

# Assessment of Ground Water Quality Index of Hazira and Its Surrounding Area

Shah Parth H<sup>1</sup>, Prajapati Bhargav C<sup>2</sup>, Prajapati Akash I<sup>3</sup> and Rangrej Samarth K<sup>4</sup>

<sup>1,2,3,4</sup> B.E. Student of civil department, Bhagwan Mahavir college of engineering and technology, Surat

**Abstract-** Water is indispensable for the existence and survival of life on earth. Water is needed in almost every sphere of human activity. Groundwater pollution is one of the environmental problems in rural areas. An attempt has been made in this present work to determine the groundwater quality of Hazira and its surrounding region, Surat, Gujarat. Total five ground water samples were collected from open wells, and analyzed for physico-chemical parameters like pH, total hardness, total dissolved solids, total suspended solid, total solids, dissolved oxygen, calcium, chlorides, sulphate. To determine Water Quality for seasonal variation, firstly water sample was taken in August and September (Rainy season). After that other water samples were taken in January, February and March (Winter season) respectively. The result indicates irrespective of the season that only well is unsuitable for drinking purpose, rest can be used for drinking purpose but their quality require immediate check. In all parameters analysis show strong correlation with each other. It is measured that, high amount of dissolved solids is present in most of the samples. For keeping check on water quality and economical solution in form of Bio-Sand Filter has been suggested, which will decrease Total Hardness, Magnesium Hardness, Turbidity and Dechlorination of water takes place.

**Index Terms-** Groundwater quality, Water quality index, Hazira ground water quality.

## I. INTRODUCTION

The water plays an important role in development of any city or town. Most of developed cities are located at or near river site. But some small villages are far away from river and government is unable to supply required water so they are using different ground water sources like open wells and boring.

Pure water is colourless, tasteless, and odourless and is chemically composed of just two elements hydrogen and oxygen. But in the Ground Water there are many types of impurities like Dirt or Suspended Solids and Chemical impurities.

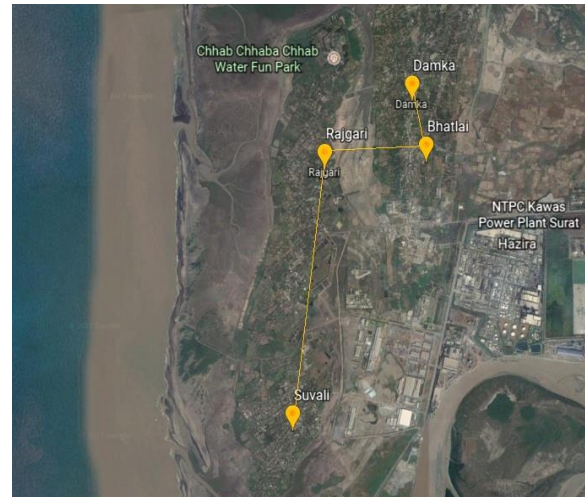
To check the quality of water different types of parameters are use like pH, Turbidity, Total hardness, Total solids, DO(Dissolved oxygen), etc. Above parameters are use to find the Water Quality Index of ground water.

## II. SCOPE OF WORK

In the biological parameters can be added to this test result so as to get knowledge of all parameters, further test can be performed for remaining months in a year so as to arrive at seasonal variation and its effect on groundwater. Further here, more work can be done on Bio-Sand Filters, its different layers, thickness of layers and its design.

## III. METHODOLOGY

### A. Study area



Based on reliability and analysis condition 5 different sampling points are selected in hazira and its surrounding region:

- 1) Bhatlai (Gram panchayat)
- 2) Damka-1 (Near primary school)
- 3) Damka-2 (Sai temple)
- 4) Rajgiri
- 5) Sunvali

