Lake 2014

Analysis of physicochemical parameters of drinking, borewell and Cauvery water around Vagdevi Vilas School, Marathahalli, Bangalore

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Introduction

- Ground water is the major source of drinking water in both urban and rural areas.
- An urban citizen requires over 100l of water everyday for the daily chores.
- Bangalore (population over 9 million), gets its water supply from borewells (1.75lakh in number) and the rivers (Cauvery, Arkavathy, Hemavathy, Shimsha).
- To support the needs of the population, the city requires over 900 million litres of water everyday!

Objective

- The prime objective of this study is to analyse the various physical and chemical parameters of the water (borewells and Cauvery) in our school and from the surrounding areas.
- We at school use this water for all our daily needs. This water is filtered (RO technology) and used for drinking.
- Few of the nearby residents directly use this water without any purification or alteration.
- Our study would indicate if this water is fit to be used for drinking and other household chores.

Materials and methods

Study area

The sample sites are within 2Km from each other.

Sample Sites	Co-ordinates
Cauvery Water	12°57’17.73”N; 77°42’34.29”E
VVSM Borewell	12°56’36.45”N; 77°42’36.62”E
VVSM Filter	12°56’37.10”N; 77°42’35.04”E
Munnelokalu Borewell	12°57’17.73”N; 77°42’34.30”E

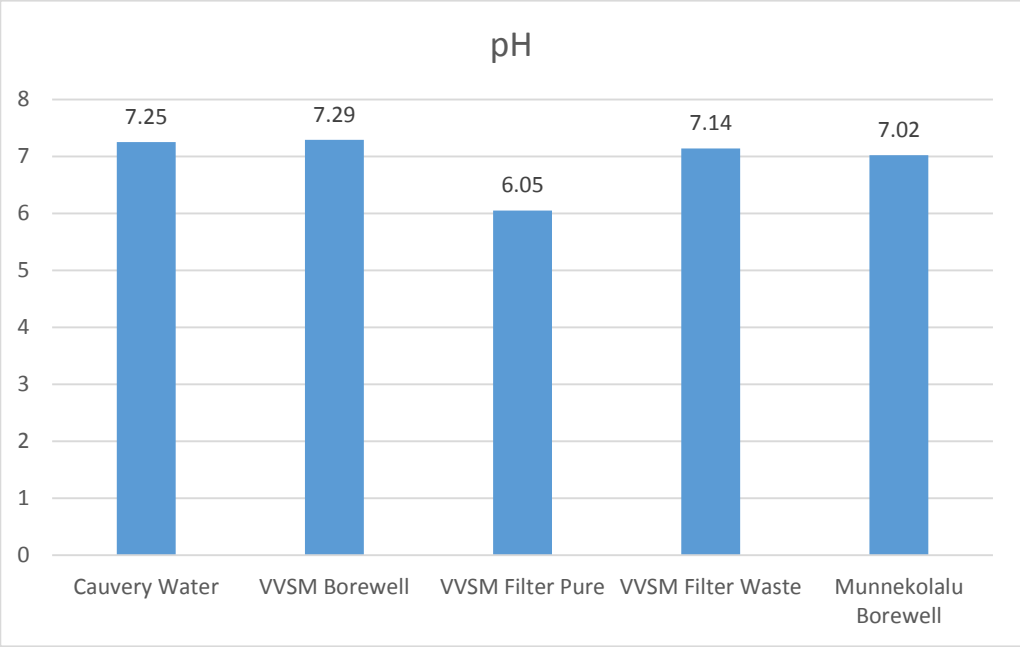
Water sample collection and analysis

- Water samples from 5 different sites were collected.

- The pH, EC, TDS were tested onsite. Free CO2, DO, Total Hardness, Chlorides, Ca and Mg Hardness, Na, K, Phosphates, Nitrates, COD and BOD were analysed using standard methods.

