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A Review Paper on Groundwater Recharge by Utilizing Waste Water from Residential Area

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Abstract - *Artificial recharge of groundwater exploitation treated effluent continues to rise, significantly in arid and semi-arid countries. Artificial recharge as a method to reinforce the natural provide of groundwater aquifers is turning into more and more necessary in groundwater management. The primary aim of this study is to coming up with and planning of artificial recharge structures for residential area. Basic operational water demand is calculable to quantify the water to be recharged for a balanced and property water recharge cycle. The study estimated the degree of generated waste water yet as rain runoff water and from the residential area. The rate of natural well water recharge, rain runoff and total treated effluent out there for recharge is calculable as further or various method of recharge of ground water. From the source it is found that a confined aquifer is goes decreasingly up to 4m to 8m from there natural level. The soil strata below the aquifer were impervious. So recharging below impervious layer is impossible so that we have to recharge treated water in pervious layer. That is within aquifer so that treating this water within rapid sand filter and sends it to the aquifer. The primary objective of this technology is enhance groundwater resources in arid and semi arid area in country.*

1. INTRODUCTION

Artificial Recharge Technique could be a method of replenishing ground water by Surface and Sub-Surface ways. It is necessary that groundwater ought to be recharged naturally or artificially in proportion to the quantum of depletion. As artificial recharge has improved method, managers have begun to look for extra sources of recharged water artificially. In this context recharge of groundwater table using waste water from residential area is one of the best method. Different type of method have been employed all over the word can briefly classified into two categories that is surface and sub surface ground water recharge. In surface method available water is spread on open area to let them percolate sub-surface reservoir. In sub-surface method artificially we bore hole or well and recharge the ground water. Our project is based on sub-surface recharge of ground water by treating waste water from the residential area. Groundwater is the main source of both drinking and irrigation water. India is the largest user of ground water table in the world. It use about 230 cubic kilometers of ground water per year. It is equal to the 1 quarter of the global. India used 60% of their irrigated agriculture water and 80% of their drinking water from the ground water from a report of World Bank it said up to 2022 the ground water table in 22 cities in India is goes to their critical condition. If the over exploitation of groundwater is continue then the whole country will suffering from water scarcity. In India the total number of bore wells and wells is around Twenty Seven million which consumed 50% of groundwater. To solve this problem we create our model. In this model we use water from residential area to increase the ground water table. We use waste water from residential area, this water transfer to cylinder in which sedimentation and floating of oil on surface of water is takes place. By giving some treatment we remove the oil and then we transfer this water to the rapid sand filter in which water is purified upto some level then, this water is send to well and from well it transfer to the ground water table. The applications of this project are land subsidence, preserve of ground water resource in part of India, reduction in wastage of waste water from residential area. Nagpur city, one of the major metropolitan cities in India, is situated at the centre of the India. Nagpur is inhabited by more than 2.5 million people in an area of 227 Sq.km. Water supply for this population is maintained by augmenting a combination of surface storage reservoirs and aquifers. Nagpur municipal corporation (NMC) is responsible for water supply and sewerage services in the Nagpur Metropolitan Area. The preset study is initiated by considering reuse of waste water to recharge the aquifer for augmentation of groundwater which is a viable option rather than demanding the additional sources.

Chart 1- ground water source in Nagpur district

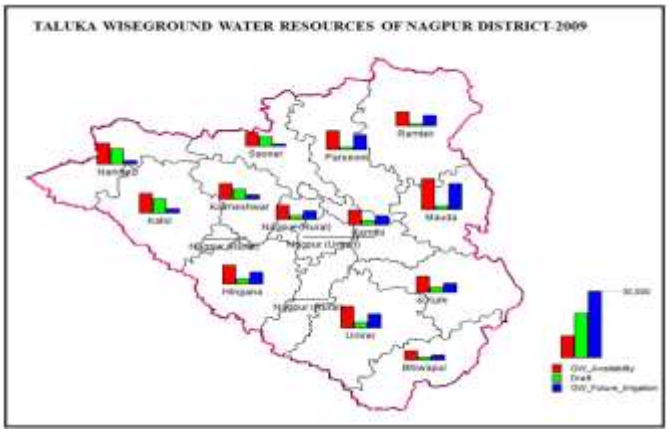

Table-1: Classification of Ground Water Samples for Drinking based on BIS Drinking Water Standards (IS-10500-91, Revised 2003)

Para m-eters	D L	MPL	Samples with conc. < DL	Samples with conc. in DL- MPL	Sam ples with conc . >MP L
TA (mg/ L)	200	600	22	14	-
TH (mg/ L)	300	600	24	9	3
NO3 (mg/ L)	45	No relaxa tion	22	-	14
F (mg/ L)	1.0	1.5	35	-	-

Table-2: classification of ground water for irrigation based on EC

Type	EC	No. of sample	% of samples
Low salinity water	<250	Nil 2	Nil
Medium salinity water	250-750	24	67
High salinity water	750-2250	10	28
Very high salinity water	>2250	2	5
Total		**36**	**100.0**

2. Experimental procedure

2.1Collection of waste water

Collecting waste water from residential area is the first step of project in which we provide screener in pipe line to remove big particle.

2.2 Sedimentation and removing of oil

Collected water allow to settle in tank to remove suspended particle.

When water is settle the oil will float on the surface of water as the density of oil is less than density of water.

2.3 Rapid sand filter

Settle water is transfer to rapid sand filter in which purification of water is takes place and water percolate to ground.

3. Literature review

3.1 Debu Mukherjee (2016), he worked on **'Artificial ground water recharge in India'** ground water recharge occurs both naturally and artificially through the process of infiltration where the water percolates from the surface to the bed of the aquifer. He gave the different methodology for ground water recharge. Some of the method of artificial recharge as **surface spreading technique, flooding, ditches and furrows, recharge basin, gully plug.** by this technique we increase ground water.

3.2 S. Packialakshmi, S. Balaji and T.kumaresan (2015), they work on **'Inducing Recharge of Groundwater by Treated Waste Water – A pilot Study in Southern Chennai Metropolitan Area'** He select an area in Chennai city (Sirucheri) he design a structure for the treatment of waste water and recharging the ground artificially. The soil characteristics of study area is clay from ground level to a depth of 4 to 8 meter and the infiltration capacity of clay soil in study is very low.

4. CONCLUSION

Artificial ground water recharge by utilizing waste water from residential area is quite helpful to increase in amount of ground water. As we remove the oil from the water secondarily we use grease. By reusing waste water increase in ground water. We use Rapid sand filter for treatment of waste water in which different type of soil layer are in addition to which we use charcoal as organic matter remover. Thickness of layer is according to the waste coming from that area and the treated water directly transfer to the well as the well is directly connected to the ground water table. In this manner we increase ground water table in the area where the ground water goes to their critical level.

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