

RAINWATER HARVESTING

Additional Water for tomorrows needs

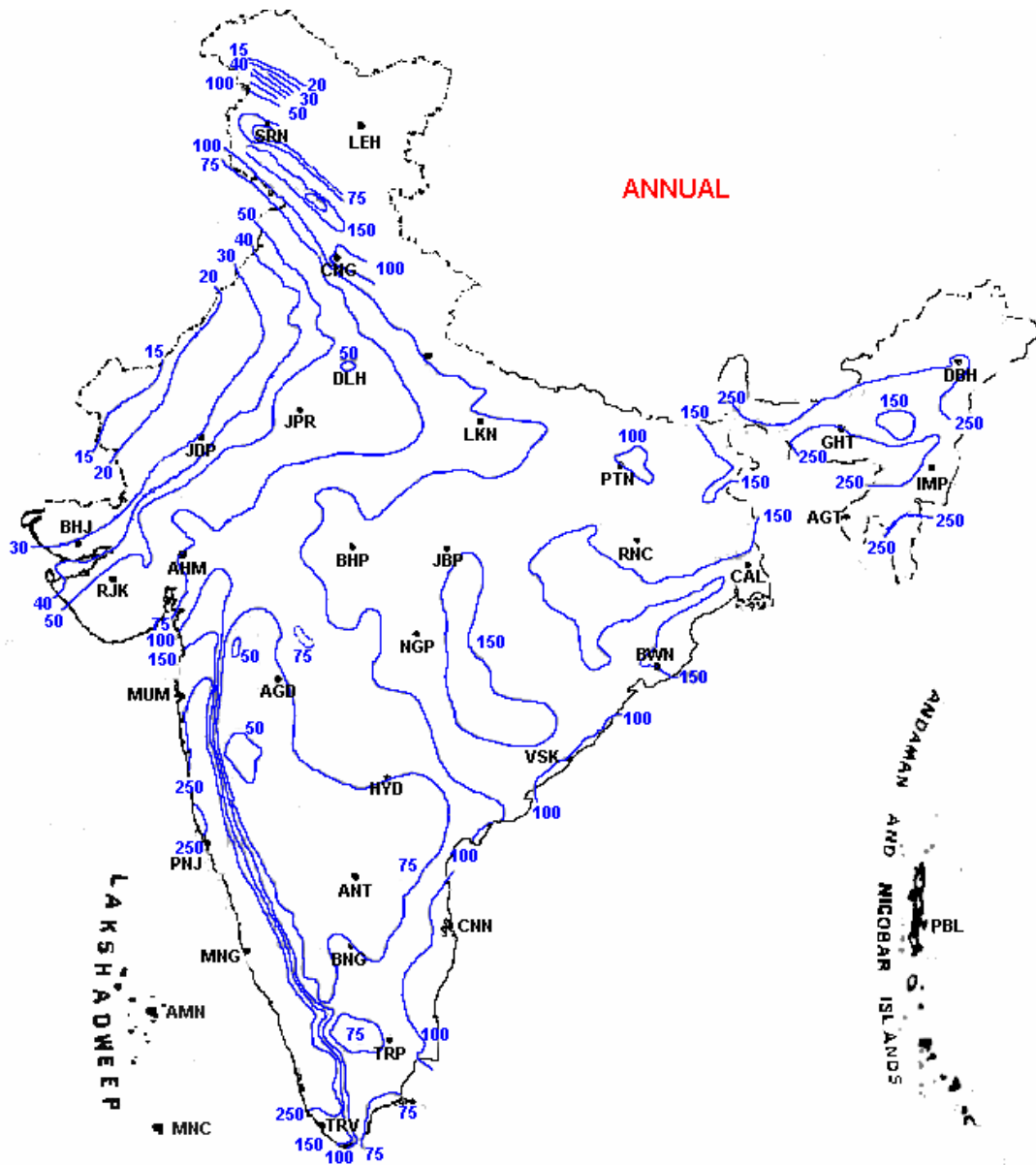
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Introduction: Water availability per capita has been on the decline in India. Two reasons have been the increasing demand for water and the increasing population. The quantum of water available to the country being fixed the increasing demand reduces per capita water availability. Agriculture continues to be the single largest consumer of water however industrial demand for water shows the fastest growth. Especially South India and in particular Karnataka is a drought prone region. The state enjoys the dubious distinction of having the second largest area prone to drought next only to Rajasthan. Water scarcity is however a world wide issue and many steps are being taken to manage it from policy and project levels but increasingly it is being recognized that people from various sectors have to become partners in the solution process and not remain simply as institutional beneficiaries.

