



Small innovations, big impact

Making drinking Water available to parched villages

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Working Together to Empower Rural India



“SUSTAINABLE DEVELOPMENT by its nature is a work in progress...”

Suri Sehgal

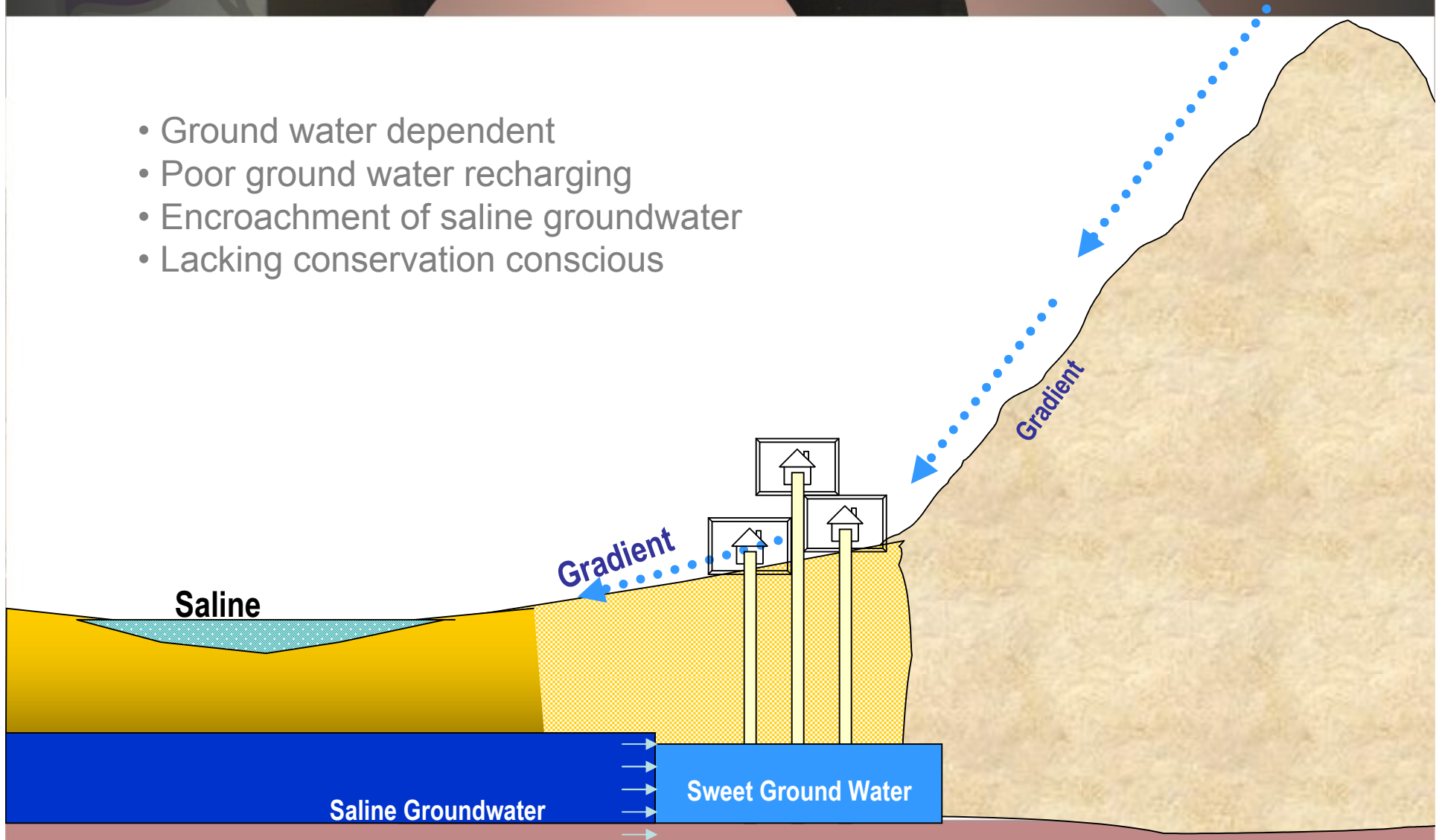
Institute Of Rural Research & Development

