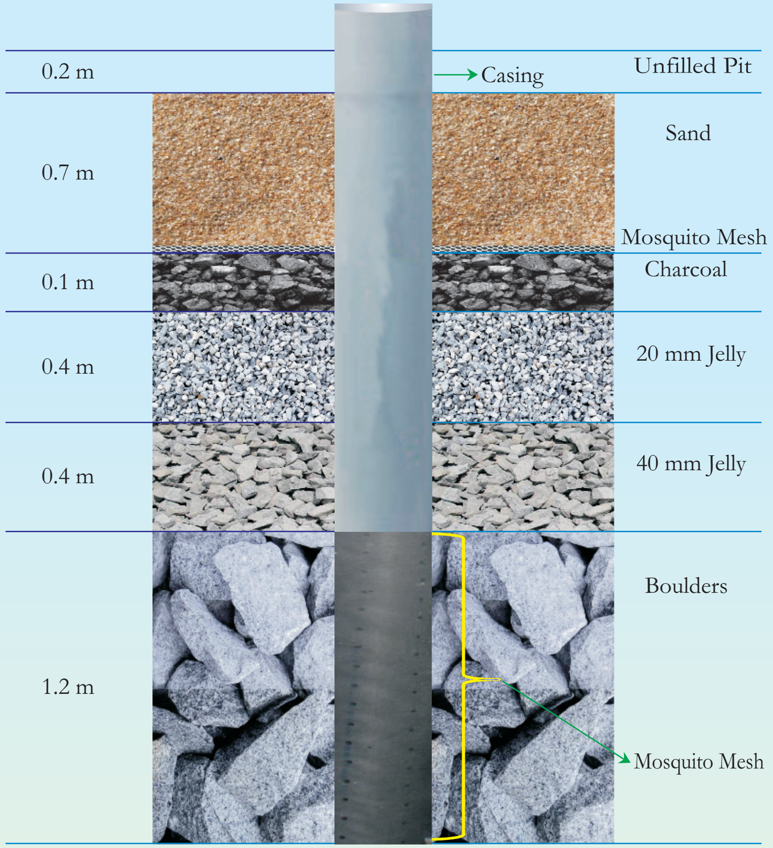


Pictorial view of different layers of bore well recharge

Cost involved for bore well recharging

Description	Amount (Rs.)
Excavation charges	4,000=00
Nylon mesh	1,500=00
Big boulder (11.08 m^3)	8,000=00
40 mm jelly (3.69 m^3)	3,000=00
20 mm jelly (3.69 m^3)	5,000=00
Charcoal	2,500=00
Sand	7,000=00
Labour charges	4,000=00
Miscellaneous	1,000=00
Total	36,000=00

Advantages

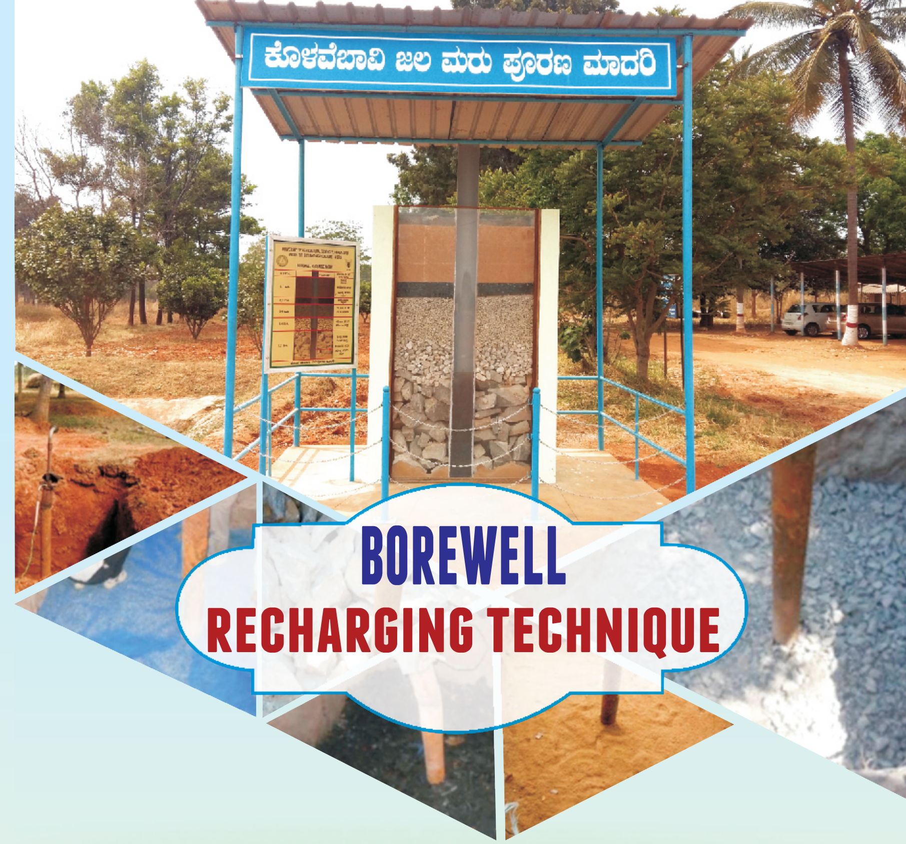
- Replenishes ground water
- Boon for agriculture
- Eco-friendly
- Low cost
- Long lasting effect
- Helps in regulating soil temperature