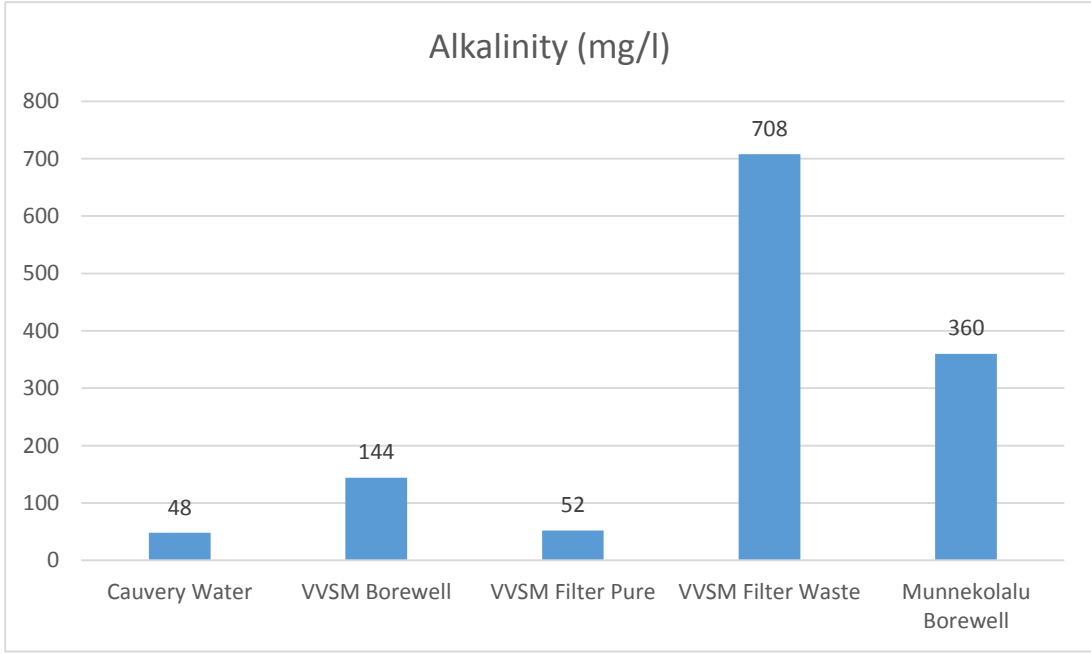
pH

- BIS (drinking water), 6.5 < pH < 8.5
- If pH < 6.5, corrosion of pipes occur, thus releasing toxic metals.
- Higher pH values induce scale formation in water heating apparatus and also reduce the germicidal potential of Chlorine.



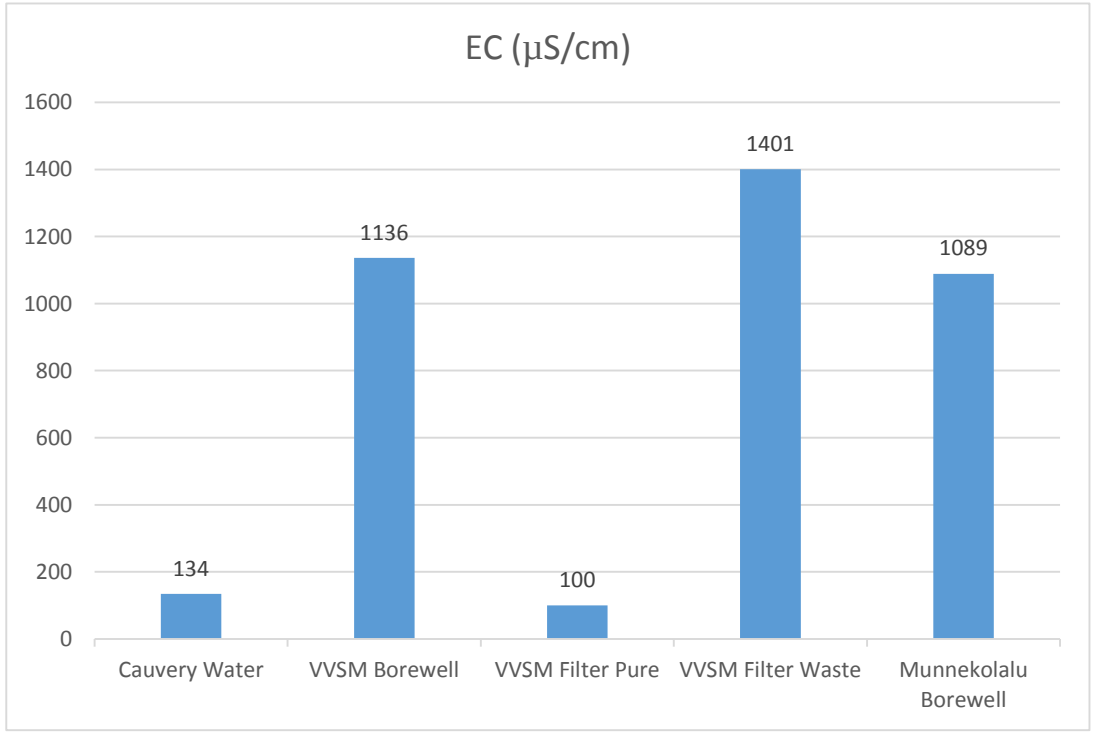
Alkalinity

- BIS (drinking water) limit is 200mg/l.
- In healthy natural waters, alkalinity is more common than acidity.
- High alkalinity imparts an unpleasant taste.