India is blessed with adequate rainfall as a whole, yet there are large swathes of dry, drought prone area. In many other places the quality of groundwater is not good. In such places rainwater harvesting can provide lifeline water for survival and more.



Annual rainfall in India

Problems of water supply in Karnataka: Relative to other states, Karnataka has the best-managed institutions to focus on the provision of water. Yet due to inherent problems of the sector more than 20,000 habitations out of the more than 54,000 habitations were yet to receive adequate standard quantity and quality of water. In urban areas more than 190 out of the 208 small and medium towns are struggling to get adequate quantity of water as per standards.

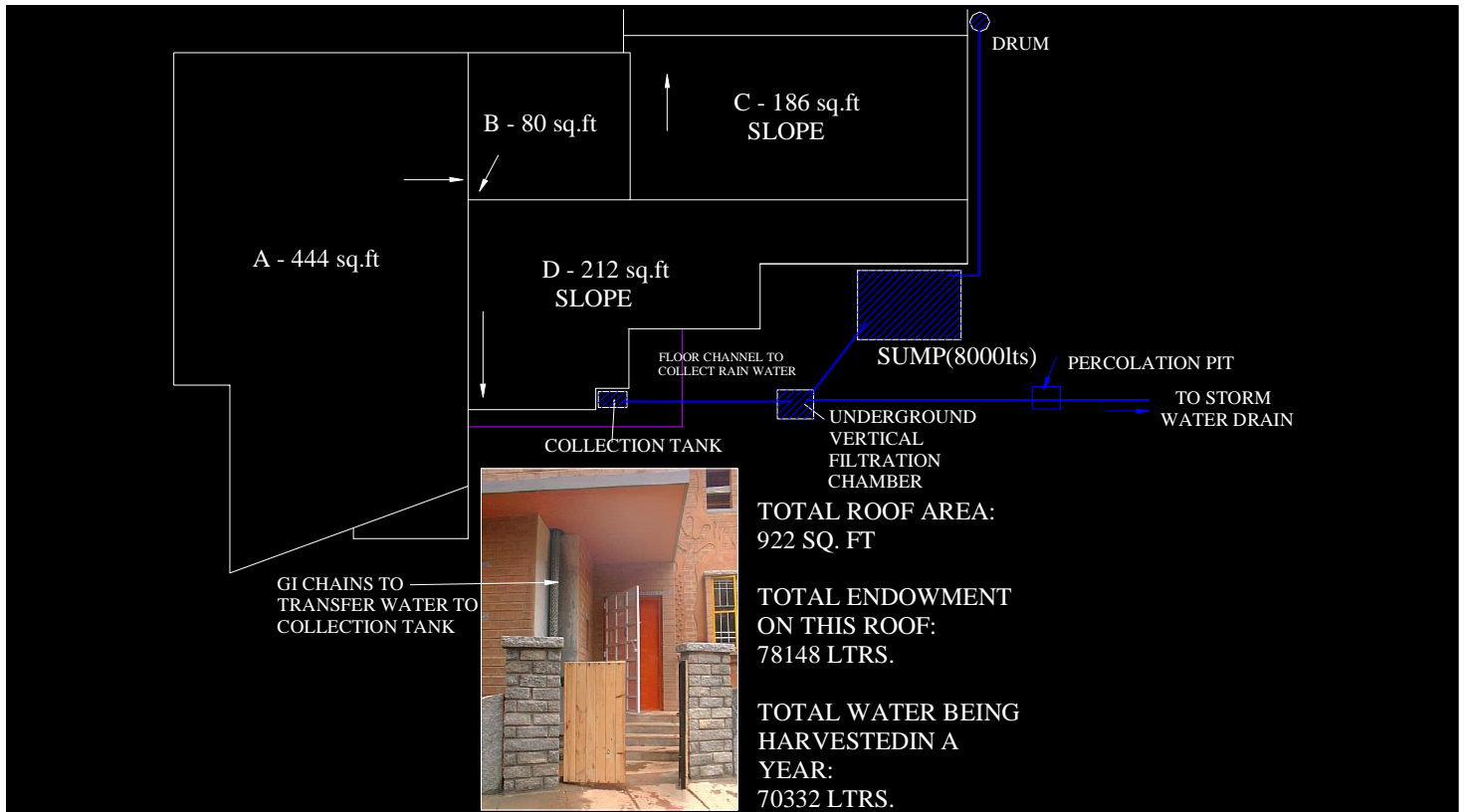
The absence of perennial rivers, the nature of groundwater presence in a hard rock terrain, the pricing policy for water and the legal framework for its management have all contributed to the short supply.

