

STUDY ON RAIN WATER HARVESTING

Rohit Pal, Nitish Kumar, Jayant Kumar

U.G. Student, IIMT College of Engg. (G. Noida)

I. INTRODUCTION

Water as we all know is very essential for our day to day living and that it is becoming an increasingly scarce resource. No living being, including plants can survive without water. Yet, those of us who have grown up in cities tend to take water for granted. We have not given water and the need to conserve it the importance that it richly deserves. How many of us indeed are aware that the ultimate source of water we get is the rain that falls during the monsoons? We get our daily requirement of water from two sources: 1) Water conserved during monsoon in four reservoirs -Redhills, Poondi, Sholavaram and Chembarambakkam - treated and supplied by the Metrowater Board and 2) the water drawn from the soil below our homes, known as ground water. Till about thirty years back, the areas around our homes and offices used to be unpaved and the rain falling on these areas would percolate into the soil and remain there for being drawn through shallow open wells. With the proliferation of flat complexes, not only have these areas been paved and percolation of rainwater into the soil almost totally stopped, the quantity of water drawn from the soil below has increased manyfold. Consequently, open wells and not-so-deep bore wells started drying up. The reason is that no sincere attempt is made to replenish the ground water table with rainwater during the monsoon. As individuals, groups and communities, let us all wake up before it is too late and not only understand what rainwater harvesting is all about but also implement measures to harvest rainwater in our houses and flat complexes and put it into the soil for our subsequent use.

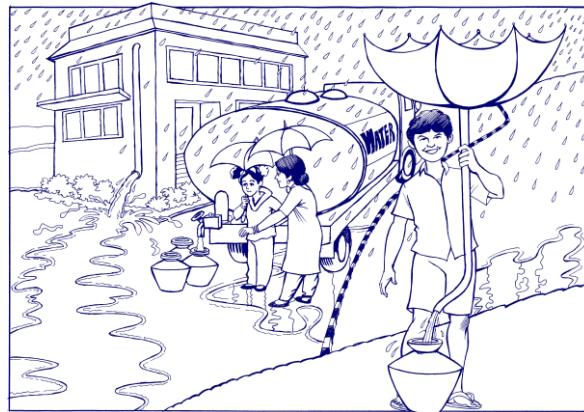
LET US NOT TAKE WATER FOR GRANTED

II. RAINWATER HARVESTING

Catching rainwater when and where it falls for use during non-monsoon months is called rainwater harvesting. This can be done in two ways: as surface water, diverting the rainwater into tanks, ponds etc or as ground water by ingesting it into the soil. In cities, due to shrinking of open spaces, rainwater can be harvested only as ground water.

III. NEED FOR RAINWATER HARVESTING

Chennai city receives an average annual rainfall of around 129 cm and its duration is about two months. Moreover, rainfall also occurs in heavy short spells of a few days or even a few hours -on an average of 300 hours throughout the year. These characteristics of our rainfall force us not only to conserve large quantity of rainwater during these few days but also to store wherever it rains -in metropolitan cities like Chennai, as ground water. Failure to do so results in either flooding of low lying areas or wastage by means of run off into the sea. What is presently happening in our city is that the areas around houses and flat complexes are paved indiscriminately. As a result all the rainwater runs off into the road and floods the area making life miserable. It is quite possible to put all this water into the soil below with a little effort and expenditure so that the precious rainwater is not lost but becomes available for our use subsequently



WATER IS EVERYBODY'S BUSINESS

IV. BENEFITS OF RAINWATER HARVESTING

- Rainwater harvesting replenishes the ground water table and enables our dug wells and bore wells to yield in a sustained manner.
- If the ground water happens to be brackish, harvesting will reduce the salinity. In areas where the water becomes yellow due to presence of iron salts, rainwater harvesting will progressively leach out these salts leading to clean water availability in the long run.
- Flooding of low lying areas and roads can be avoided to a large extent, since rainwater that is not harvested both within the house as well as outside is mainly responsible for flooding.

V. HOW MUCH RAINWATER CAN BE HARVESTED

At the macro-level, our annual rainfall of 129 cm, if harvested within Chennai city, extending over an area of 174 sq.kms., is capable of yielding 125 litres Per capita per day, making us self sufficient. At the micro-level, this amount of rainfall is capable of yielding more than 700 litres of water per day, throughout the year, if harvested in one ground of plot (2400 sq.ft.). This will not only take care of the daily needs of a family with 5 members but will also reduce their dependance on metrowater.

