

14. Rainwater Harvesting and Management

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Abstract:

Water is the most essential source for the human being to live. Water harvesting is the activity of direct collection of rainwater, which can be stored for direct use or can be recharged into the groundwater.

Water harvesting is the collection of runoffs for productive purposes. As land pressure rises, cities are growing vertical and in countryside more forest areas are encroached and being used for agriculture.

In India the small farmers depend on Monsoon where rainfall is from June to October and much of the precious water is soon lost as surface runoff. While irrigation may be the most obvious response to drought, it has proved costly and can only benefit a fortunate few. There is now increasing interest in the low-cost alternative generally referred to as 'Rain Water Harvesting' (RWH) and its management. A sustainable solution to the problem.

Keywords:

Rain water harvesting, Categories of Rainwater Harvesting, History of RWH, History of RWH in India, Current status of RWH in India, Jal Shakti Abhiyan, Market for Rainwater Harvesting in India.

Research Questions:

Q] What is Rainwater Harvesting (RWH) and Management?

Q] History of Rainwater Harvesting.

Q] What is the current status of RWH in India?

Q] Rainwater Harvesting and Management and Sustainable Development.

14.1 Introduction:

Rainwater harvesting is a simple strategy by which rainfall is gathered and stored for future usage. The process involves collection and storage of rainwater with help of artificially designed systems, that runs off natural or man-made catchment areas e.g. rooftop, compounds, rocky surface, hill slopes or artificially repaired impervious/semi-pervious land surface.

The collected rainwater from surfaces on which rain falls may be filtered, stored and utilized in different ways or directly used for recharge purposes. Rainwater Harvesting is unrestricted from any kind of impurity, with relatively less storage cost and no maintenance cost involved except for periodical cleaning.

Highlights of Rainwater Harvesting:

- Lessens urban flooding.
- Straightforwardness in building framework in less time.
- Monetarily less expensive in development contrasted with different sources, i.e. dams, redirection, and so on.
- Water collecting is the perfect circumstance for those regions where there is lacking groundwater supply or surface assets.
- Aides in using the essential wellspring of water and keep the overflow from going into sewer or tempest channels, accordingly lessening the heap on treatment plants.
- Reviving water into the aquifers which help in enhancing the nature of existing groundwater through weakening.

Rainwater harvesting systems fall under two broad categories i.e., roof-top rainwater harvesting and the surface rainwater harvesting. The roof-top system includes collecting of runoff from roof of a building/house through pipes/gutter and stored in storage tanks, whereas the surface rainwater harvesting systems include collecting the runoff from ground surfaces and intermittent or ephemeral watercourses in a storage reservoir or constructed catchment system.

The surface rainwater harvesting systems are the natural and traditional techniques that can also be used to recharge the groundwater.

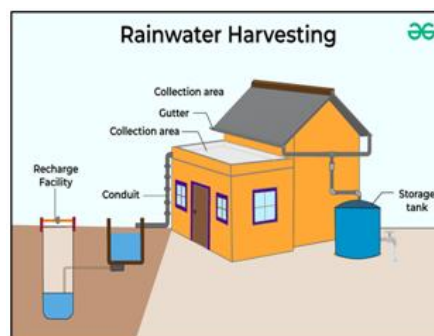
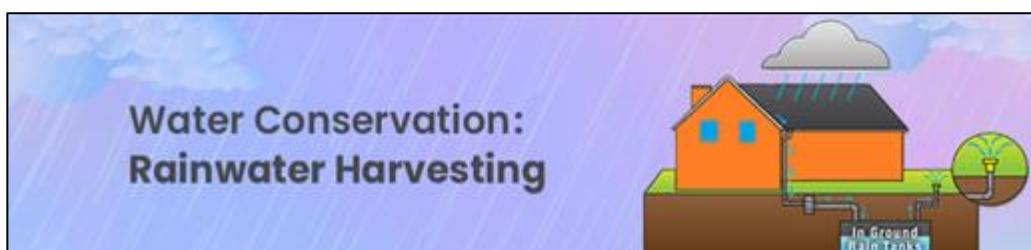




Figure 14.1: Rainwater Harvesting

14.2 History of Rainwater Harvesting:

Water collecting and use frameworks have been utilized since antiquated circumstances and confirmation of rooftop catchment frameworks go back to early Roman circumstances.