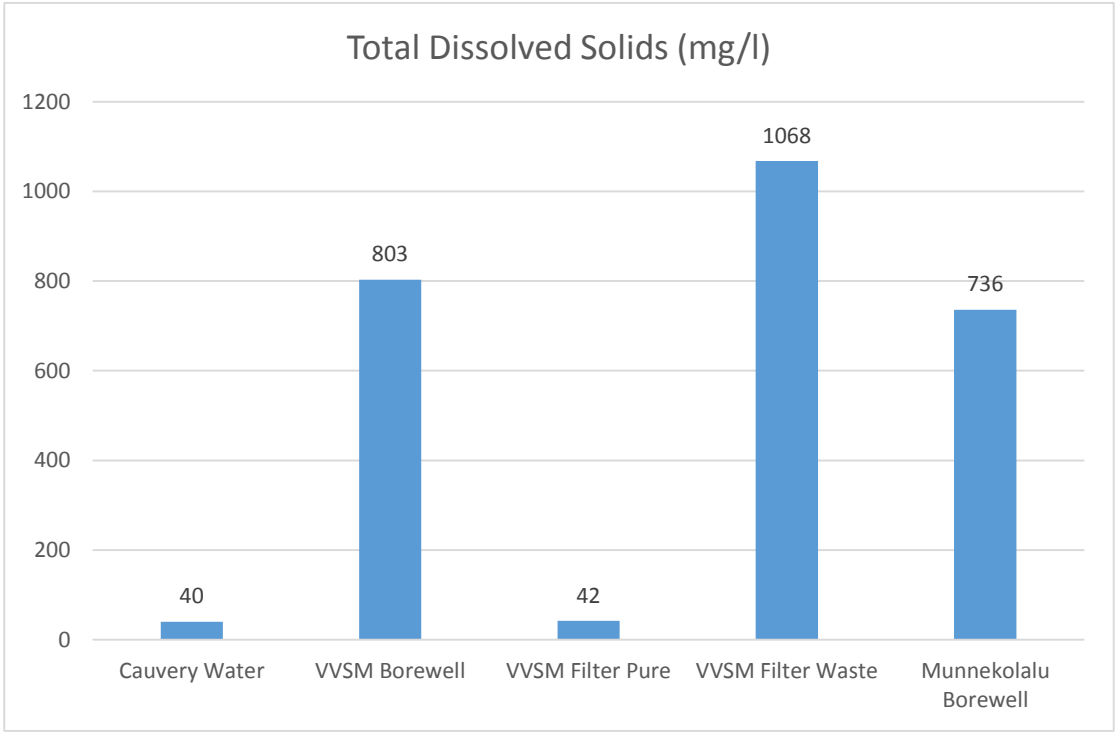
Electrical Conductivity

- Denotes the ability of water to carry current.
- Depends on the presence of ions and their total concentration.
- Proportional to the amount of salts dissolved.



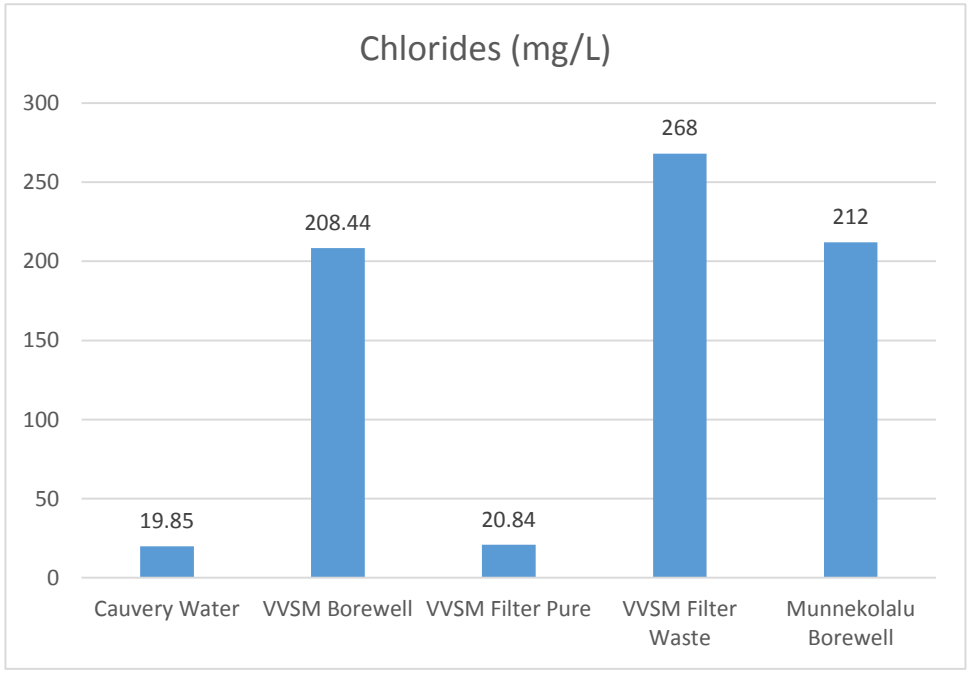
Total Dissolved Solids

- BIS (drinking water), limit is 500mg/l.
- Waters with high dissolved solids generally affect on taste and is not considered desirable and could cause excessive scaling in appliances.



