# Water Contamination: Quality, Access and Equity

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***Abstract: Water contamination now a day is a very common problem in the society. In India it's becoming bigger and bigger day by day. Mostly all the rivers, lakes and ground water sources are getting polluted by many pollutants present in the environment. Untreated Waste coming from the industries and factories is the main cause for the water contamination. The quality of water can be easily calculated by finding these proprieties; these include turbidity, ph, temperature, dissolved oxygen, electrical conductivity/salinity. These are the main five basic principles on which quality of water is checked. The presence of heavy metals such as arsenic, cadmium, iron etc. also has a very bad effect on the aquatic life. The source of these heavy metals in water contamination comes mainly from the waste from factories and industries. Now use of pesticides such as DDT in agricultural sector also contributes on the contamination of ground water. Now the harmful gases present in the atmosphere such as NOx and SOx gases which are the main reason/source behind the acid rain also have a bad/harmful effect on the water bodies as it may cause eutrophication there. So overall we can say that water contamination is one of the biggest problems that we are going to face in next few years. Scientists are doing their best to find out the solution of these problems. Recent development is that the use of "Green chemistry" in this sector can greatly reduce the effect of pollutants and also is environment friendly as it does not cause any bad effect to the environment or ecosystem. So we must also find some other ways to protect water or soil or air from being contaminated and to conserve the beauty of our beautiful environment.***

***Keywords: - water quality, physical and chemical characteristics, precipitation, and toxic.***

## 1. INTRODUCTION

Doctors use instruments like thermometers and stethoscopes to check on your health. Scientists use instruments like Secchi (sek'-ee) disks, probes, nets, gauges, and meters to determine how healthy the water is. They take measurements of the physical and chemical condition of the water and the health of the critters that live in it. Water samples aren't the only things scientists collect. They take photographs from airplanes and even satellites. They use their eyes to observe what's happening along streams, lakes, and bays to get an overall sense of the health of the water. Individual, one-time tests are important if the test results indicate a toxic or dangerous condition, such as high ammonia, and corrective action has to be taken immediately. The greatest benefit of testing, however, is obtained when results are plotted on graph paper over a period of several testing's, so

that trends or directions can be noted early. Today water covers 7/10th part of the globe surface, fills its atmosphere and lies unfathomed, beneath the crust of the world. Only less than 1% of it is fit and available for use and consumption by mankind.

**Material and method's:-** The Five Basic Water Quality check Parameters, their source and their permissible limit in water are:-

**1. Dissolved Oxygen**: - It is the amount of oxygen dissolved in water. Most aquatic organisms need oxygen to survive and grow.

**Why do we test it? : -** Fish 'breathe' in dissolved oxygen through their gills. Organic waste and higher water temperatures cause dissolved oxygen levels to fall. High levels of dissolved oxygen mean a greater variety of living things can survive [7].

**Table 1 below: - showing limits or permissible limit of DO in water quality:-**

| DO [ppm] | Remarks |
|---|---|
| 0.0-4.0 | Good |
| 4.1-7.9 | Fair |
| 8-12 | Poor |
| >12 | Too high |

If there is not enough oxygen in the water, the following may happen:

- Death of adults and juveniles
- Reduction in growth
- Failure of eggs/larvae to survive
- Change of species present in a given water body
- 

**2. Turbidity: -** Turbidity is the cloudiness or haziness of a fluid caused by individual particles (total suspended or dissolved solids) that are generally invisible to the naked eye, similar to smoke in air [7, 8]. The measurement of turbidity is a key test of water quality**.**

**Why do we test it: -** Suspended particles diffuse sunlight and absorb heat . This can increase temperature and reduce light available for algal photosynthesis. If the turbidity is caused by

suspended sediment, it can be an indicator of erosion, either natural or man-made. Suspended sediments can clog the gills of fish. Once the sediment settles, it can foul gravel beds and smother fish eggs and benthic insects. The sediment can also carry pathogens, pollutants and nutrients. Instrument used: - turbidometer. Units in NTU(Nephlometric turbidity unit), FTU(formalin turbidity unit, JTU(jackson turbidity unit).

**3. pH :-** It is a measure of the acidity or basicity of an aqueous solution. Solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are basic or alkaline. Pure water has a pH very close to 7. The pH scale is logarithmic and goes from 0 to 14. For each whole number increase (i.e. 1 to 2) the hydrogen ion concentration decreases ten fold and the water becomes less acidic [8].