(An initiative of S M Sehgal Foundation)



Mewat: Ground conditions

- Ground water dependent
- Poor ground water recharging
- Encroachment of saline groundwater
- Lacking conservation conscious





Karhera, the saline village

District Mewat:

Out of 503 only 63 villages have fresh ground water

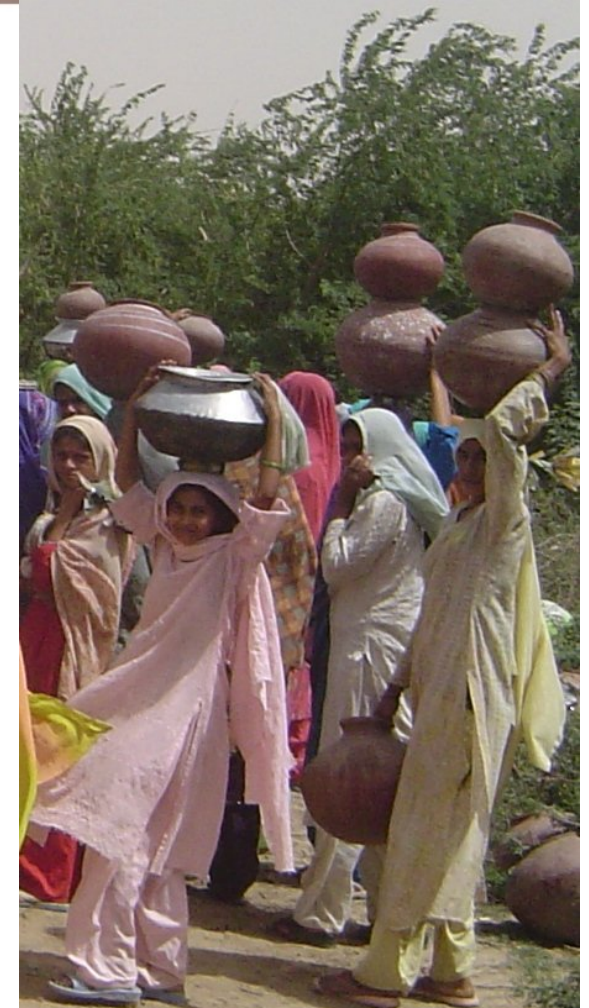
- Ground water : The only source of water

Village: Karhera

- Highly Saline Ground Water (TDS - 30,000) at 7' depth
- Dependent on unreliable Public Water Supply from Ghagas

Village: Ghagas

- Supplying water to other 8 villages
- Ground water depleting fast
- Community resisting water sharing