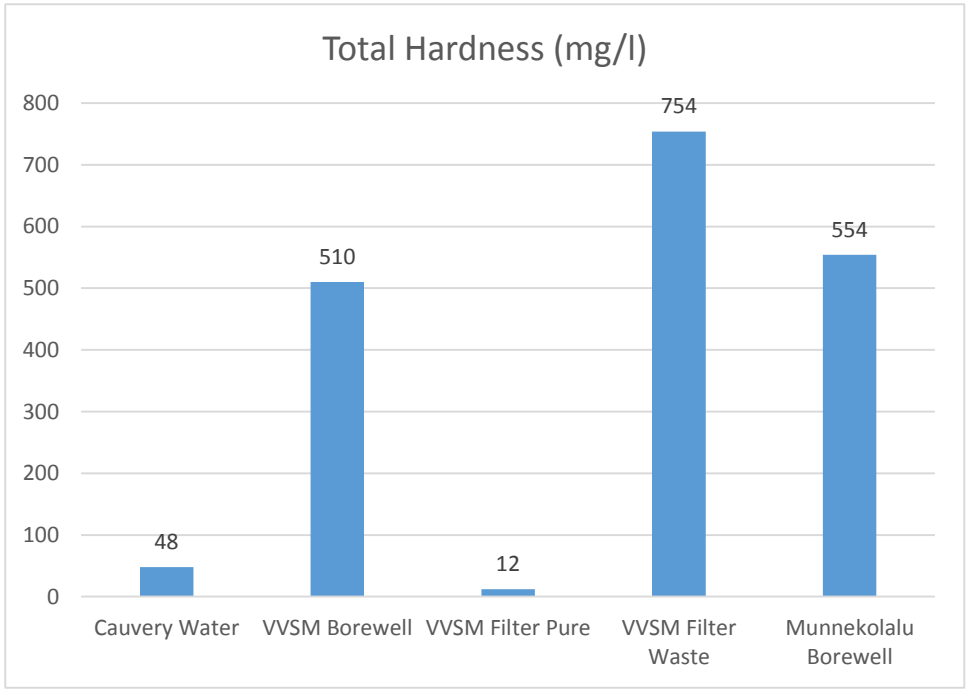
Chlorides

- BIS (drinking water) limit is 250mg/l.
- High content imparts a salty taste, could cause high blood pressure.
- High content indicates large amount of organic matter.
- Good indicator of contamination.



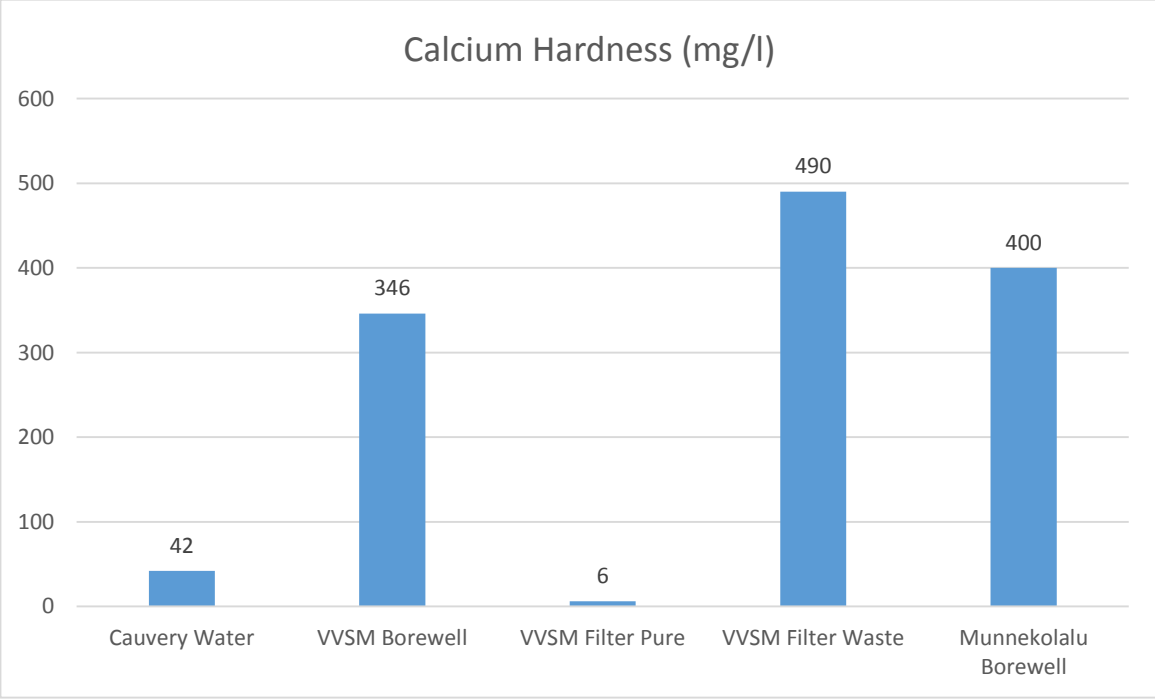
Total Hardness

- BIS (drinking water) limit is 200mg/l.
- Higher concentration could cause kidney problems.
- Hard water renders the water unsuitable for bathing, washing and also forms scales in boilers.



