



Research Paper on Analysing impact of Various Parameters on Water Quality Index

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Abstract: Water is a limited natural resource. Therefore, preserving water is very important for protection of our environment [1]. Various water quality monitoring systems have been developed to measure concentration of the constituents in quantity for characterisation of water for different uses [2]. Water quality can be estimated through quality index which in turn is analysed through various parameters such as pH level, Turbidity, Dissolved Oxygen, Conductivity etc. This paper addresses the impact of parameters on water quality index [3]. Moreover, the paper also depicts how water can be utilised based on various values of parameters.

Keywords: parameters, pH level, Turbidity, Dissolved Oxygen (DO), Electrical Conductivity (EC), Water Quality Index(WQI)

I. INTRODUCTION

A Water Quality Index (WQI) is a measure by which water quality can be estimated for various purposes [4]. WQI can be used to predict whether the water is suitable for drinking purpose, industrial purpose or aquatic organisms etc. WQI can be measured on the scale 0 to 100. Higher the WQI, better is the quality of water. Below are the classifications of WQI [5]:

Table 1.1-Classification of Water Quality Index

Water Quality Index	Water Quality Status
95-100	Excellent water quality
89-94	Very Good water quality
80-88	Good water quality
65-79	Fair water quality
45-64	Marginal water quality
0-44	Poor water quality

WQI gets affected by various water quality parameters. In this paper effect of pH level, turbidity, dissolved oxygen (do) and electrical conductivity is analysed.

II. EFFECT OF WATER QUALITY PARAMETERS ON WQI

i)pH Level

(Potential of Hydrogen) pH is the measure of hydrogen ions in the water. Water has hydrogen ions and hydroxyl ions. When there are equal numbers of both, the water is neutral.[6] As the hydrogen ions (H^+) increase, the water becomes more acidic; as the hydroxyl ions (OH^-) increase, the water becomes more basic. pH is measured on a logarithmic scale of 0 to 14. 7 is neutral; less than 7 is acidic; more than 7 is basic. [7]

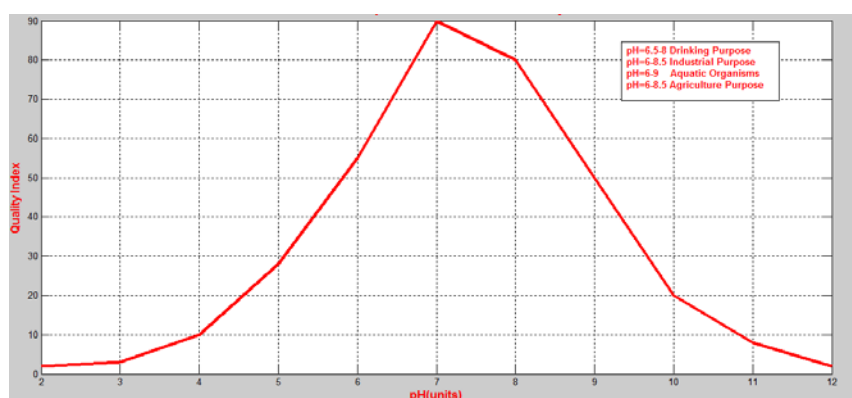


Fig:2.1- Effect of pH on WQI

Initially, when the pH is 0 unit, water quality is very poor. As the pH increases till 7 unit, water quality increases and is excellent. Above 7 units of pH, the water quality again starts decreasing and reaches to very poor.

(ii) Turbidity

Turbidity is parameter of the optical property that cause scattering and absorption of light. Turbidity can be caused by solid suspended matter such as finely divided organic and inorganic matter, clay, silt etc. Turbidity is measured in Nephelometric Turbidity Unit (NTU) [8].

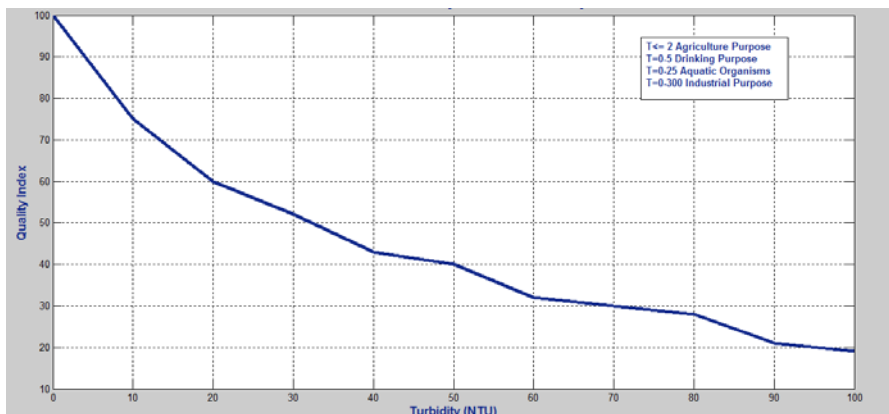


Fig:2.2- Effect of Turbidity on WQI.