Solutions for water management: At a broader level Economic pricing of water, legal framework for its sustainable management, information and training for its adequate management are all solution. At a smaller micro level, efficient use of water is one solution as is water reuse and recycling. Rainwater harvesting is emerging as one more component in the basket of solutions.

Rainwater harvesting:

The collection and storage of rain water for later productive use is defined as rainwater harvesting.

With severe drought being experienced in several parts of the world, rainwater harvesting an ancient technique is fast reemerging on the development sector front as a potential weapon for ‘water security’ of people, villages and industries.



Rainwater harvesting in a sump tank

Components of rainwater harvesting: Any rainwater harvesting system has three components

Catchment

Conveyance

Storage

Rainwater harvesting is further categorized based on the catchment for the rainwater as

rooftop rainwater harvesting,

rainwater harvesting from paved and unpaved area called **storm water** harvesting

rainwater harvesting from water channels or streams called **flood water** harvesting

Catchment: Any surface can act as the catchment for rainwater harvesting. Rooftops are favoured because of the large coefficient of run-off generated from them and the relatively less likelihood of their contamination. Paved areas, footpaths and roads are also good rainwater runoff generators and with adequate catchment management strategies can provide good quantity and adequate quality of runoff water for use. Unpaved areas also generate runoff during heavy storms and can be modified to act as rainwater catchment.

Conveyance: Conveyance systems can be the catchment surface itself acting as a sheet runoff. For rooftops rainwater gutters and rainwater down pipes are conveyance systems, which need to be designed appropriately so as to manage the severest intensity of rain as well as not to lose any water during the conveyance process. Storm water drains, French drains with pebbles are also conveyance systems.



A beautiful conveyance system, chains bring rainwater down from the roof

Storage: From the simplest ground level tank, to underground sumps, surface lined ponds and large lakes storage options are many depending on the context of the rainwater harvesting design.

In many a case the soil profile may also permit artificial recharge of rainwater to open wells and borewells where water can be stored to be retrieved later for productive use.

Rainwater harvesting urban areas: A simple rain barrel connected to the down pipes bringing rain down from the roof is a good way to begin. Depending on the distribution of rainfall at a place, substantial amounts of rainwater can be harvested. In Bangalore for example, if a 500 litre rain barrel is connected to a 50 square metre roof, more than 23,000 litres of rain can be harvested annually.

A slight increase in storage capacity of say 6000 litres connected to a 100 square metre roof area can harvest between 70,000 to 80,000 litres annually.