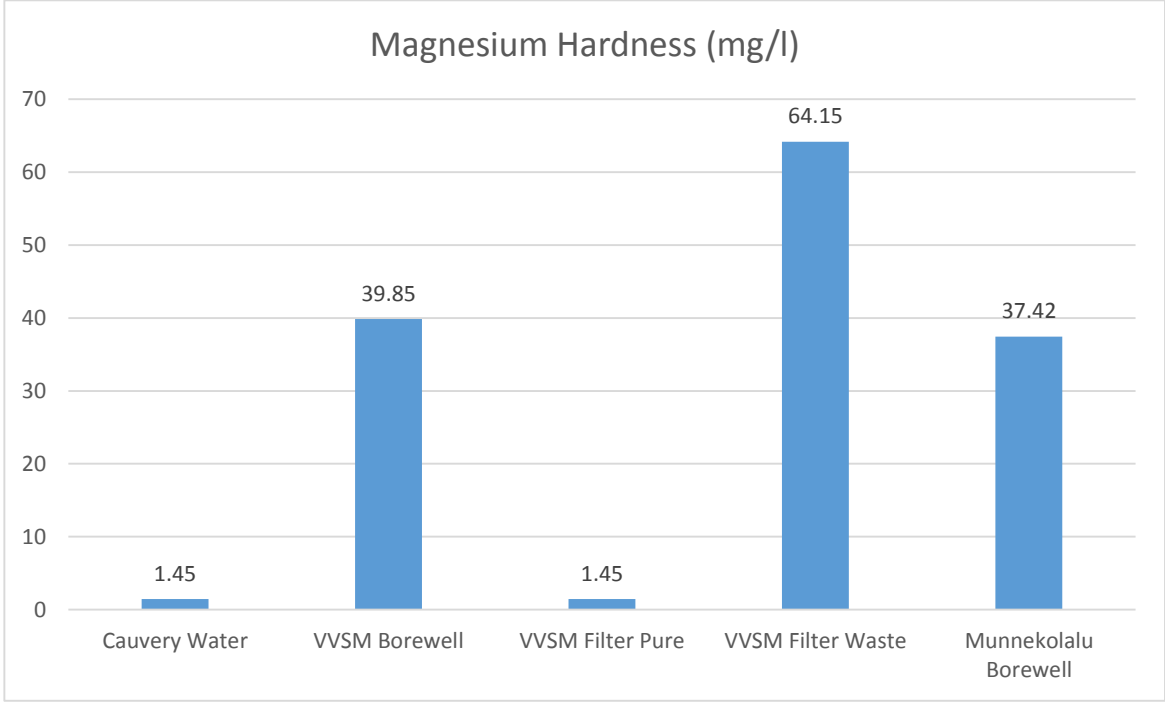
Calcium Hardness

- BIS (drinking water) limit is 75 mg/l.
- Contributes to the Total Hardness.
- Small concentrations prevent corrosion of metal pipes by laying a protective coating.
- Increased concentration on heating forms scales in appliances.



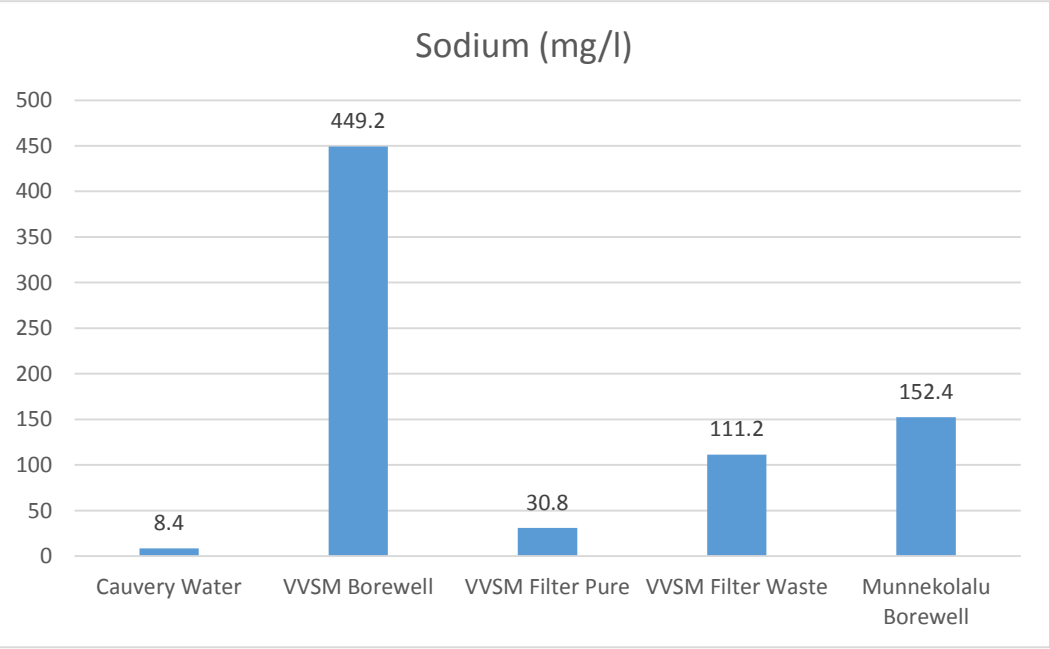
Magnesium Hardness

- BIS (drinking water) limit is 30mg/l.
- It is an important element contributing to the hardness of water.
- High concentrations reduce the utility of water for domestic use and impart an unpleasant taste to water and is unfit for drinking.