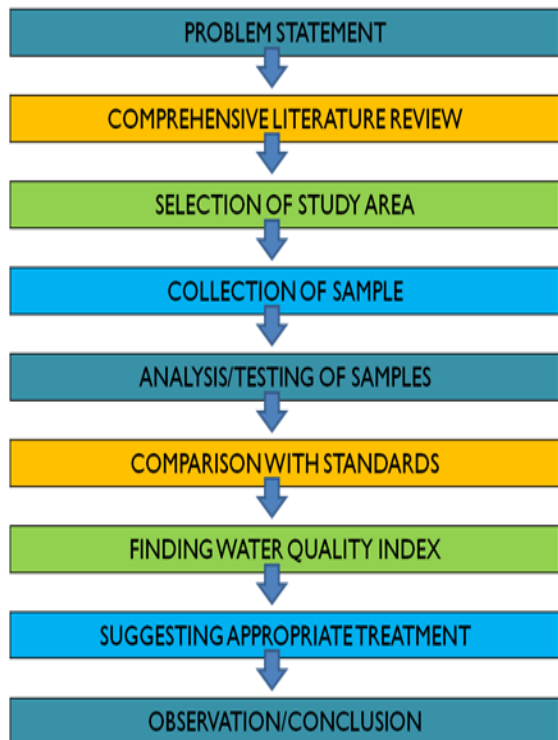
**B. Problem Statment**

In some villages which has no facility of government water supply. This villages are using open wells as drinking water source.

Ground water consist impurities. Direct use of this water cause a serious problem to health and cause disease like typhoid, cholera, etc.

The water quality index is low of ground water at villages.

**C. Proposed Methodology**

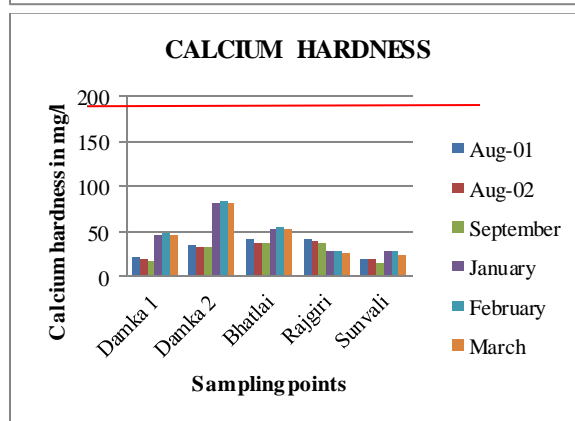
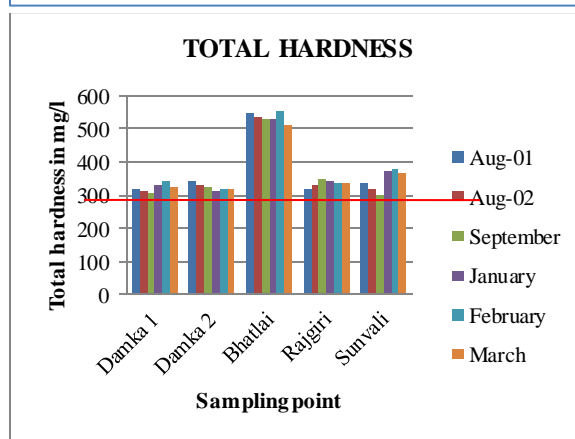
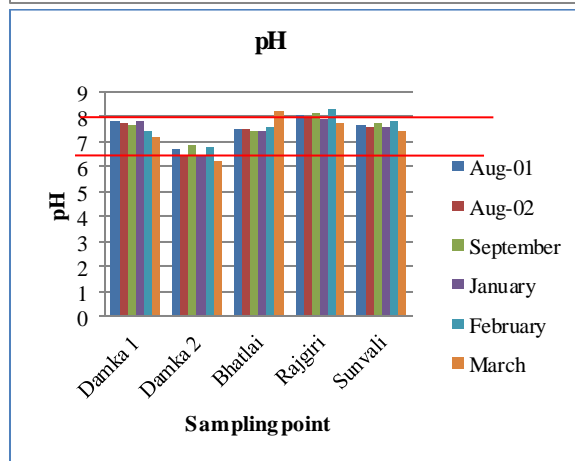
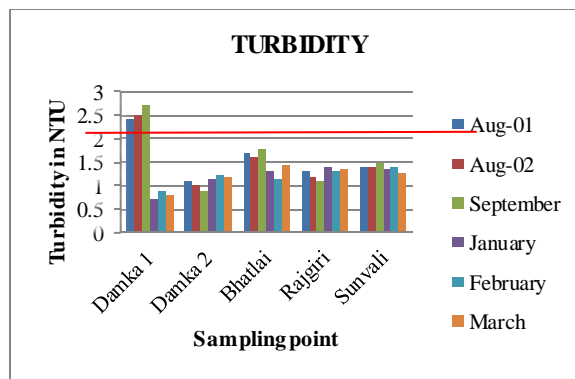