**Why do we test it: -** pH measures hydrogen ions in the water and indicates if the water is alkaline (>7), neutral (7) or acidic (<7). This level of solubility tells what nutrients are available to aquatic life. Metals tend to become more toxic at a lower pH because they are more soluble.

**Instrument used: -** pH meter

**Table 2 below represent pH quality parameter:-**

| pH | Remarks :- |
|---|---|
| <5.5 | Poor |
| 5.5-6.5 | Average |
| 6.5-8.0 | Good |
| 8.1-8.5 | Average |
| >8.6 | poor |

**4. Electrical conductivity/salinity: -** It is the measures a material's ability to conduct an electric current. It is commonly represented by the Greek letter σ (sigma), but κ (kappa) (especially in electrical engineering) or γ (gamma) are also occasionally used [8, 7].

**Why we test it: -** High levels of salt affect plant growth, water quality and soil quality. Many areas of India have natural levels of salinity however an increased reading can mean human activities have negatively impacted the environment.

**Unit**: - Micro Siemens (uS) abbreviated to electrical conductivity (EC).

**Table 3:- below shows quality of water for electrical conductivity**

| Electrical conductivity [uS] | Remarks :- |
|---|---|
| 1-100 | Excellent |
| 500 | Fair |
| >750 | Poor |
| 1600 | Upper limit for drinking |
| 5000 | Upper limit for crops |
| 8000 | Upper limit for livestock |
| 50000 | seawater |

**5. Temperature: -** Temperature is a measure of the average energy (kinetic) of water molecules. It is measured on a linear scale of degrees Celsius or degrees Fahrenheit.

It is one of the most important water quality parameters. Temperature affects water chemistry and the functions of aquatic organisms.

**Why do we test it: -** Water temperature has a direct link with toxic absorption, salinity and dissolved oxygen. Some organisms cannot reproduce if water is not at the correct temperature, for example, coral polyps reproduce well in a narrow temperature range above 26 ° C. Altitude and proximity to coasts will influence natural water temperature eg: water in the Snowy Mountains may be 3 ° C, but this is its natural state, not necessarily poor quality. Keep this in mind when measuring. The ranges provided below are a guide.

**Table 3 below shows the temperature range for the quality of water:-**

| Temperature [º C] | Remarks :- |
|---|---|
| 0-9 | Poor |
| 10-14 | Fair |
| 15-25 | Good |
| 26-36 | Fair |
| >37 | Poor |

**UNIT: -** DEGREE CELSIUS (º C)**, instrument used: -** thermometer

## 2. CONCLUSION

Now from the above data we can simply assume that the quality of water now a day is a major concern**.** On an average, India receives about 120cm of precipitation per year, mostly as rainfall. On the volume basis is 400 M.Ha.m. The fate of precipitation is estimated as, evaporation 18%; surface runoff 29% and soil infiltration 53%. Nothing can be done to reduce this 18% loss by evaporation. However, wise management can reduce 29% of surface runoff. In India the ground water reserve is very huge. The rainfall adds nearly 3 million cubic kilometre of water in a year [1, 2]. The most of water goes into rivers and the rest of water goes underground. This is very helpful in the process of irrigation. The fresh water is used by the humans for many purposes. It is used in the drinking, bathing, washing and in the production of electricity. It helps to rear fishes and the other aquatic animals.

It is used in the disposal of sewage and organic wastes. The industrial plants and the construction of houses are dependent on it. Surface water quality in a region is largely determined both by natural processes and by anthropogenic inputs. The anthropogenic discharges constitute a constant polluting source, whereas surface runoff is a seasonal phenomenon, largely affected by climate within the basin. Land erosion in the lake catchment not only affects the physical and chemical properties of soils but also enriched the lake water with nutrients. For any urban water body, growth of the habitation around the lake vicinity without a proper sewerage system further exaggerates organic and nutrient loading in the lake [3, 9]. The shortfall or lack of sewage treatment facilities has contaminated the majority of surface and ground waters. These aquatic resources are now unfit for current as well as future use and consequently pose critical health problems. Central Pollution Control Board (CPCB, 2006; CPCB, 2009) estimate indicates that about 26,254 million litres per day (MLD) of wastewater are generated in 921 Class I cities (Population > 1,00,000) and Class II (Population 50,000–1,00,000) towns in India (housing more than 70% of the urban population). However, only 27% (7044 MLD) of wastewater is treated. So from the above statement's we can say that some better technologies must be used and other alternatives will be searched to treat or to save the water from being polluted and that's will help in the healthy environment of our society.

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