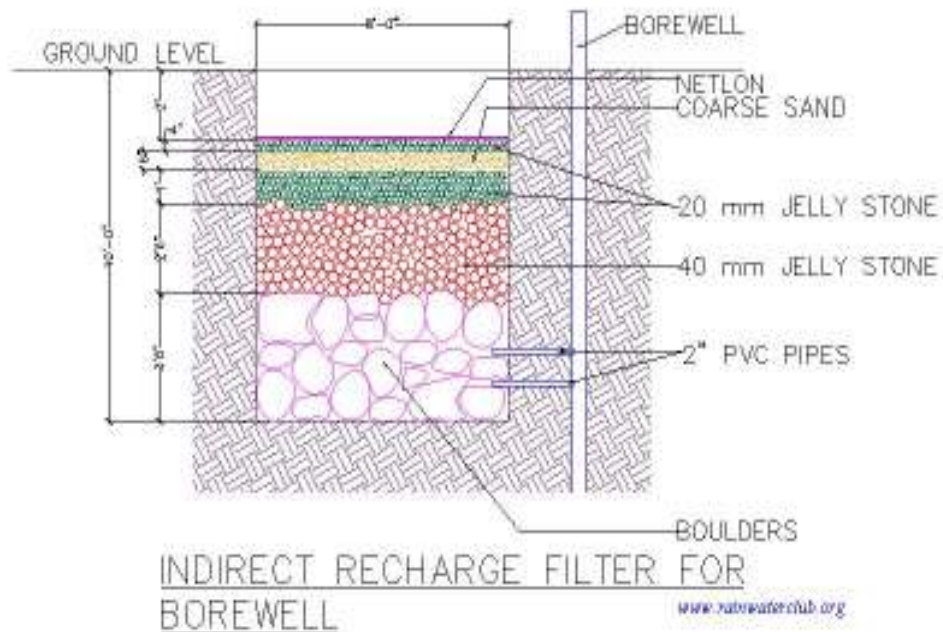


The Rain Barrel – a simple method of rainwater harvesting

A recharge well is another interesting way of harvesting rainwater. Typically such wells are about 1 metre in diameter and can go to be 6 metres deep or even deeper. Rainwater from rooftops and even from land surface can be led into these recharge wells. They will revitalize the groundwater table and in many cases aquifers have been rejuvenated and groundwater has become accessible for use.



A recharge well



Recharging a bore well

Rainwater harvesting in rural areas: Traditionally water harvesting was done in 'tanks', manmade lakes and 'kalyani' or step well in rural areas.



A traditional 'kalyani' to store rainwater



A ‘tank’ or a man made reservoir to harvest rainwater

In the modern context, it is necessary to revive the ancient culture of maintaining these beautiful rain harvesting structures and make them functional.

Rooftop rainwater harvesting has also become necessary in villages suffering for lack of water. These structures provide clean fluoride and arsenic free water at the doorstep.



Domestic rooftop rainwater harvesting structure for a village house



Rooftop rainwater harvesting system for a village house

In rural areas farm ponds are good methods of harvesting rainwater. They can either be used as collection structures or as recharge structures depending on the nature of the soil and the condition of infiltration and percolation at a place.



A farm pond next to a bore well, dug for recharge purpose

Poly houses too can harvest rainwater and if used through a drip irrigation mechanism much water requirement of the poly house can come from rainwater



Rainwater harvesting from a poly house

Potential for rainwater harvesting: One acre of land in Bangalore for example, with about 900 mm of rain receives **nearly 36 lakh litres of water** as endowment. A small 100 square metre of roof area would receive **90,000 litres of rainwater in an average year of rain.**

You can calculate what is the potential of rainwater harvesting in your area and have one appropriate for you. Rainwater harvesting has tremendous potential and it is up to each one of us to push this technique further for a sustainable water situation for India.