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UNDERGROUND WATER RECHARGING BY WASTE TUBE WELLS CASING PIPE OF INDIA MARK 2ND HAND PUMP

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ABSTRACT

Nature established a balance between rainfall and sources (surface and subsurface) of water. Due to over exploitation of ground water sources the balance between ground water storage and its recharging is getting continuously disturbed. So in order to enhance this balance a number of researcheswere conducted by manyinvestigators. A method of rainwater harvesting technique is invented at an optimal cost in this research. A filter media is attached with a tube well casing pipe through which clean rain water can pass through. India mark 2nd hand pump tube well casing pipe is utilized in this research as a Ground water recharging source, which is left stay in the ground after the re-boring of the hand pump and become useless.

Keywords:Casing pipe,India mark 2nd hand pump,Rainwater harvesting,Re-boring, Tube well

I.INTRODUCTION

We are living in 21st century. The modern, develop era of science. But in the name of development and industrialization weare damaging nature's gift, covering earth surface with concrete structures, multistory building construction, and many more. Water is our one of the basic need of life next to the Air, without which we can't think about our life. Potable water can be found by 3 resources:

(1.) Rain fall (2.) Surface water sources (SWS)(3.) Ground water sources (GWS).

Infiltration of rainwater through porous media of soil converts it into the ground water, the excess of water flows on the surface. Thus nature established a balance between all of them, but due to over exploitation of GWS, and prevention of infiltration by impermeable concrete cover,this equilibrium gets disturbed. We are the responsible for this so we have to take an initiative to maintain this equilibrium. India mark 2nd Hand Pumps (IM 2nd HP) are most common means of getting potable water from GWS which are installed by Uttar Pradesh Jal Nigam (UPJN). When water comes out along with sand from the IM 2nd HPthen it became necessary to change the tube well casing because after a certain time boring get choked by sand and water problem may arise. Every year about 10% of IM 2nd HP is getting re-bored. In this process plastic pipe casing of 110× 63mm diameter are left in the ground for the sake of nature and economy our basic intension is to utilize these wasted tube wells casing as a ground water recharge tube wells resource.

II.INTENTIONS OF THE PROJECT

1. To utilize theuseless tube well casing of an India mark 2nd hand pump for the enhancement of natural resources.
2. Ground water recharging system in Cost effective manner.
3. To reduce water logging problems during rainfall season.
4. To solve potable water problem at a certain level.

III.MATERIAL USED

1. Nylon mesh
2. Charcoal (in smaller crushed size).
3. Uniformly graded Aggregate(6.3mm in size).
4. 53-PPC (Cement) as perIS: 1489-1991(Part 1 and 2).
5. Permeable concrete
6. Tube well of India mark 2nd hand pump (according to UP Jal Nigam).

3.1 Properties of Cement used for permeable concrete

S. No	Property	Expected value	Observed value
1.	Fineness test	<5%	2.43%
2.	Consistency test	30-38%	31%
3.	Initial setting time test	30 min	34 min
4.	Final setting time test	600 min	555 min
5.	Soundness test	<10 mm	2.3 mm
6.	Compressive strength test	>43 N/mm^2	54.2 N/mm^2