Need To create Potable Water Locally in each village



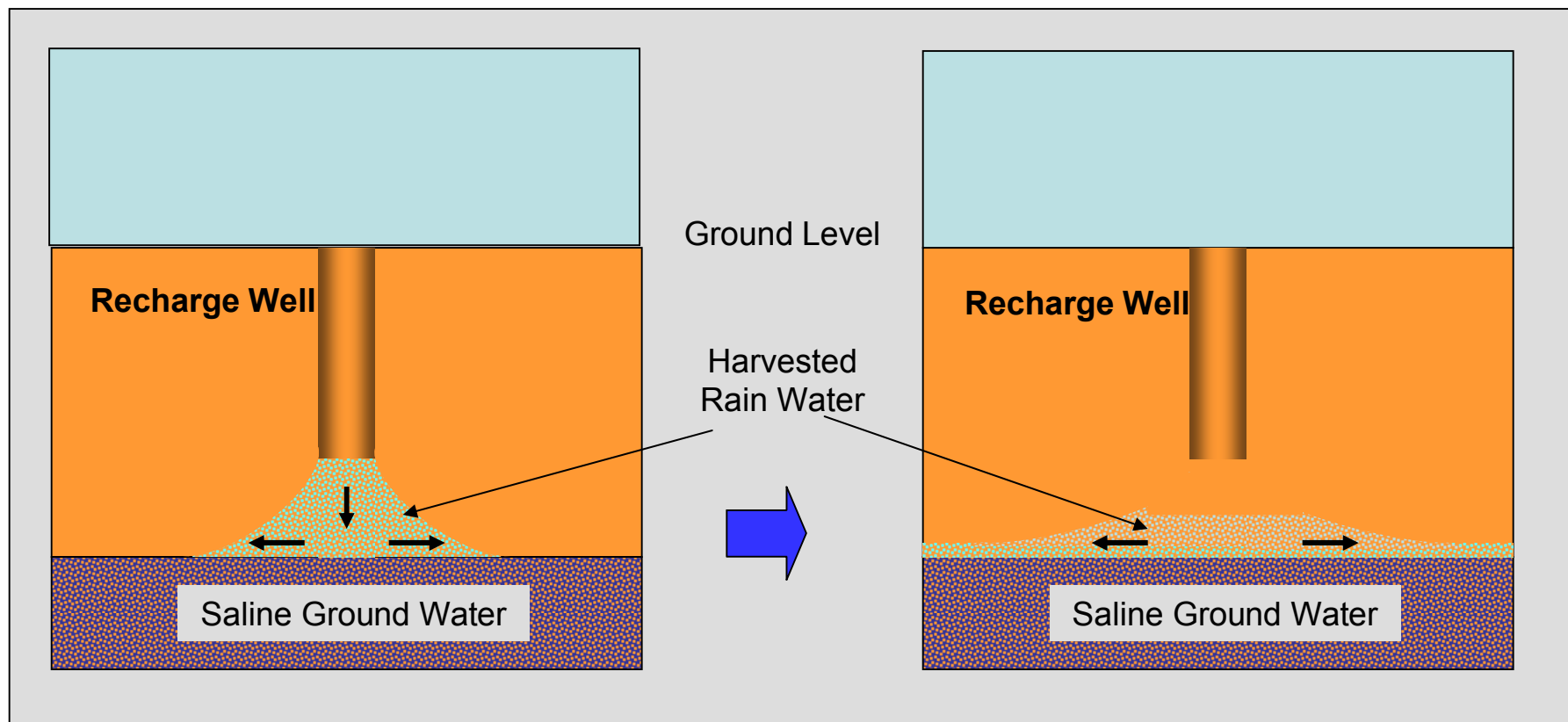
Technology selection

OPTIONS	Saline Ground Water		Harvested Rain Water	
Technology	RO System	Solar Desalination	Storage	Recharging
Limitations	<ul style="list-style-type: none">•High TDS•Energy•Cost•Low Recovery•Waste Disposal	<ul style="list-style-type: none">•Low Productivity•Sun dependent•Inconsistent•Need Space	<ul style="list-style-type: none">•High cost•Need Space•Contamination	<ul style="list-style-type: none">•High Salinity
				Going ahead



Rain Water Spreading over Saline Water

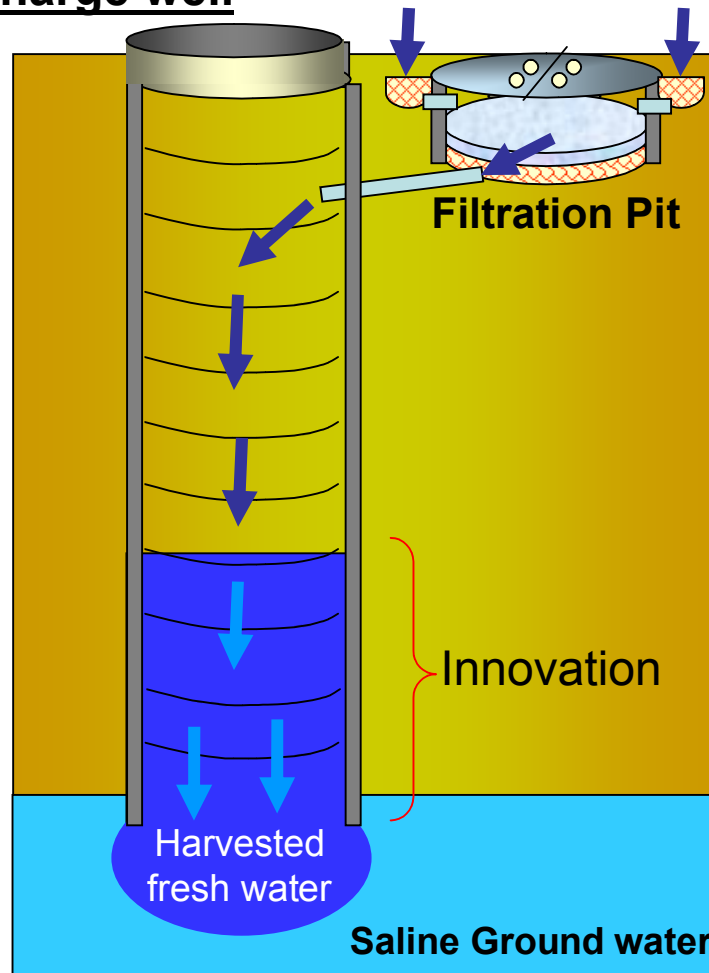
Fresh Water does not remain consolidated but spreads out requiring an innovative solution.





