



## Ground Water Recharge

(\*T. Ashly)

Department of Agricultural Engineering, Agricultural Engineering College and Research Institute, Tamil Nadu Agricultural University, Coimbatore

\*Corresponding Author's email: [tashly2004@gmail.com](mailto:tashly2004@gmail.com)

### Abstract

Ground water recharge is a hydrologic process in which the ground water is recharged by surface water. This process usually occurs in the vadose zone. Recharge occurs by both artificial and natural methods. A greatest declination in ground water is observed in many parts of the world. This is due to over irrigation, deforestation, urbanization etc.... In order to improve the ground water availability it is necessary to conserve water by recharging the depleted ground water.

**Keywords:** ground water recharge, artificial and natural recharge, declination, conserve water.

### Introduction

The demand for water is increasing day by day due to increased population, agriculture, industry, high standards of living and other purpose. Hence humans are compelled to conserve water resources. Groundwater recharge is an important component for sustainable groundwater management, as increasing the amount of recharge can help improve conditions in over drafted basins, or allow for additional pumping in basins that are not experiencing chronic declines in groundwater levels.

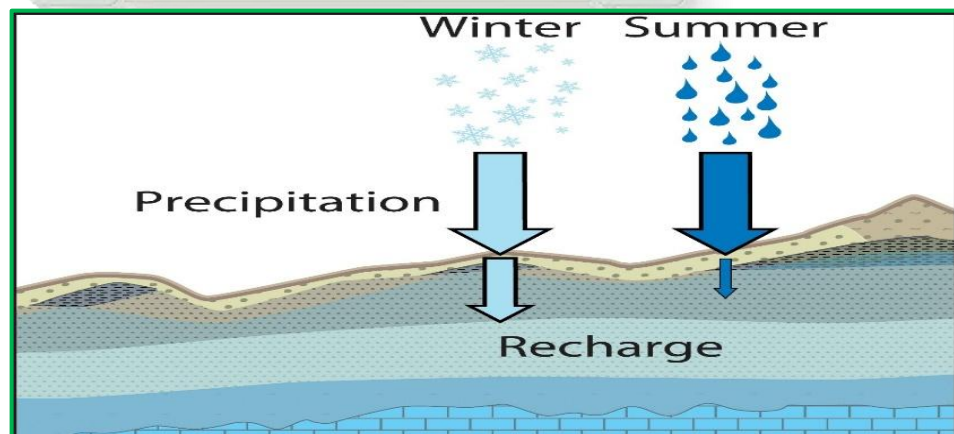
Ground water can be recharged by two methods, they are

1. Natural methods
2. Artificial methods

**1.Natural Method:** It is the process in which recharge occurs as precipitation falls on the land surface, it infiltrates into soils, and moves through the voids down to the water table. Natural recharge also can occur as surface-water leak out from lakes ponds, rivers etc.

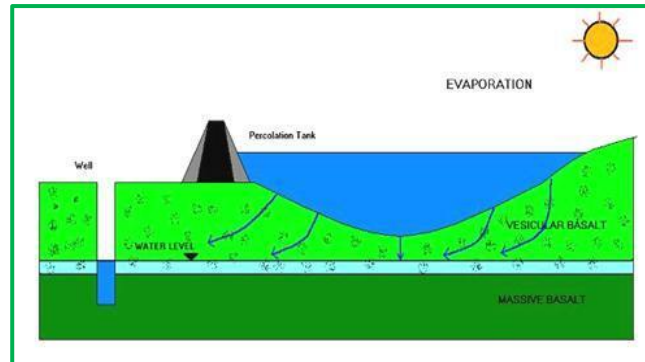
**2.Artificial Recharge:** The amount of water consumed per capita is decreasing day by day and to increase the ground water recharge we need artificial method. The process by which ground water is recharged

artificially is known as artificial recharge. This is the most effective method than natural method. This method involves various techniques.



**BASIN OR PERCOLATION TANKS:**

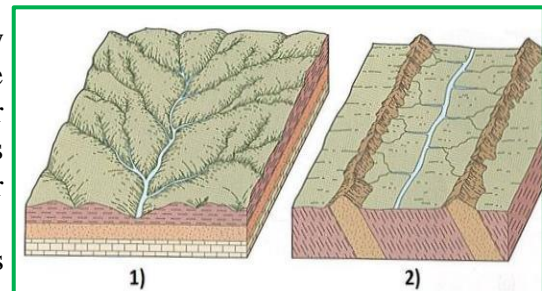
It is an Anthropogenic method which consist of highly permeable land in its reservoir, which allows the excess runoff water to percolate and it will increase the storage of ground water. It is an artificially created surface water body submerging a highly permeable land area so that the surface runoff is made to percolates and recharge the ground water storage .