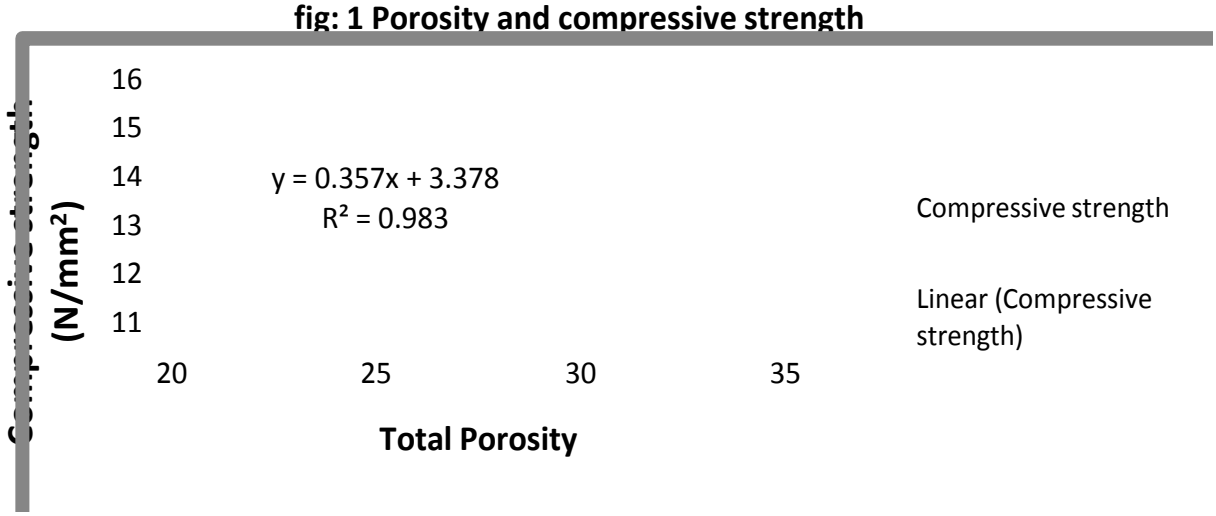
3.2 Properties of uniform aggregate

S. No.	Property	Expected value	Observed value
1.	Uniform size	<12.5 mm	6.3mm
2.	Sp.gr.	2.5 to 3.0	2.62
3.	Water absorption	<6%	0.5%

3.3 Property of permeable concrete

S. No.	Property	Observed value
1.	w/c ratio	0.32
2.	Porosity	26.58

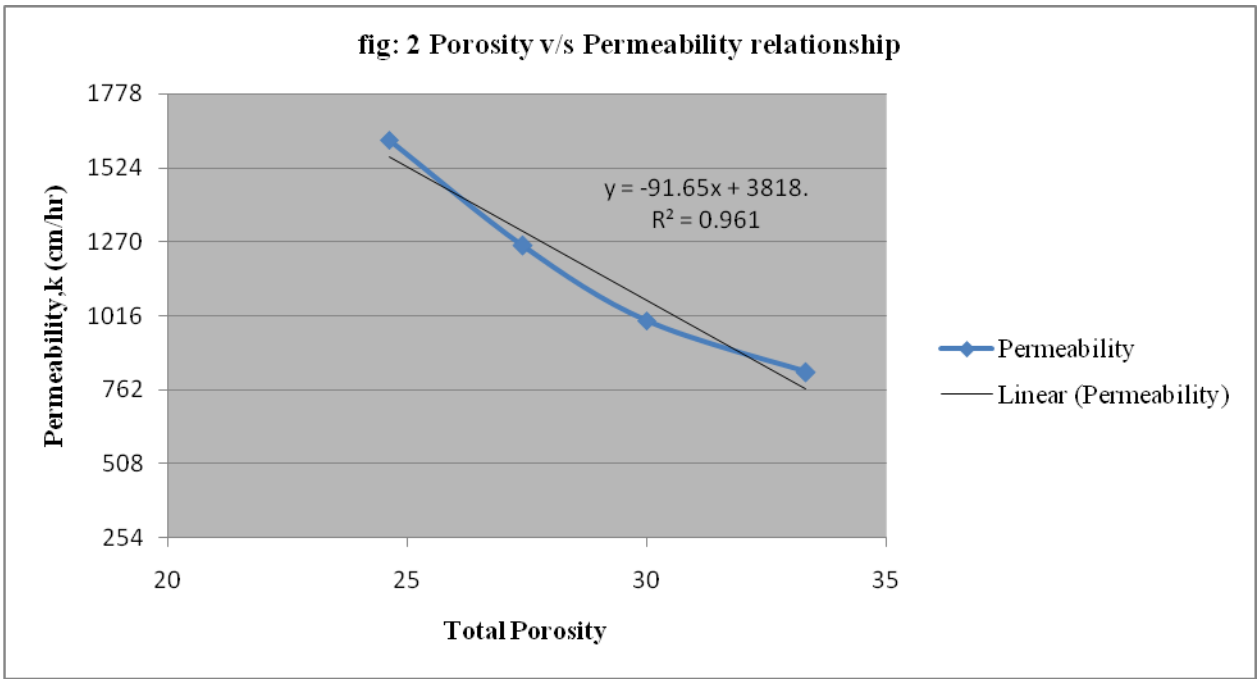
fig: 1 Porosity and compressive strength