Small Innovation, Big impact

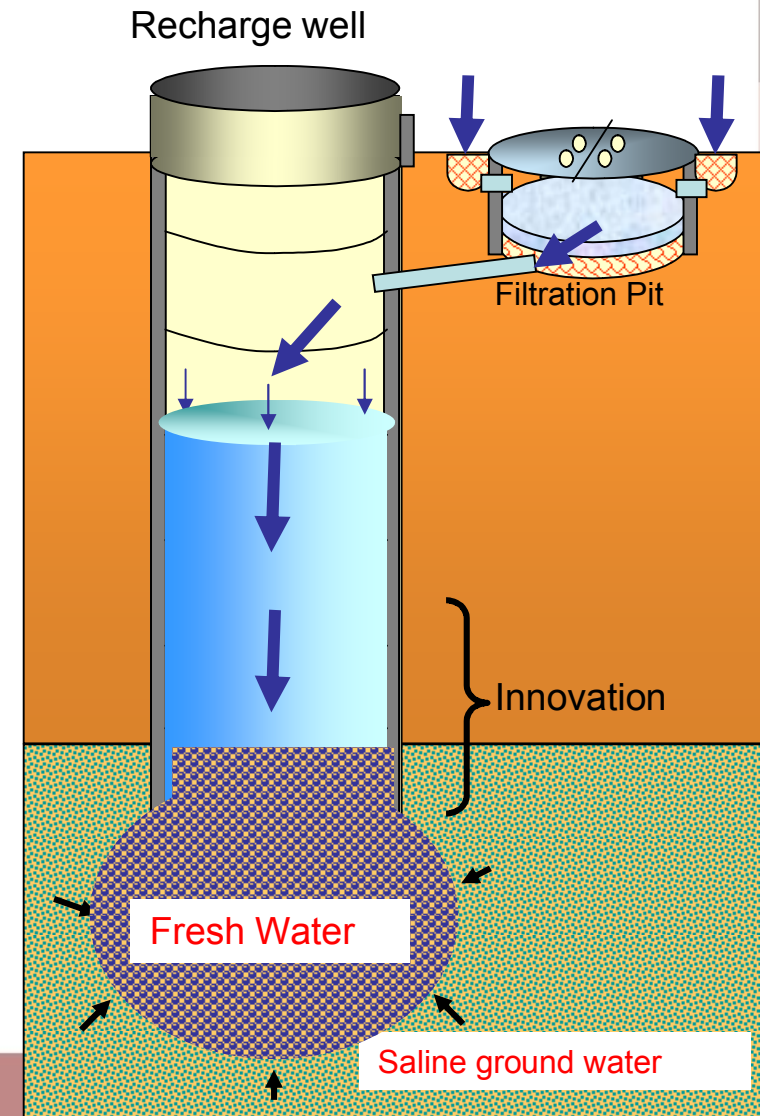
Recharge well





How the innovation works?