WATER IS AS IMPORTANT AS FOOD

Nylon mesh should be spread in between the bottom layer of pebbles and sand the remaining two thirds should be left unfilled for smooth flow of water. A PVC drum can also be used for this purpose.

Note 2:- In cases of diversion of rainwater into sumps, the filter will have to be located above the ground level and there should be enough space available for it.

Note 3. Diversion to sumps is recommended only in places where there is no or very little municipal supply and where water is purchased even on rainy days.

II) Any overflow from the sump can be led into an open well, if any, within the premises. Pipes not directed to the sump can also be led into the well (fig.1)

III) In the absence of an open well, a percolation/recharge well could be dug (fig.2) and the same can be made use of to put the rooftop water into it.

VI. METHODS OF RAINWATER HARVESTING

Methods of harvesting rainwater are different for different areas and therefore it is site and soil specific. It can mean anything from collecting it in a vessel to ingesting into the soil. Traditional rainwater harvesting, which is still prevalent in rural areas, was done in surface storage bodies like irrigation tanks (known as eri in tamil), lakes, ponds etc. In urban areas, due to shrinking of open spaces, rainwater will have to necessarily be harvested as ground water. Hence, harvesting in such places will depend very much on the nature of the soil viz. clayey, sandy, rocky etc. In houses and flat complexes, rainwater falls on both the terrace (rooftop) as well as on the area all around (driveway). It is this water, which will have to be led into the ground wherever possible.

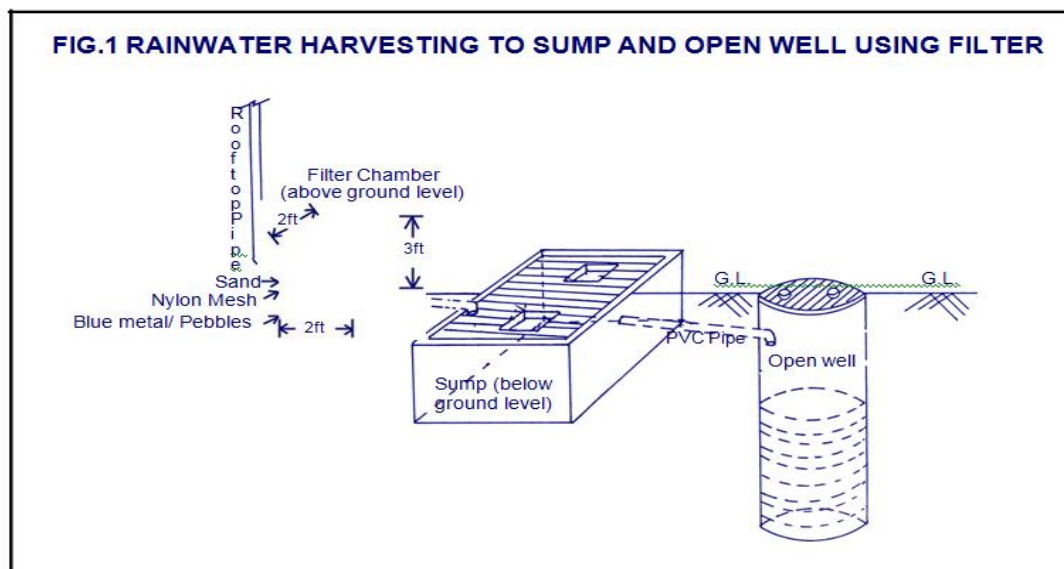
VII. ROOFTOP HARVESTING

Rooftop rainwater is of a good quality as it falls on clean terraces and is brought down by the drain pipes called rooftop pipes.

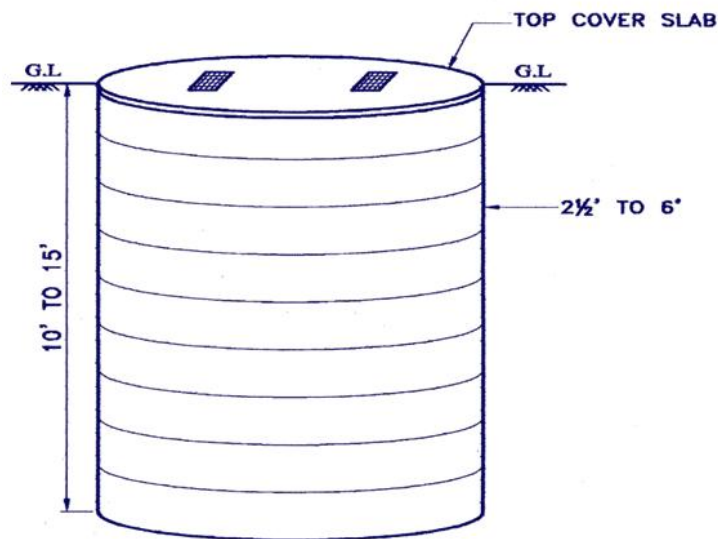
1. Direct at least one or more of these pipes located close to the existing sump (meant for receiving metrowater) into it through a filter.