As the amount of suspended, insoluble particles increases in water, turbidity increases which in turn decreases water quality.

(iii) Dissolved Oxygen (DO)

All living organisms depend upon oxygen to maintain the metabolic processes that produce energy for growth and

reproduction. Dissolved oxygen is important in precipitation and dissolution of inorganic substances in water. DO is the basis of Biological Oxygen Demand test to evaluate pollution potential of wastes. DO is measured in milligrams per litre(mg/l).[9]

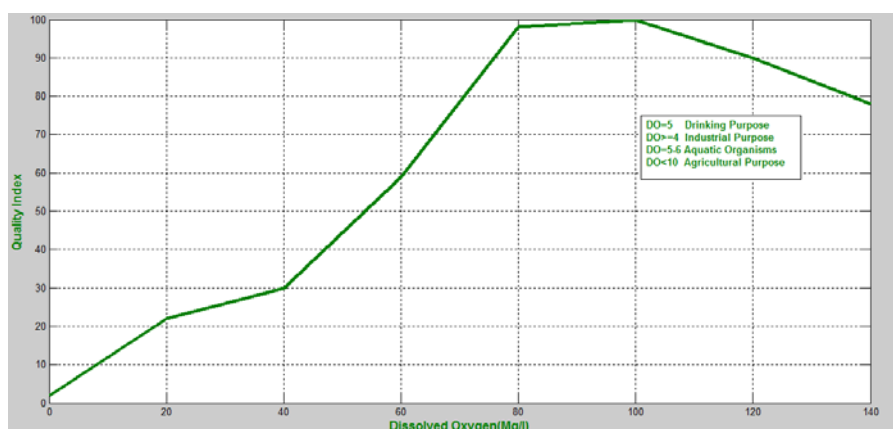


Fig:2.3- Effect of dissolved oxygen on WQI

WQI increases till dissolved oxygen value reaches to 100 mg/l. Above 100 mg/l, the WQI decreases and the water quality becomes very poor.

(iv) Electrical Conductivity(EC)

Conductivity is a measurement of the ability of an aqueous solution to carry an electrical current. An ion is an atom of an element that has gained or lost an electron which will create a negative or positive state. Conductivity and temperature are directly related. [9]

III. CHARACTERISATION OF WATER FOR DIFFERENT USES BASED ON VARIOUS PARAMETERS

Water can be utilised for various purposes based on various water quality parameters. pH value, turbidity, dissolved oxygen, electrical conductivity are analysed to check suitability of water for drinking purpose, industrial purpose, aquatic organisms, agriculture purpose. Water quality parameters should satisfy certain limits so as to become suitable for these purpose. Parameters values are given below:

Water suitable for Drinking purpose	<ul style="list-style-type: none"> •pH: 6.5-8 units •T: 0-5 NTU •DO: 5 mg/l •EC: 0-2500 μS/cm
Water suitable for Industrial purpose	<ul style="list-style-type: none"> •pH: 6-8.5 units •T: 0-300 NTU •DO\geq 4 mg/l •EC: 0-2250 μS/cm
Water suitable for Aquatic organisms	<ul style="list-style-type: none"> •pH: 6-9 units •T: 0-25 NTU •DO: 5-6 mg/l •EC: 150-500 μS/cm
Water suitable for Agriculture purpose	<ul style="list-style-type: none"> •pH: 6.5-8.5 units •T\leq2 NTU •DO: 10 mg/l •EC: 0-6000 μS/cm

Fig:3.1- Characterisation of water for different uses

Where T= Turbidity, EC= Electrical Conductivity, μ S/cm = microsiemens per centimetre, NTU=Nephelometric Turbidity Unit

IV. RESULTS AND CONCLUSIONS

WQI gets affected by various water quality parameters [10]. These parameters should be carefully examined as they define the characterisation of water for different purposes. More parameters can be added to see observe their relationship with WQI. The parameters can be analysed for more purposes.

V. REFERENCES

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