- **Density** of harvested rain water is lower than the saline ground water.
- **Overburden pressure** pushes the saline water down.
- Flow under the ground through soil voids is a **stream-line flow**.
- First rush of water into the void spaces **flushes** the Voids.
- **Buoyant force** from surrounding saline ground water keeps pocket intact.
- **Limited Brownian motion** within void spaces avoids further mixing.
- Cut off from light and air **prevents growth** of pathogens.





Karheda School had no water since 20 years!

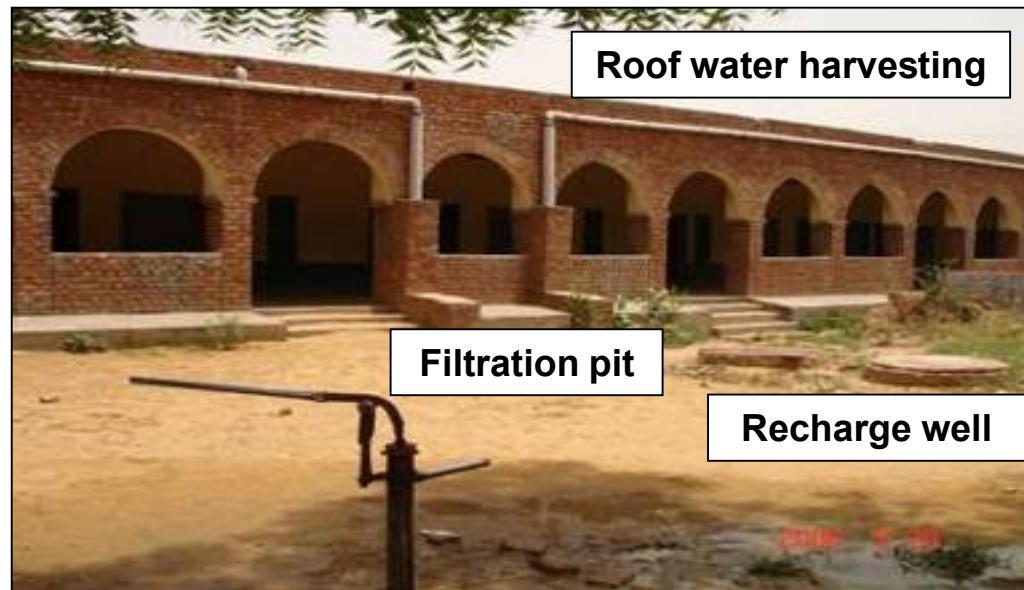
Water requirement : 1lac liter / yr

- Drinking water : 200 liter / day
- Mid day Meals : 120 liter / day
- Sanitation & Others : 180 liter / day

Roof water harvesting

- Roof Area : 300 Sq m
- Annual rainfall : 500 mm
- Estimated Harvest : **1,27,500 liters / yr**

