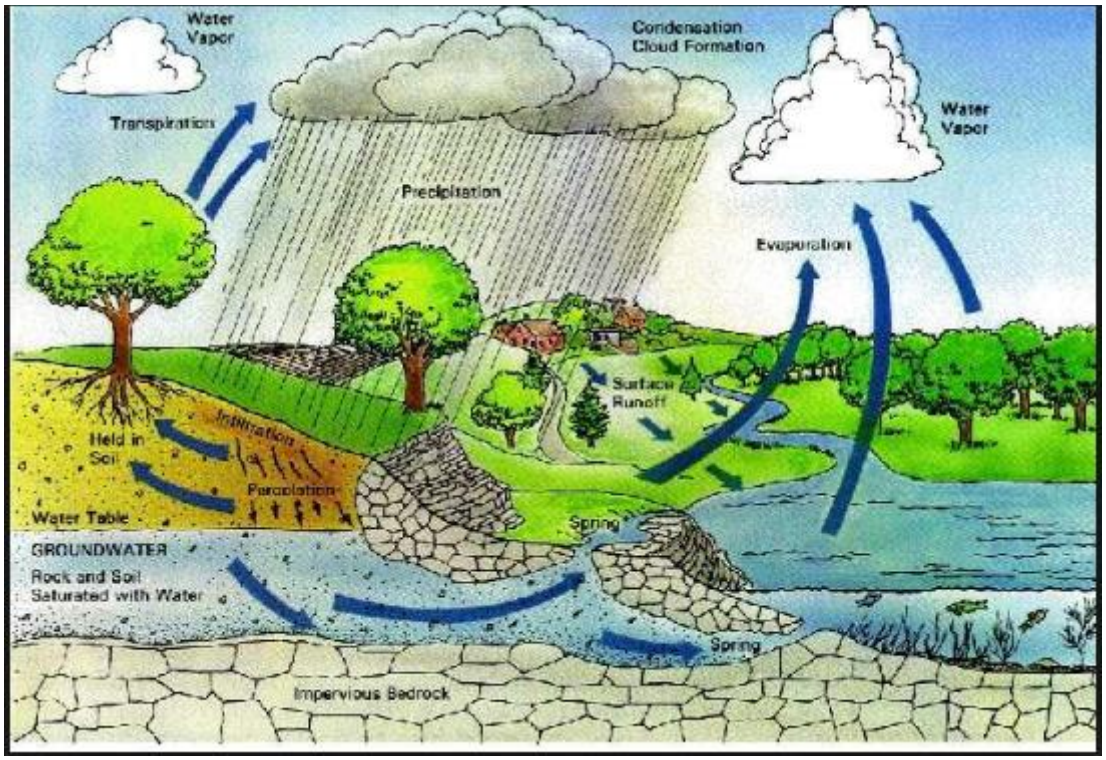
Off late everyday through WhatsApp forward or through any other medium we are getting threat to have a waterless civilization soon, which may eventually head towards the end of the civilization only!!! So what is the solution for this?

The answer could be the **Conservation of the water table, rather the natural environment.** So what is **"Conservation"** and how can it be done**??**
Conservation describes the process through which the material rather environment is prolonged through carefully planned interventions.

Apart from the measured and thoughtful use of "Water" a technical way out is there, which is more scientific**. "Rain Water Harvesting"** that's a very relevant solution in today's crisis period. If we think as Kolkata is in a better position now, than the rest of the 21 cities which are severely threatened to be waterless by next year, then we are mistaking, as the water table can't be constant!! The land is interconnected; if our nearest city goes waterless they will try to pull out the adjacent land's water table too. The rain water harvesting may improve the scenario. West Bengal's yearly rain fall varies from 125cm – 250cm, in monsoon it is avg. 175cm. in this situation rain water harvesting is possible as the picture is better than that of the cities which are in danger.



Now how to do the harvesting - **Rainwater harvesting** is the accumulation and storage of rainwater for reuse on-site, rather than allowing it to run off. Rainwater can be collected mainly from roofs, and the water collected is redirected to a deep pit (well, shaft, or borehole), aquifer, a reservoir (a metal reservoir is a better option, which we can arrange from our kitchen as there is metal containers readily available for storing grains) with percolation, or collected from dew or fog with nets or other tools. Its uses include water for gardens, irrigation, domestic use (apart from cooking and drinking, we actually can use the rainwater, may be for washing clothes or utensils), with proper treatment we even can drink it or indoor heating for houses, etc. The harvested water can also be used as longer-term storage and for most important purposes such as **Groundwater Recharge**.

Whereas in India there are states like Pune or Bangalore, where it has been a complete mandatory for new buildings coming up, to have the proper Rain water harvesting system integrated with the services, the other countries like New Zealand or Canada have started this practice almost a half century ago!!

As we are mostly city dwellers, so we should discuss the methods to recharge ground water through rainwater harvesting in urban areas.