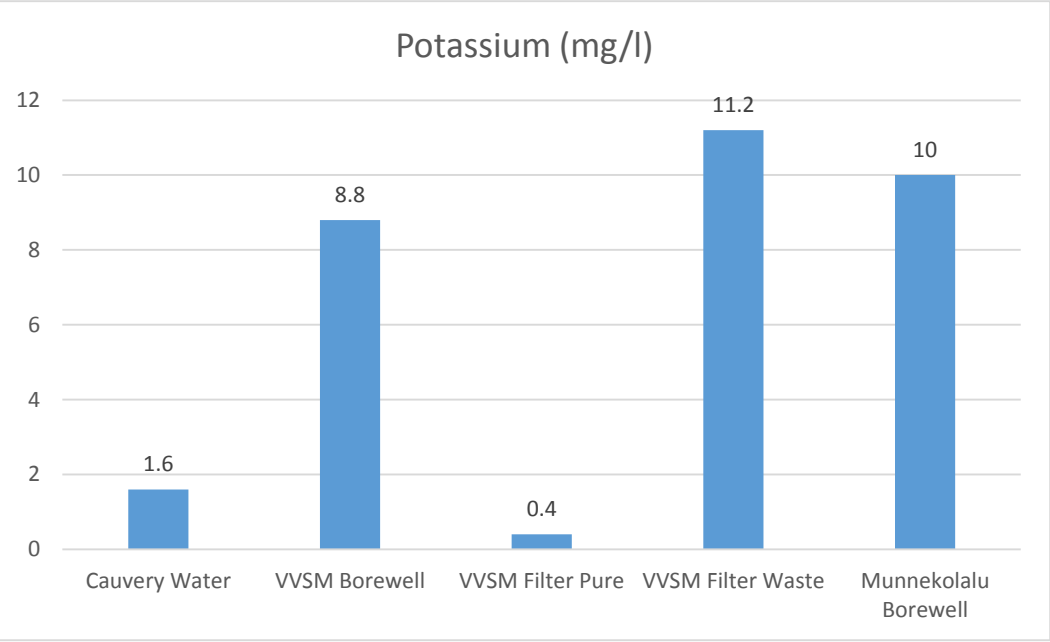
Sodium

- Sodium is one of the most abundant element and is a common constituent of natural water.
- Concentration ranges from very low in surface waters, relatively high in deep ground waters and highest in marine waters.



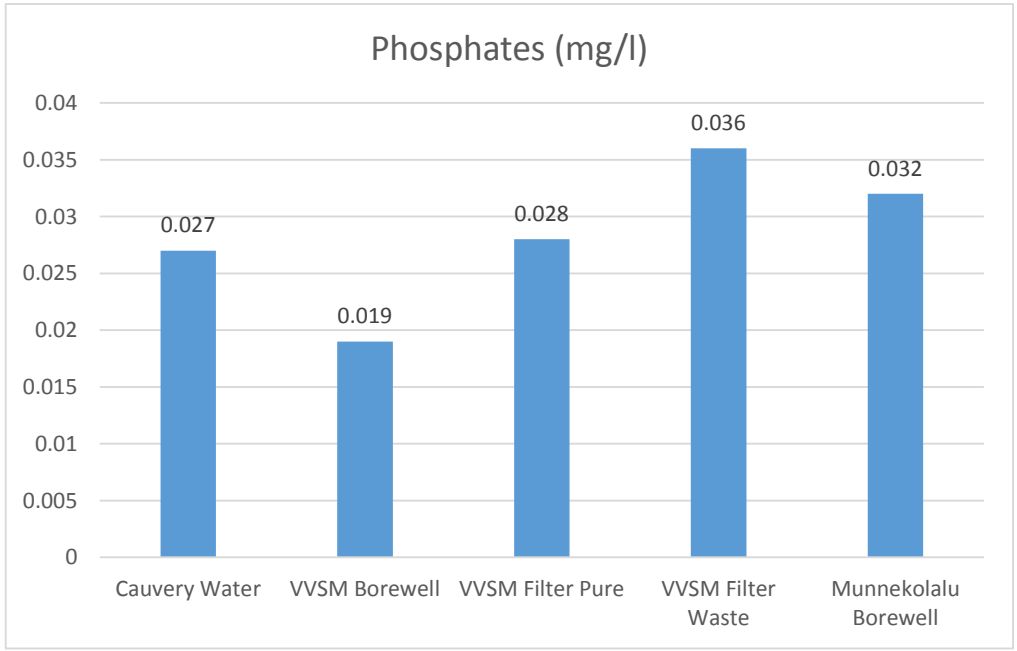
Potassium

- Potassium behaves similar to sodium and is found in small quantities
- It plays a vital role in the metabolism of fresh water.