Now, Karheda school has water round the year





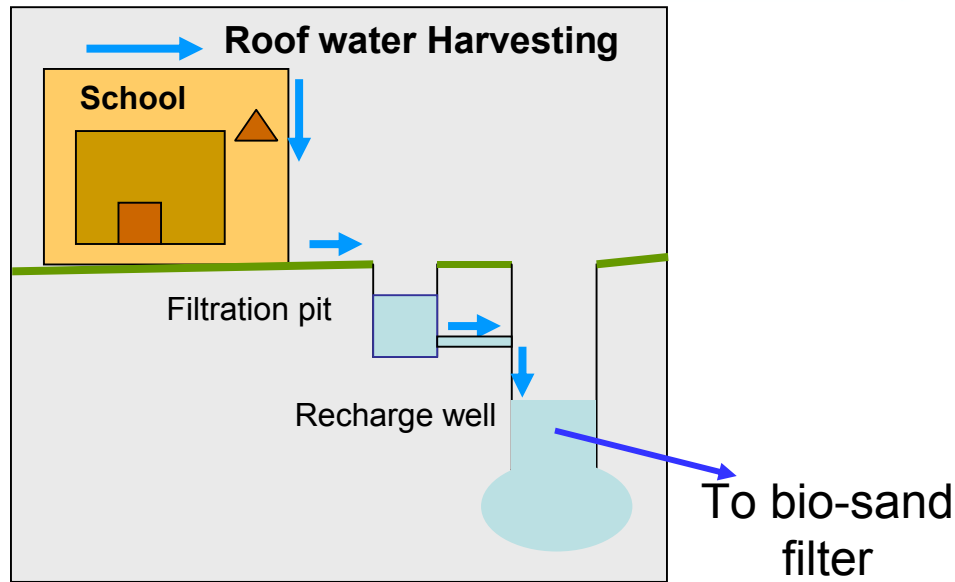
Water analysis at Karheda School

S. No.	Characteristics	Unit	Desirable Limits	Saline Ground Water	Public Supply Water	Recharge well Water
1	pH value		6.5 to 8.5	7.4	8	7.0
2	Total Hardness	mg/l	300	7702	400	95
3	Iron	mg/l	0.3	0.6	1	0.02
4	Chlorides	mg/l	250	9792	269	39
5	Fluoride	mg/l	1.0	2.5	1.5	0.3
6	Dissolved Solids	mg/l	500	30230	710	201
7	Magnesium	mg/l	30	1273	29	6
8	Calcium	mg/l	75	958	111	28
9	Sulphate	mg/l	200	6972	61	51
10	Nitrate	mg/l	45	1626	135	4
11	Cadmium	mg/l	0.01	0.07	<0.01	<0.01
12	Lead	mg/l	0.05	0.4	<0.01	<0.01
13	Alkalinity	mg/l	200	353	190	51
14	MPN Coliform	/100 ml	10	7	278	900

Recharge well water is free from chemical contaminants but has pathogens

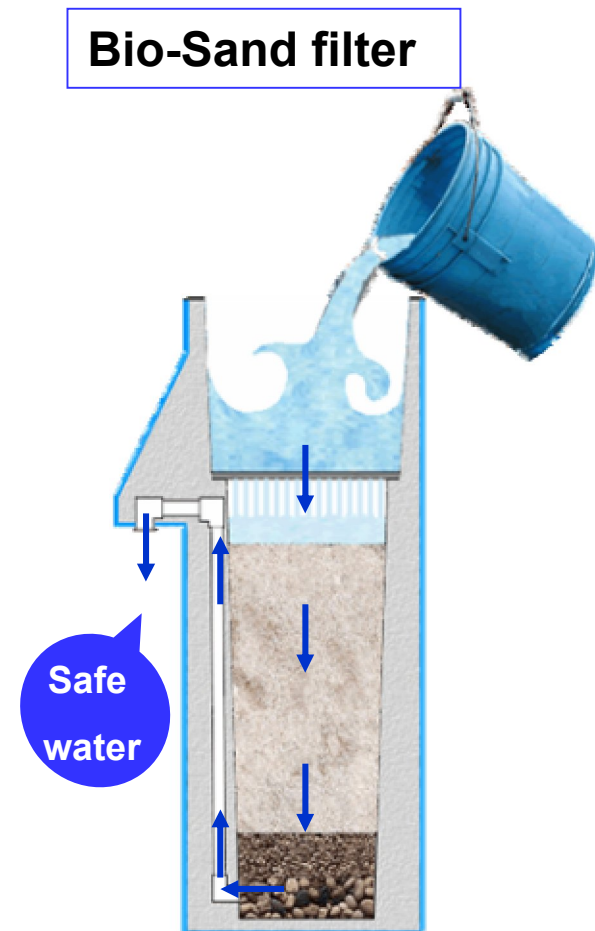


Safe Drinking Water was not a norm for villagers



Bio-Sand filter

- Adapted from CWAST Canada
- Removes:
 - 90% of fecal coliform
 - 100% of protozoa and helminths
 - suspended sediments
- Low cost





Having technology is not enough!



“Jal Chetna Yatra”(Water Literacy Campaign)



Water Literacy through street plays



Demonstrating technologies



Community discussing water project blueprint



Small innovations, big impact

The story of bringing water to Karheda school may sound like a small case study, but it is replicable, and has been replicated in 20 villages of Mewat.

70% of the poor live in villages, so scale up of rural development is the crux. We appeal to you and your organization to “adopt a village”, a program or a part of a program in rural development, in which Sehgal Foundation would be glad to assist you.

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