Roman estates and even entire urban communities were intended to exploit water as the chief water hotspot for drinking and residential purposes since no less than 2000 B.C. In the Negev leave in Israel, tanks for putting away overflow from slopes for both local and farming purposes have permitted home and development in zones with as meager as 100mm of rain for each year. The most punctual known proof of the utilization of the innovation in Africa originates from northern Egypt, where tanks running from 200-2000m³ have been utilized for no less than 2000 years – numerous are as yet operational today. The innovation likewise has a long history in Asia, where water gathering hones have been followed back right around 2000 years in Thailand. The little scale gathering of water from the overhang of rooftops or by means of straightforward drains into conventional jugs and pots has been polished in Africa and Asia for a huge number of years. In numerous remote provincial regions, this is as yet the technique utilized today. The world's biggest water tank is most likely the Yerebatan Sarayi in Istanbul, Turkey. This was built amid the lead of Caesar Justinian (A.D. 527-565). It quantifies 140m by 70m and has a limit of 80,000 cubic meters.

Concentrating on the Indian Subcontinent, the history of rainwater harvesting can be traced back to around 300 BC where the farming communities in the North- West, i.e. present-day Pakistan, parts of Afghanistan, and India, were known to use techniques for storing

rainwater for agricultural and personal uses. Ancient rainwater collection tanks were built by various dynasties ruling different parts of India viz the Shivganga Tank in Thanjavur, Veeranam Tank in Cuddalore, Tamil Nadu. In the medieval period, rulers constructed Baolis and tanks to enhance water storage.

By the 1980s, NGOs and communities began reviving rainwater harvesting. Significant milestones include Tamil Nadu's 2001 mandate for rainwater harvesting in all buildings, the 2002 National Water Policy emphasizing its importance, and Delhi's 2007 regulation for new buildings. Throughout the 2010s, states like Karnataka, Gujarat, and Rajasthan implemented supportive policies.

14.2.1 Current Status of Rainwater Harvesting and Management in India:

India receives an average annual rainfall of 1,180 mm according to annual data from the Meteorological Department. Only 8% of rainwater is harvested in India. Rainwater harvesting can provide up to 70% of the water needs for a household. According to recent World Bank estimates, by 2030, there will be a 40% increase in India's water demand beyond what can be supplied at the current rate. The country's economic and social stability, as well as its security, are seriously at stake due to water scarcity.

The Indian government has been promoting rainwater harvesting for many years. In 2001, the government made rainwater harvesting mandatory for all new buildings with a roof area of more than 100 square meters. The government also provides subsidies for rainwater harvesting systems.

Recent initiatives, such as the 2020 Jal Shakti Abhiyan, with the theme "Catch the Rain - Where it Falls When it Falls" to cover all the blocks of all districts (rural as well as urban areas) across the country during 22nd March 2021 to 30th November 2021 continue to promote rainwater harvesting through government and NGO efforts, leveraging technological advancements and raising public awareness.

Notably, Rajasthan completed 127,683 water conservation and rainwater harvesting projects, while Haryana completed 49,136 projects. There is a significant push towards integrating traditional wisdom with modern technology, resulting in more efficient and scalable rainwater harvesting systems. Public awareness campaigns, government subsidies, and NGO activities have been pivotal in encouraging widespread adoption. The market for rainwater harvesting in India is projected to grow at a compound annual growth rate (CAGR) of 9.88% between 2022 and 2027, increasing by USD 61.12 million.

For instance, in Chinchani village, Solapur district, RWH systems have been installed in 55 homes, leading to significant water conservation through recharge pits. In urban areas like Pune, municipal projects have led to substantial water savings, with 55.3 million liters conserved across various public buildings.

Overall, the current status of rainwater harvesting in India reflects a growing commitment to sustainable water management practices, with ongoing efforts to expand and optimize these systems across the country.

14.3 Conclusion:

Despite the advancements, challenges remain, including the need for better infrastructure, maintenance of existing systems, and overcoming socio-economic barriers in rural regions. Utilizing a rainwater harvesting system has numerous advantages in regions with adequate rainfall but insufficient groundwater supplies. It is a straightforward natural method of water conservation. It will also open the door to a variety of other economic pursuits that will empower local populations.

It is no denying that sustaining and recharging the groundwater along with judicious use of the limited fresh water resources is the need of the hour. If sufficient measures are not taken up immediately, we will face a crisis which will be detrimental to the very survival of mankind. Efficient management of water resources and education about judicious utilisation of water resources along with measures of harnessing, recharging and maintaining the quality of water and water bodies has to be taken up on war footing. Instead of placing their faith in the administration to solve the water situation, thousands of families across the nation can engage in rainwater gathering, starting from individual houses, apartments, parks, and other public spaces all around the nation. Similar to how we all know that charity starts at home, a contribution to the well-being of society must also begin at home.

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