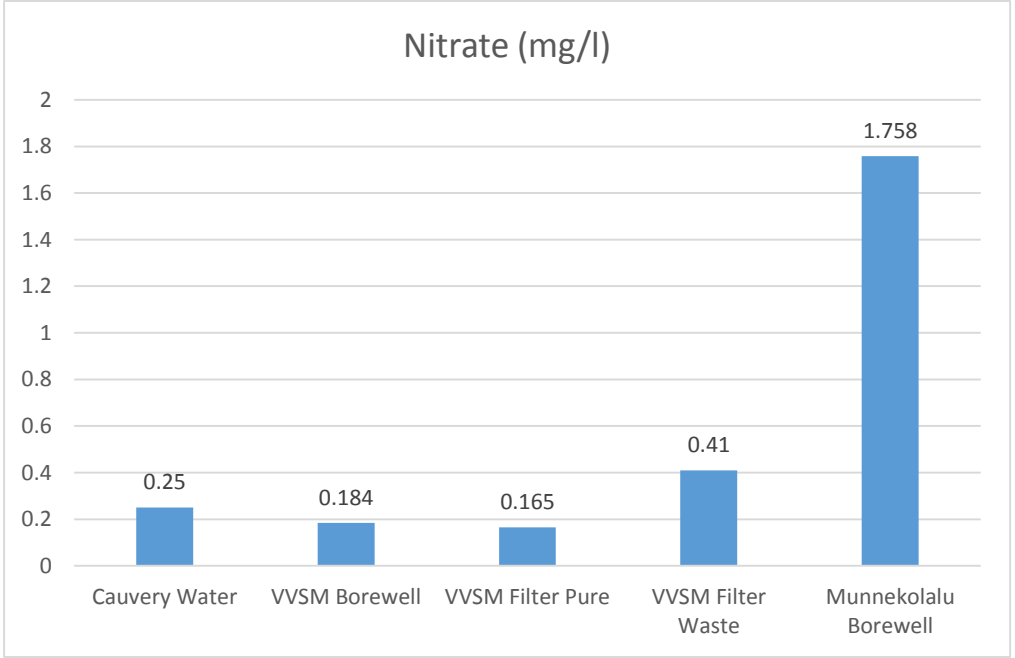
Phosphates

- BIS (drinking water) limit for dissolved phosphates is 5mg/l.
- The source are from fertilizers, detergents, weathering of rocks and decomposition of organic matter.



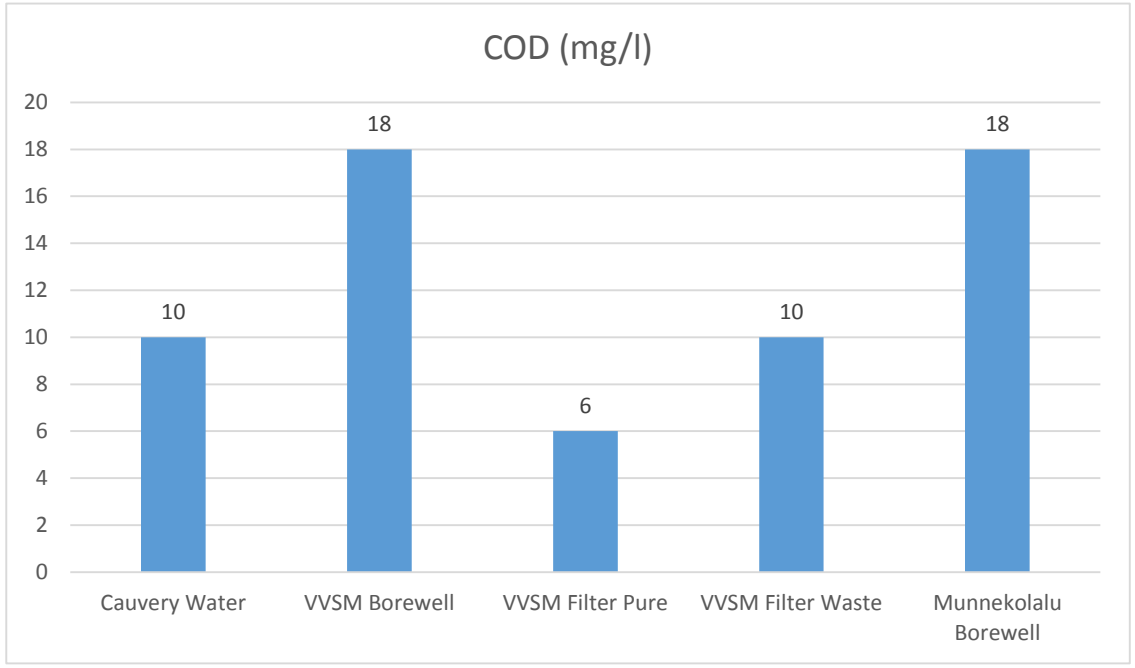
Nitrates

- BIS (drinking water) limit is 45mg/l.
- Higher concentration (>1mg/l) in ground water indicates agricultural contamination from fertilizers.
- Higher concentration above 45mg/l could cause Blue baby disease in infants.