3.4 Total porosity v/s compressive strength relationship

S. No.	Total Porosity	Compressive strength
1	24.63	12.35
2	27.42	13
3	30	14
4	33.33	15.42

fig: 2 Porosity v/s Permeability relationship



3.5 Total porosity v/s permeability relationship

S. No.	Total Porosity	Permeability, k (cm/hr)
1	24.63	1620.6
2	27.42	1257.62
3	30	99.5
4	33.33	822.34

IV.METHOD OF CONSTRUCTION OF FILTER

The filter media is designed in such that this can be able to prevent the floating particles to get into the tube well resulting more clear water can be able to get access the groundwater resources. Filter media consists of a setup of Permeable Concrete, Nylon mesh And charcoal as shown in figure 3.

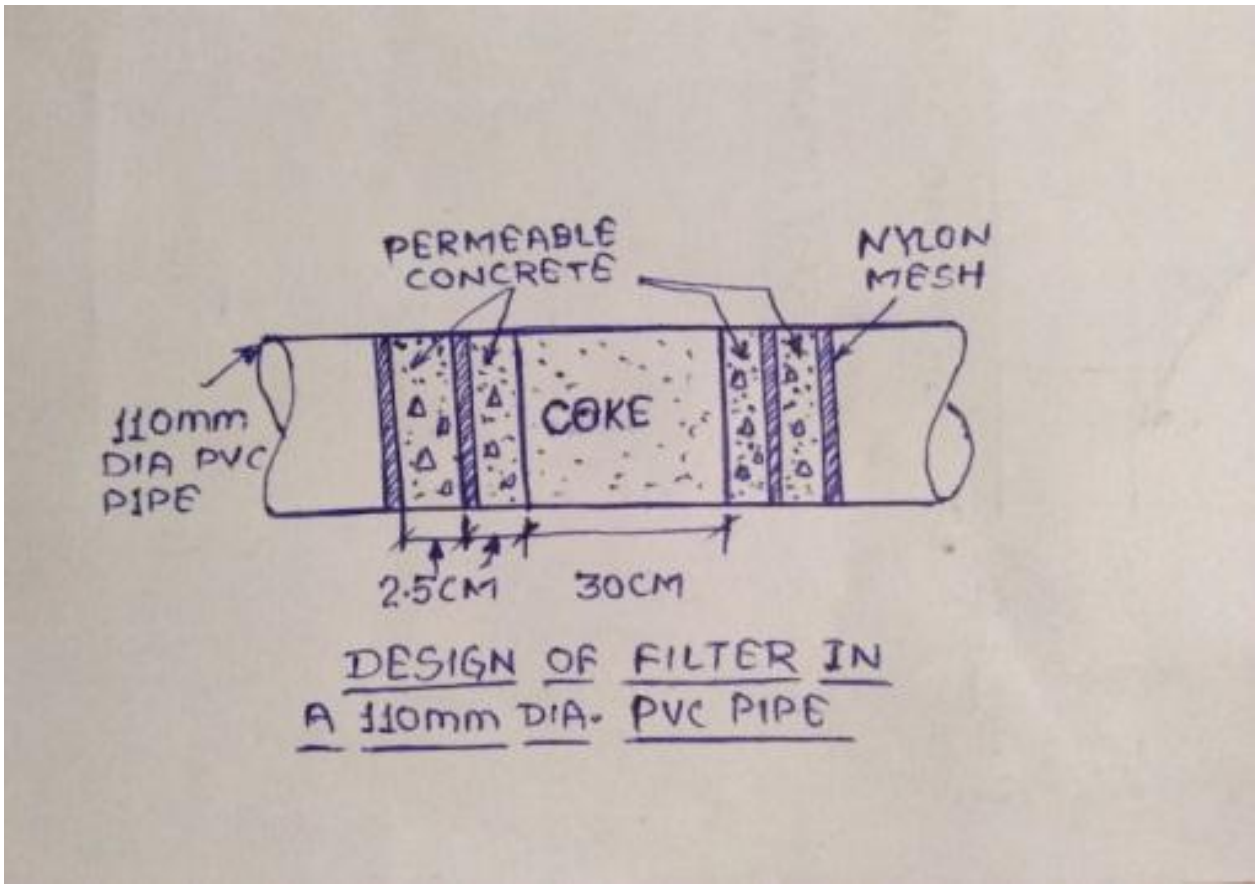


Fig: 3 Design of filter

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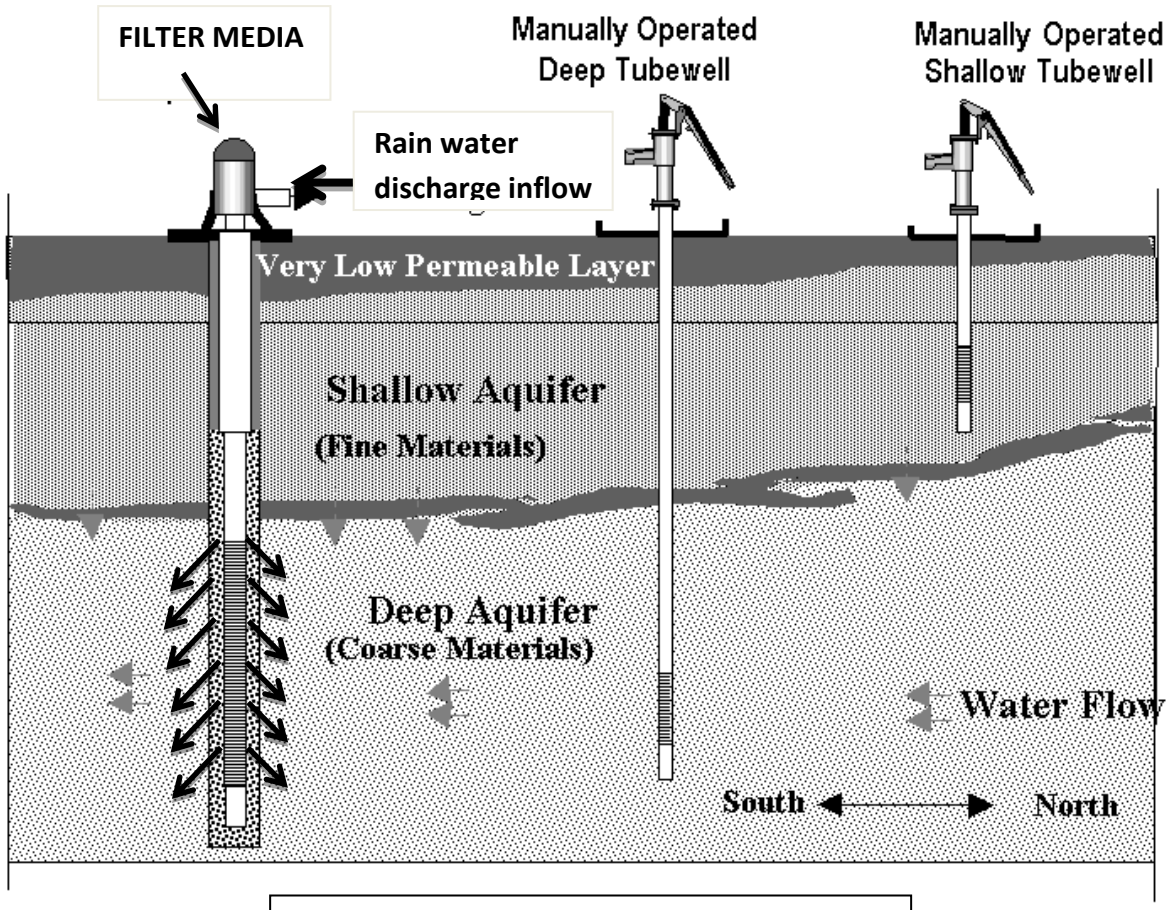

Fig: 5installation of filter to tube well casing

V.METHOD OF INSTALLING

All the concrete covering areas which are in the direct contact of rain are connected together by means of conduit in such a way that the rainwater can be collected at a single point where the filter is to be installed. The outlet is connected to the tube well so that filtered water can go into the tube well without being contaminated.

VI.CONCLUSION

Nature provides human very beautiful gifts butit's over exploitation caused by manmade activities without thinking about its worst effect. This project helps in following manner

1. To utilize the wasted tube wells casing of IM 2nd HP.
2. To solve water problem at a certain level.
3. To recharge ground water sources andpredominantly maintain equilibrium of Underground water resources.

4. Optimal utilization of materials by reducing the tube well casing waste which is useless earlier after re-boring of the hand pump.

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