Study of pH of water sample collected from Rain Water Harvesting System

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Abstract

As the water crisis continues to become severe, there is dire need to do reforms in water management system and revival of traditional systems. One of the systems is the rain water harvesting technology. Rain water harvesting is a technique used for collecting, storing and using it for irrigation, industrial and domestic use. It is one of the traditional methods practiced in different parts of India specially Gujarat and Rajasthan where water availability is less. Also in Punjab the water level is decreasing and it is important to conserve water. Rain water harvesting can be a step forward to conserve water. In the present study, pH of water sample from rain water harvesting system was found to be neutral.

KEYWORDS: Rain water harvesting, pH, Rain water harvesting system

Water is one of the five basic elements (viz. Earth, water, fire, air and sky) and very important that no creature can live without it. Despite knowing its importance, human beings do not save and conserve water resources, probably because of its abundance. This irresponsible attitude resulted in deterioration of water bodies in terms of quality and quantity. The harvested water is used after rainy season is over. Main aims of rain water harvesting are:

1.Reduce runoff and soil erosion.

2.Avoid floods.

3.Meet increasing demand of water at less cost.

4.To maintain ground water level.

5.Improve soil texture and solve water problems in arid and semi-arid regions.

6.Aid ecological conservation.

Components of Rain Water Harvesting system:

Generally, roof top harvesting system is used, which is low cost and effective method, especially for urban rain water harvesting. The rainwater is collected in roof tops of houses and buildings and then diverted to covered tanks or underground water tank or pits. The common components of a rain water harvesting system are:

1.Catchments:The catchment of rain water harvesting is the surface which directly receives rainfall. Mainly it is roof which is made up of reinforced concrete cement or iron sheets. Apart from that, lawn or open ground is also used as catchment.

2.Coarse mesh :It is attached at hole of roof to prevent the passage of debris in water.

3.Conduits:Conduits are pipelines or drains that carry rain water from the catchment or rooftop area to harvesting system. It is mainly made up of polyvinyl chloride or galvanized iron.

4.First flushing :It is a value that ensures that runoff from the first spell or rain is flushed out and does not enter the system. The first spell of rain water contains large amount of air pollutants.

5.Filters:The filter is used to remove suspended pollutants from rain water collected. A filter is a chamber filled with material like fibre, coarse sand, charcoal and gravel to remove debris and dirt, before it enters storage tank.

6.Storage /facility :There are different types of tanks w. r. t. shape, size and constructional material. They may be rectangular or cylindrical and made up of tank reinforced cement concrete, ferrocement, masonary , plastic or metals. These tanks can be constructed above ground, partly underground or fully underground.

7.Recharge structure: The collected rain water is charged into ground water aquifer through dugwells ,borewells, recharge trenches and pits. The water percolates through soil strata and enters into underground water. This increases the level of water table and surrounding wells retain water throughout the year.

pH ,historically denoting "potential of hydrogen" (or "power of hydrogen"), is a scale used to specify the acidity or basicity of an aqueous solution. Acidic solutions (solutions with higher concentrations of H^+ ions) are measured to have lower pH values than basic or alkaline solutions.

The pH scale is logarithmic and inversely indicates the concentration of hydrogen ions in the solution.

The concept of pH was first introduced by the Danish chemist Søren Peder Lauritz Sørensen at the Carlsberg Laboratory in 1909and was revised to the modern pH in 1924 to accommodate definitions and measurements in terms of electrochemical cells.

The first electronic method for measuring pH was invented by Arnold Orville Beckman, a professor at California Institute of Technology in 1934. It was in response to local citrus grower Sunkist that wanted a better method for quickly testing the pH of lemons they were picking from their nearby orchards.

Experiment: A sample of 200 ml of water was collected from rain water harvesting system from Khalsa college, Asr and pH of water sample was studied using pH meter and pH strips.It was found that pH of water sample collected from rain water harvesting system is neutral and comes out to be 6.78.

ADVANTAGES OF RAIN WATER HARVESTING SYSTEM:

1.The installation of rain water harvesting system is very simple and most people can easily build their own system .

2. Theoperation and maintenance of a household rain water collection system is controlled by individual without having to rely on experts.

3.it makes use of natural source of water and reduces flooding,soil erosion etc.

4.Excellent source of water for irrigation with no chemicals like fluoride,chlorine,salts.

5. The technology iseco-friendly and sustainable.

DISADVANTAGES:

1.The installation cost of system is high.

2.regular maintenance,cleaning and repair isrequired for successful collection system.

3.the quality of rain water is affected by air pollution in environment.

4.Limited rainfall or drought period can cause problems with supply of water.

5. if storage tank is not properly managed,it becomes breeding site of mosquitoes and other insects.

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