A demonstration on bore well recharging of a depleted bore well was carried out in Hosapalya village of Nelamangala taluk, Bangalore rural district. After a period of two years, it was observed that the runoff water diverted from the catchment area to recharge pits of the defunct bore well resulted in discharging water @ 9.7 l sec^{-1}. The incremental discharge rate was greater during advancement of monsoon and lower towards cessation of monsoon. The results of the demonstration is presented in the table below.

Impact of bore well recharge on water discharge from recharged bore well

Month	Mean of two years	
	Rainfall (mm)	Yield (l/sec)
Jan	0	7.6
Feb	0	7.9
March	9.00	7.1
April	27.25	7.7
May	81.20	7.4
June	101.00	11.6
July	88.90	9.6
Aug	94.70	11.4
Sept	95.20	13.1
Oct	242.10	12.4
Nov	31.80	11.8
Dec	0.50	9.6
Average		9.7

The water quality of recharged bore well indicated no differences with the control.



BOREWELL RECHARGING TECHNIQUE

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2019

Borewell Recharging Technique

Water crisis as a result of climate change though altered annual rainfall and river flow regimes, affected the groundwater recharge rate. Prevention of stress on ground water can be made possible by way of recharging the ground water through scientific watershed management. Techniques in order to augment the depleting ground water resources, it is essential to conserve and recharge the surplus monsoon runoff that flows into the sea. The depletion of ground water on one side and its quality deterioration on the other side are equally vexing. Pollution of ground water due to external contaminants produced by industrial, urban and agricultural activities is quite well documented. Overexploitation of ground water can lead to lowering of ground water levels besides increasing total dissolved solids (TDS). A major problem encountered in developing ground water resources in hard rock areas is the sharply declining ground water levels leading to the formation of over-exploited pockets.

Bore wells drilled in hard rocks often become unproductive as the weathered / partly weathered rocks as well as the shallow water bearing fracture zones progressively become desaturated. In such areas, bore wells are drilled too deeper over the years with the hope of encountering deep fracture zones leading to mining of ground water, since there is no replenishment of the deep fracture zones taking place. In order to counter the over-exploitation of hard rock aquifers, the concept of rainwater harvesting and artificial recharge to the ground water system has lately caught the attention of technocrats dealing with water resources as well as by the public. It is well known that artificial recharging of aquifers has in many cases resulted in a remarkable recovery of ground water levels locally in the vicinity of artificial recharging structures, at least in the first few years of their construction. Artificial recharging is becoming increasingly necessary to ensure sustainable groundwater supplies to satisfy the needs of growing population. The important advantages of artificial recharge are subsurface storage at no cost, negligible evaporation losses and higher biological purity with minimum temperature variations. The rain water harvesting and recharging of bore well by using runoff water is gaining importance under dryland areas because of reduced rainfall, increased intensity and depleted ground water level. In order to rejuvenate the defunct/ low yielding bore well, they are treated with runoff filtration beds to enhance the ground water level and improve the water yield. Selecting suitable filter layer for recharge is most important for successful implementation. It needs a due consideration of intake capacity and ability to transmit water in to the groundwater zone.

Materials Required

Nylon mesh	20 mm baby jelly stones
Stones/boulders	Charcoal
40 mm jelly stones	Sand

Design aspects of filter bed for recharging bore well

A pit of 3 m x 3 m x 3 m to be excavated in the region centring the casing of bore well

↓

Filter holes are made on casing pipe up to 1 m from base and mosquito mesh / nylon mesh wrapped tightly

↓

First layer of pit filled with big sized boulders from base up to 1.2 m depth accounting 10.8 m^3 volume

↓

Second layer filled with 40 mm jelly 0.4 m accounting 3.6 m^3 volume

↓

Third layer filled with 20 mm jelly of 0.4 m accounting 3.6 m^3 volume

↓

Fourth layer, spread nylon mesh and fill charcoal to 0.1 m depth accounting 0.9 m^3

↓

Fifth layer fill with sand to 0.7 m depth accounting 6.3 m^3

↓

Remaining space (0.2 m) left unfilled for ponding water

Process

1. Physical filtration

The physical impurities such as silt, inert materials viz., straw, leaf litter, grasses etc from the runoff water will be tapped by the sand layer, which is replaced once in 1-2 years depending on the inert load.

2. Chemical / Biological filtration

The chemical impurities and biological load viz,, micro-organisms are take care by the charcoal layer.

3. Suction

The different sized stones viz., 20 mm jelly, 40 mm jelly and boulders help to create suction to flow of water into the casing pipe.