Note 1. These filters, which are used only to remove suspended impurities in rooftop water, can be masonry tanks measuring 2.5 ft. x 2.5 ft. and about 3 ft. deep. One third of the filter alone should be filled with coarse river sand sandwiched between two layers of blue metal/pebbles.

VIII. FOOD CAN BE PRODUCED : WATER TO BE MANAGED



RAIN IS THE ULTIMATE SOURCE OF WATER



These are constructed using cement rings readily available in the market. The diameter of these rings range from 2.5ft to 6.0ft depending on the volume of water that is likely to be ingested into each one of them. The depth to which these wells are dug depends on the nature of the soil. They are left unfilled and are covered with RCC slabs of suitable thickness to facilitate vehicular movement on them.

These are constructed using cement rings readily available in the market. The diameter of these rings range from 2.5ft to 6.0ft depending on the volume of water that is likely to be ingested into each one of them. The depth to which these wells are dug depends on the nature of the soil. They are left unfilled and are covered with RCC slabs of suitable thickness to facilitate vehicular movement on them.

RAIN IS THE ULTIMATE SOURCE OF WATER

These are constructed using cement rings readily available in the market. The diameter of these rings range from 2.5ft to 6.0ft depending on the volume of water that is likely to be ingested into each one of them. The depth to which these wells are dug depends on the nature of the soil. They are left unfilled and are covered with RCC slabs of suitable thickness to facilitate vehicular movement on them.

IV) In houses/flat complexes where there is not enough space around the builtup area to dig a recharge well, a percolation/recharge pit could be made (fig.3) for the purpose of putting rooftop water into it.

DO NOT DROP THAT PRECIOUS DROP

V) In areas where the soil is likely to be clayey upto say, 15 ft. or more, it is advisable to go in for a percolation/ recharge well cum bore pit (fig.4).

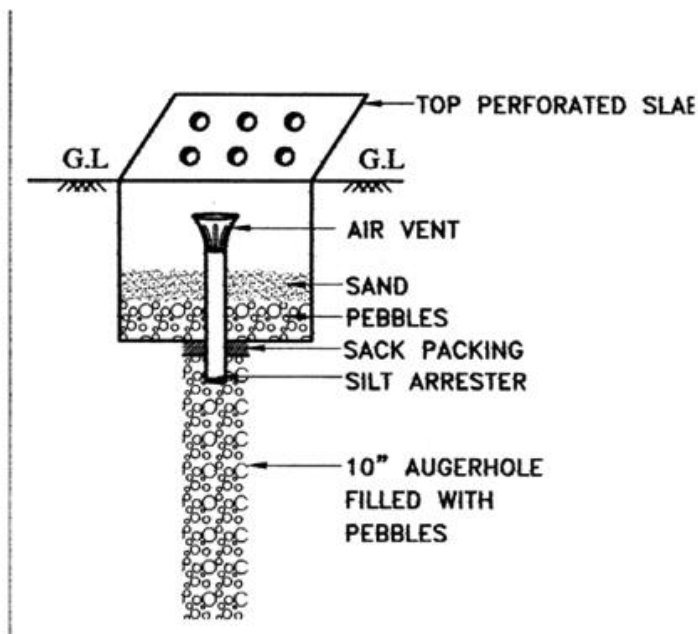


Fig. 3 Percolation/Recharge Bore Pit

A Percolation/recharge pit is a hand bore made in the soil with the help of an augur and filled up with pebbles and river sand on top. The depth of these pits will be anywhere between 4 and 8 metres depending on the nature of the soil. The pit has to be dug to a depth till a reasonably sandy stratum is reached. The diameter of the pits will be 25 cms. (10 ins.). A square/ circular collection chamber with silt arrestor is provided at the top. Instead of filling up with pebbles, which is done only to prevent caving in of the bore, a PVC pipe of 4 or 6 in. diameter can also be inserted for the entire depth.

CATCH WATER WHERE IT FALLS