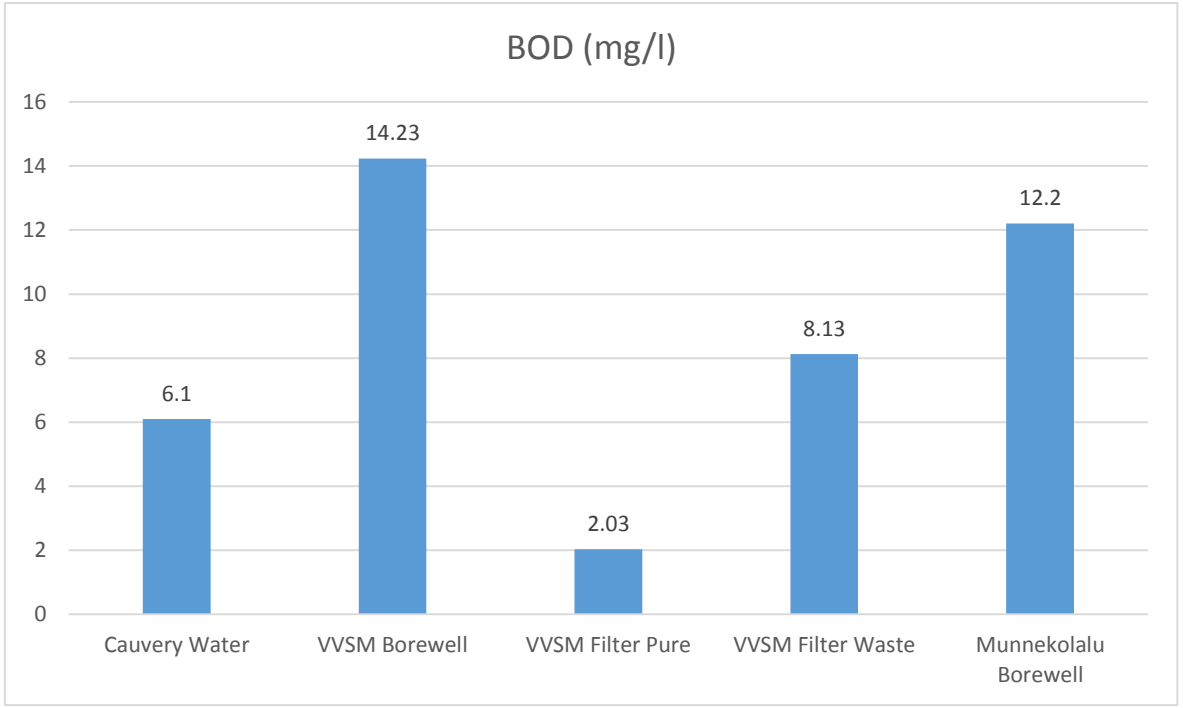
COD

- BIS (drinking water) limit is 250mg/l.
- Water with high values indicate that there is inadequate oxygen available in the sample.



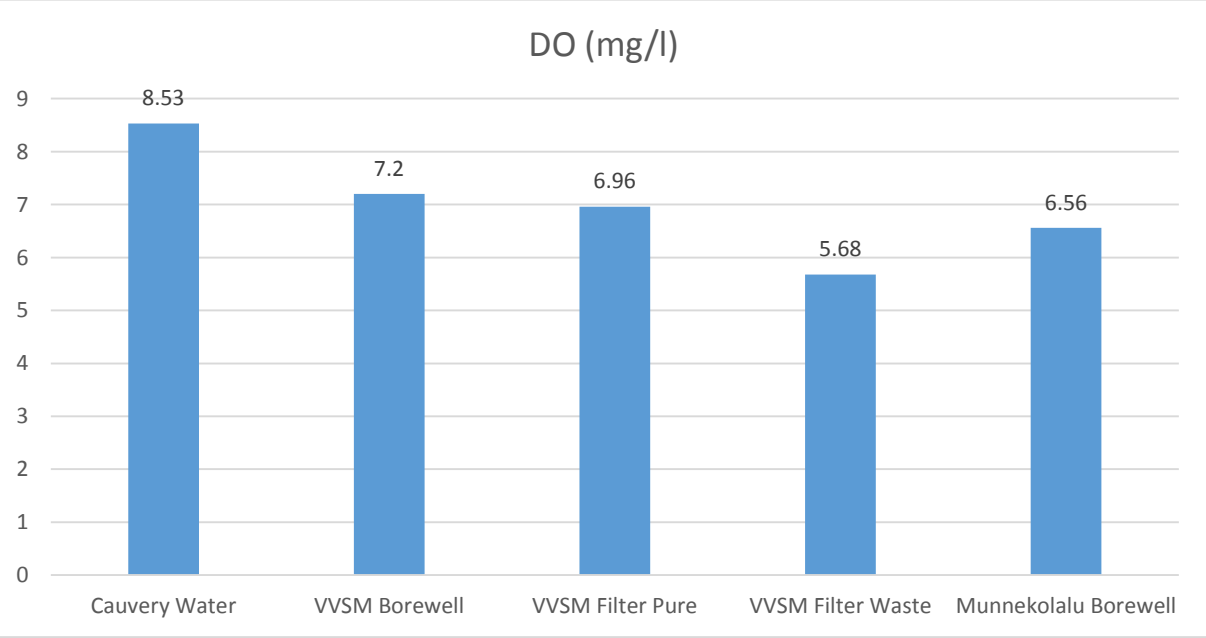
BOD

- This test indicates the pollution load of water.



DO

- The analysis of DO is a key test in water pollution.
- Low concentration of DO usually indicates the decaying of organic matter in water.



Inference

- The pH levels of the drinking water at Vagdevi Vilas School to be measured again. If low pH persisted, the filter (RO) to be checked.
- The borewells' water if used directly is unfit for drinking and house hold chores. This water could be treated and used. This could cause damage to electrical appliances.
- The Cauvery water could be used directly for drinking and other household chores.
- All the above inferred without the testing of any biological parameters.

Acknowledgement

- The organisers of Lake 2014.
- Department of CES, IISc, Bangalore.
- Management and R&D department, Vagdevi Vilas School, Bangalore.
- Our mentor Mrs. Rohini Ghatpande
- Our parents.

Thank You!