**IV. RESULT AND ANALYSIS**

Table 1 Standards for Parameters [Source:IS 10500:2012]

Parameters	Standards	Unit weight
Turbidity	2 NTU	0.09
pH	6.5-8.5	0.2190
Total	200mg/l	0.0062
Calcium	200mg/l	0.025
Magnesium	100mg/l	0.061
Dissolved	5mg/l	0.3723
Total solids	1000mg/l	0.0037
Chlorides	250mg/l	0.0074
Sulphates	150mg/l	0.01236

The test result of samples are as shown:



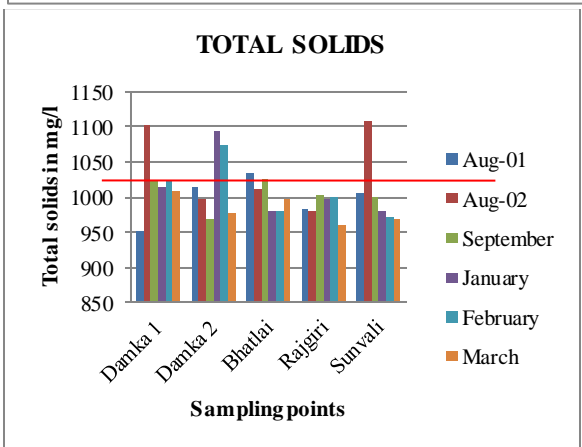
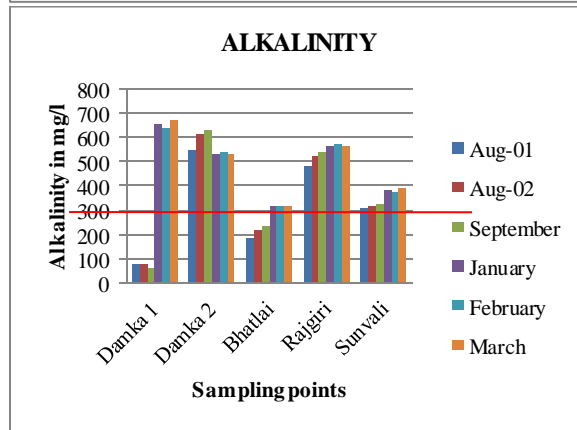
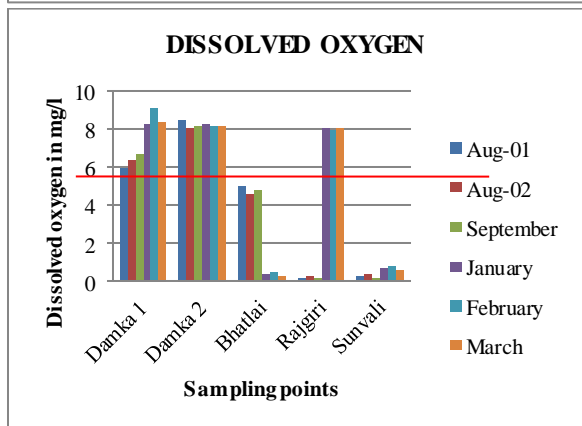
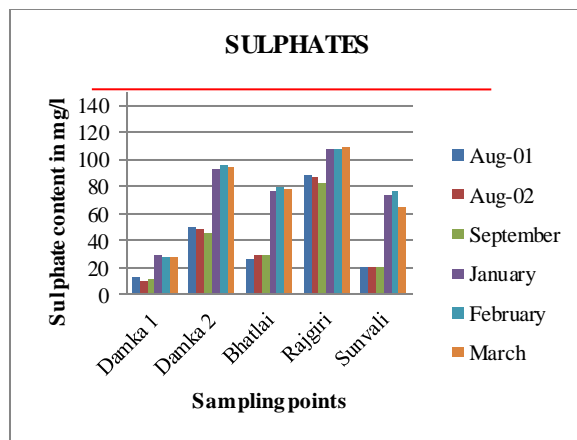
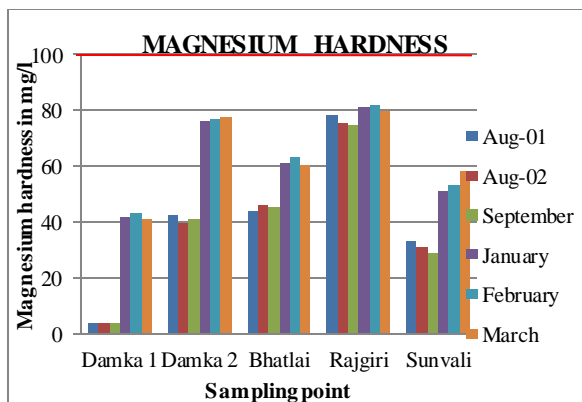


