International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 09 | September - 2022 Impact Factor: 7.185 ISSN: 2582-3930

A STUDY OF GROUND WATER & METHODS OF REPLENISH OF GROUND WATER

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Abstract - Ground water recharge and are important aspects of the global Hydrological Cycle.. ground water recharge is as the process of induced replenishment of the ground water. The recharge of ground water occurs both naturally and artificially. The natural recharge occurs through the process of infiltration where the water percolates from the surface to the bed of the aquifer. The study of this paper is to preserve or enhance groundwater. Rapid industrial development, urbanization and increase in agricultural production have led to increased groundwater withdrawals, has resulted in decreased natural recharge of aquifers. This has result in various issues related to quantity and quality of groundwater, the decrease water table levels and depletion of groundwater resources. due to variations in weather pattern and overexploitation of aquifers groundwater recharge has decreased and groundwater level has reduced . This paper discuss various methods of recharge of ground water.

***Key Words*:** Hydrological Cycle, recharge, infiltration, aquifers

1.INTRODUCTION

Groundwater is a term used by hydrologists to describe water in the saturation zone. The term "groundwater" is sometimes used to refer to the water in the partially saturated layers above the water table in agricultural lands drainage,or agronomy. In practice, all groundwater is a component of the hydrological cycle. However, a small amount of water from other sources may enter the cycle (e.g., magmatic water). The hydrological cycle describes the changes that occur when water moves from the atmosphere to the earth's surface and subsurface areas, and then back to the atmosphere. Surface water, soil moisture, and groundwater are all formed by precipitation. Groundwater returns to the surface, and all water from the surface returns to the atmosphere. Figure 3.1 shows hydrological (water) cycle involves precipitation, condensation, evaporation, runoff etc.

2. LITERATURE REVIEW

1 .Nature & effects of ground water

Community water supply, industrial manufacturing are among the most important uses of water extracted from the earth. Except in rare situations where it rises to the surface as springs. As a result, evaluations of ground-water quality are invariably based on factors that may minimize the suitability of drained groundwater for potability, agricultural, industrial use.

The proportion of these holes or spaces in the amount of given rock volume, which is known as the porosity, which determines the amount of water present in the rock. More pore spasms mean more porosity and water accumulation. (J. Chilton, 1996

2. Methods of replenish of ground water

Groundwater recharge happens both naturally and artificially. Natural recharge happens as water seeps through the texture over the aquifer's stratum through the process of infiltration. As a result, anthropological approaches have been used to complement the natural infiltration technique. To artificially refresh the ground water, a variety of techniques are used. The technique chosen is determined by the hydrological system of the region in question. The following aregeneral categories for the various methods:

Aside from the above approaches, conservational structures such as ground water dams, subsurface dykes, and other conservational structures are often used to stop the subsurface surge. Many other methods are being used to link the different fractures in hard rocky areas so that ground water can be supplemented. (Kavuri, et. al., 2011)

3.Artificial recharge methods

The method of restoring water to an aquifer by human effort is known as artificial recharge. Artificial aquifer recharge's key goal is to conserve water for later usage while also enhancing water quality. (Kavuri and colleagues, 2011)

Groundwater replenishment by artificial aquifer recharge is critical in India's dry and semi-dry areas. These methods have long been employed in developed continents, but they have only recently gained popularity in developing countries like India. (A. Bhattacharya, 2010)

4.Benefits of recharging to aquifers

Artificial recharge may benefit through the use of aquifers for water conservation and delivery, as well as the elimination of contaminants by natural cleansing processes that occur when contaminated rain and surface water enter the soil and percolate down through different geological formations. Recharging an aquifer will dramatically boost its long-term yield.Recharge methods are beneficial to the climate, particularly in arid areas.The majority of aquifer recharge systems are simple to use. (A. Bhattacharya, 2010)

3. METHODOLOGY

Groundwater recharge, also known as groundwater replenishment, is a natural process through which precipitation, runoff, and surface water flow infiltrate into the subsurface aquifer system.

Groundwater replenishment is determined by a number of physical, legal, and institutional factors i.e. water usage, recharge intensity, rechargeable land area, surface soil characteristics, hydrogeological and geochemical properties.

There are two methods of replenish groundwater:

Active recharge, and

In-lieu recharge.

Active recharge

Active recharge includes direct spreading recharge and aquifer injection.

Direct spreading

Direct spreading occurs as water ponded in percolation basins infiltrates

downwards into unconfined aquifers. Direct spreading in areas with highly permeable geologic materials would result in rapid, productive and cost- effective aquifer recharge. This type of recharge typically necessitates a significant amount of dedicated property.

Aquifer injection

Aquifer injection has the benefit of operating in a range of geologic environments even in limited portions as straight dispersion recharge is lesser in application never the less, thus the method is vulnerable to blockage, and well injection output necessitates some maintenance. As a result of maintaining adequate aquifer levels, it has a greater amount of energy demand.

In-Lieu recharge

In certain cases, recharge can be applicable as a substitute resource to consumers may otherwise consume ground-water, allowing ground-water to remain in-tact and growing the capability to rise in ground-water storage or for future application. Since they have the same effect on groundwater levels as supplying surface water, some agencies consider measures that reduce groundwater demand through water conservation or recycling to be in-lieu recharge.

AQUIFERS

Under normal field conditions, an aquifer is a geological structure that holds water and allows a large amount of water to flow through it. It's a porous, permeable, water-bearing geological body of rock that's usually limited to materials that can yield a significant amount of water. Gravel, lime stones, and sandstones, for example, form good aquifers when found in the right geological conditions and geographical location.

Types of Aquifer

1. Unconfined Aquifer
2. Confined Aquifer
3. Leaky Aquifer
4. Idealized Aquifer

RECHARGE OF AQUIFERS

1. Direct Methods
2. Indirect methods

4. CONCLUSION

1. Recharge is the replenishment of water to a ground water system from the ground surface.it can be occurs naturally or artificially.
2. An aquifer is a geological formation that contains water and permits significant quantity of water to move through it under ordinary field condition. It is a porous, permeable, water bearing geological body of rock generally restricted to material capable of yielding an appreciable to amount of water
3. Ground water recovered from aquifers recharged with waters of impaired quality has been used for various purposes such as Irrigation etc.

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