As we said earlier, in urban areas, rain water available from roof tops of buildings, paved and unpaved areas goes waste. This water can be recharged to aquifer and can be utilized gainfully at the time of need. The rain water harvesting system needs to be designed in a way that it does not occupy large space for collection and recharge system. A few techniques of roof top rain water harvesting in urban areas:

Recharge pit

- In alluvial areas where permeable rocks are exposed on the land surface or are located at very shallow depth, rain water harvesting can be done through recharge pits.
- The technique is suitable for buildings having a roof area of100 sq.m. These are constructed for recharging the shallow aquifers.
- Recharge Pits may be of any shape and size. They are generally constructed 1 to 2 m. wide and 2 to 3 m deep. The pits are filled with boulders (5-20 cm), gravels (5-10mm) and coarse sand (1.5- 2mm) in graded form. Boulders at the bottom, gravels in between and coarse sand at the top so that the silt content that will come with runoff water will be deposited on the top of the coarse sand layer and can easily be removed. For smaller roof area, pit may be filled with broken bricks/ cobbles.
- A mesh should be provided at the roof so that leaves or any other solid waste / debris is prevented from entering the pit. A desilting /collection chamber may also be provided at the ground to arrest the flow of finer particles to the recharge pit.
- The top layer of sand should be cleaned periodically to maintain the recharge rate.
- By-pass arrangement is to be provided before the collection chamber to reject the first showers.

Recharge trench

- Recharge trenches are suitable for buildings having roof area of 200-300 sq. m. and where permeable strata are available at shallow depths.
- Trench may be 0.5 to 1 m wide, 1 to 1.5m. deep and 10 to 20 m. long depending upon availability of water to be recharge.
- These are back filled with boulders (5-20cm), gravel (5-10 mm) and coarse sand (1.5-2 mm) in graded form – boulders at the bottom, gravel in between and coarse sand at the top so that the silt content that will come with runoff will be coarse sand at the top of the sand layer and can easily be removed.
- A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the trenches and a desilting/collection chamber may also be provided on ground to arrest the flow of finer particles to the trench.
- By-pass arrangement is to be provided before the collection chamber to reject the first showers.
- The top layer of sand should be cleaned periodically to maintain the recharge rate

Tube wells

- In areas where the shallow aquifers have dried up and existing tubewells are tapping deeper aquifer, rain water harvesting through existing tubewell can be adopted to recharge the deeper aquifers.
- PVC pipes of 10 cm dia are connected to roof drains to collect rainwater. The first roof runoff is let off through the bottom of drainpipe. After closing the bottom pipe, the rainwater of subsequent rain showers is taken through a T to an online PVC filter. The filter may be provided before water enters the tubewells. The filter is 1 –1.2 m. in length and is made up of PVC pipe. It's diameter should vary depending on the area of roof, 15 cm if roof area is less than 150 sq m and 20 cm if the roof area is more. The filter is provided with a reducer of 6.25 cm on both the sides. Filter is divided into three chambers by PVC screens so that filter material is not mixed up. The first chamber is filled up with gravel (6-10mm), middle chamber with pebbles (12-20 mm) and last chamber with bigger pebbles (20-40 mm).
- If the roof area is more, a filter pit may be provided. Rainwater from roofs is taken to collection/desilting chambers located on ground. These collection chambers are interconnected as well as connected to the filter pit through pipes having a slope of 1:15. The filter pit may vary in shape and size depending upon available runoff and are back-filled with graded material, boulder at the bottom, gravel in the middle and sand at the top with varying thickness (0.30-0.50m) and may be separated by screen. The pit is divided into two chambers, filter material in one chamber and other chamber is kept empty to accommodate

excess filtered water and to monitor the quality of filtered water. A connecting pipe with recharge well is provided at the bottom of the pit for recharging of filtered water through well.

Trench with recharge well

- In areas where the surface soil is impervious and large quantities of roof water or surface runoff is available within a very short period of heavy rainfall, the use of trench/ pits is made to store the water in a filter media and subsequently recharge to ground water through specially constructed recharge wells.
- This techniques is ideally suited for area where permeable horizon is within 3m below ground level.
- Recharge well of 100-300 diameter is constructed to a depth of at least 3 to 5 m below the water level. Based on the lithology of the area, well assembly is designed with slotted pipe against the shallow and deeper aquifer.
- A lateral trench of 1.5 to 3m width and 10 to 30 m length, depending upon the availability of water is constructed with the recharge well in the centre.
- The number of recharge wells in the trench can be decided on the basis of water availability and local vertical permeability of the rocks.
- The trench is backfilled with boulders, gravels and coarse sand to act as a filter media for the recharge wells.
- If the aquifer is available at greater depth say more than 20 m, a shallow shaft of 2 to 5 m diameter and 3-5 metres deep may be constructed depending upon availability of runoff. Inside the shaft a recharge well of 100-300 mm dia is constructed for recharging the available water to the deeper aquifers. At the bottom of the shaft a filter media is provided to avoid choking of recharge well.

Though these process are not so easy or simple (few are definitely simpler and can be done through our household), but this is definitely a relevant topic and a worth try in order to save our environment from this tough situation.

Source: https://en.wikipedia.org/wiki/Rainwater_harvesting

http://vikaspedia.in/energy/environment/rainwater-harvesting-1/rain-water-harvesting-techniques-to-augment-ground-water#section-1

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