya Pradesh. This roof water filter is first practiced at Dewas and hence the name Dewas roof water filter. It can be made easily using sand pebbles of different sizes. In this two caps are provided as T_1 and T_2. Keep the cap T_1 and T_2 always closed. The T_2 is used for periodical back washing of filter and cap T_1 is used for backwash drainage. Small pebbles of size 6 mm are on entry side of rainwater. Use of medicine for water purification is made

through cap T_2. Do not recharge rainwater for first two days in rainy season. Keep the roof always clean, especially in rainy season so that quality of

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rain water falling on roof is not deteriorated. The cost of this roof filter excluding connecting pipe is about Rs 800. For average condition in Maharashtra, from 100 square metres roof area about 50 m^3 of water can be percolated through this filter.

2. Utilization of Rainwater for Recharging Pit

Where there is no well or bore well in the house, total rainwater falling on the open plot can be recharged by making recharge pit. Water flowing out of the plot can be directed to this pit. This pit may get filled 10 to 15 times in one monsoon and can recharge water up to 200 m^3. This method is effective in the area where permeability of soil is more. The capacity of the pit may be taken up to 10 m^3. The percolation of water through this pit of the order of 200 m^3 per annum is possible. The cost of this structure may come about Rs 7000.

3. Utilization of Rainwater for Well Recharging

Rainwater flowing in the farm is diverted to a water collecting tank of size 6 m x 6 m x 1.5 m near well and a small filter pit of size 1.5 m x 1.5 m x 0.6m is made at the bottom of large pit. Otherwise suitable pit may be excavated depending upon the availability of space near well.

Conclusion

The proper conservation, maintenance and careful use of water resources, along with developing additional storages may considerably reduce the chance of water famines for further generations to come. In addition to these measures, it is necessary to find out means and ways for increasing the available usable water by developing artificial rain technology. It is also of vital importance to conserve water by practicing economy and avoiding its wastage.

However ground water exploitation is inevitable especially urban areas. To curtail its reduction, a strategy to implement the groundwater recharge, in a major way needs to be launched with concerted efforts by various Non-Governmental and Governmental agencies and the public at large, to increase the water table and make the groundwater resource, a reliable and sustainable source for supplementing water supply needs. It is about building our relationship with water and the environment. Harvest rain. Learn the prestigious value of each rain drop.

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