**DITCHES AND FURROW METHOD:**

This provides maximum contact area for recharging water from the canal or source stream in location with various geology .This method is classified into following patterns,

**LATERAL DITCH PATTERN:** The runoff water is allowed to flow into a canal or ditch , from which smaller ditches at right angles are formed. The gate valves monitor the flow rate. The excess water, as well as any sediments returns back to the main stream through a return canal. Factors like furrow depth wetted surface, uniform velocity are determined by topography .

**DENDRITIC (tree like) PATTERN:** Basically this looks like the branching pattern of the tree roots. This pattern is developed where the river channel flows the slope of the terrain. The water is streamed into the main canal. Until all the water infiltrates into the ground this pattern is continued.



**CONTOUR PATTERN:** According to the area's ground surface outline the ditches are excavated.

These are designed in such a way that to move front and back to navigate the spread area numerous times and switch back if ditch get close to the stream . These ditches connects the main streams to downstream retuning extra water to it at its lowest point

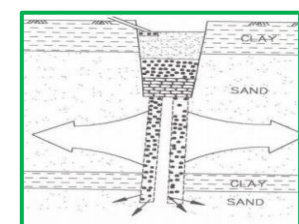
**RECHARGE WELLS:** This is the subsurface ground water recharge techniques which is used to directly discharge water into deep-water bearing zones. There are many ways to incorporate recharge wells. These type of recharge wells has to be built in valley points, in which we get highest rainfall .The runoff water decides the design and number of recharge wells.



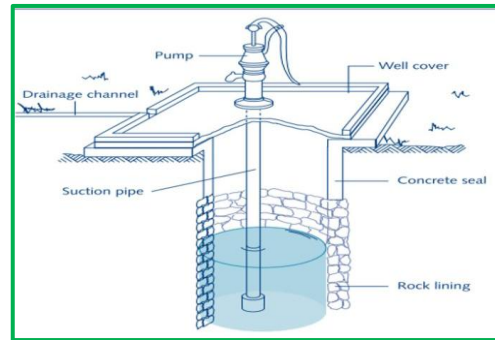
**RECHARGE PITS:** It allows the rain water to replenish the ground water. It helps the water infiltration in an area , these pits are totally invisible when finished. Recharge pits are many be rectangular, circular or square. They are 2to 3m deep and 1to 2m wide. The recharge pit is fully filled of stones, sands, boulders which acts as a filter medium. If the pit is trapezoidal the side floor should be steep enough to avoid silt deposition.



**RECHARGE SHAFT:** This is the most efficient and cost effective method to recharge unconfined aquifers overlain by poorly permeable strata . The recharge shaft may be dug or drilled. Same as recharge pits, the recharge shaft is also filled with stones or pebbles. This type of ground water recharge is suitable for shallow aquifers. The diameter of shaft is normally more than 2m and the depth varies from 10 to 15 m below the ground level. Cleaning can be done easily by removing the top layer and refilling it .



**DUG WELLS:** It is one of the indirect method of artificial recharge involving pumping from aquifer connecting surface water to induce recharge to the ground water reservoir. Dug wells are bored manually. These wells are bored deep down until it reaches the ground water table. The diameter at initial phase is 1.5 m but on some case it varies to 15m. The well need to be cased with concrete and a cement grout or bentonite clay to avoid disintegration of well.



### Conclusion

The world is surrounded by ninety nine percent of sea water, in which only one percentage covers the water which could be adopted as conveyable water. From this 1% of water covers the fresh water, among which the 40% is used for irrigation purpose which provides 13% of total food production. The ground water extraction is increasing day by day, the need for creating the source of ground water recharge is most necessary in order to satisfy the demand. Ground water recharge is an important component for sustainable ground water management. Though the installation of artificial methods are cost consuming rather than natural methods, the rate of groundwater recharge is high and more effective. When the rate of ground water recharge exceeds the rate of ground water discharge, there would be an increase in ground water supply.

### Reference

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