Table 2 GWQI RESULT

Location	WQI(Rain y season)	Class	WQI(W inter season)	Class
Damka 1	69.0783	III	54.31	III
Damka 2	40.7817	II	51.89	III
Bhatlai	74.298	III	98.14	IV
Rajgiri	108.9953	V	74.72	III
Sunvali	94.5718	IV	95.60	IV

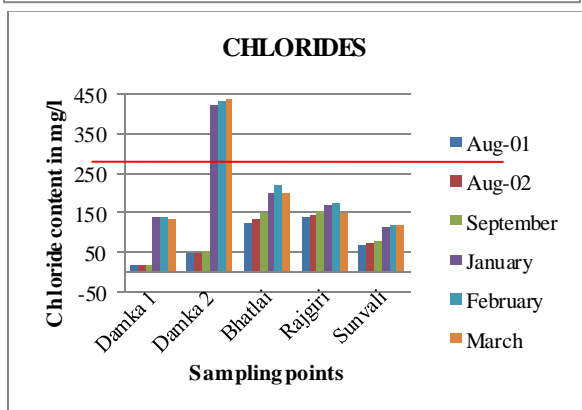


Table 3 Water quality criteria for WQI

WQI	Class	Water quality
<25	I	Excellent
25-50	II	Good water
50-75	III	Bad water
75-100	IV	Very bad water
>100	V	Water unsuitable for drinking

## V. CONCLUSION

This study shows the Ground Water Quality Index of different villages near Hazira. On the basis of

different tests, the following conclusion may be deduct:

- GWQI for Damka 1 concludes that in both season, it falls in class III which shows that water is of bad quality but it is drinkable quality.
- GWQI for Damka 2 concludes that in rainy season it falls in class II and in winter season it falls in class III which shows that in rainy season water is in good quality but in winter season the quality of water is reduced.
- GWQI for Bhatlai concludes that in rainy season it falls in class III and in winter season it falls in class IV which shows that in rainy season water is in bad quality but in winter season the quality of water is reduced to very bad.
- GWQI for Rajgiri concludes that in rainy season it falls in class V and in winter season it falls in class IV which shows that water is of very bad quality and needs immediate check on its quality.
- GWQI for Sunvali concludes that in both season, it falls in class IV which shows that water is of very bad quality and needs immediate check on its quality.
- pH of all the sample was found be in range.
- Total hardness of all samples were found to be above permissible limit.
- DO of two sites Damka-1, Damka-2 are above the permissible limit, rest samples are within permissible limit of drinking water parameters.
- Calculation of ground water quality index shows that water of Damka 2 is best suited for drinking purpose and water of Rajgiri and Sunvali is totally unsuitable for drinking purpose, rest sites have quality is not so good, so a simple treatment in the form of bio-sand filters(BSF) has been recommended.

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Prajapati Akash (Enrollment No. 140060106156),  
 Prajapati Bhargav (Enrollment No. 140060106157)  
 Rangrej Samarth (Enrollment No. 140060106165),  
 Shah Parth (Enrollment No. 140060106178)

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