



ASSESSING PROBLEMS RELATED TO WATER POLLUTION: POLLUTANTS AND PARAMETERS

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ABSTRACT

As human populations grow, industrial and agricultural activities expand, and climate change threatens to disrupt the hydrological cycle, declining water quality has become a global problem. Water is still considered to be one of the most basic essentials of life today. We cannot presume that our source of money will be harmed by a lack of water. Heavy metal absorption has been observed by toxicologists in a variety of water bodies, plants, and vegetables. Individual physical state is directly influenced by the consumption of contaminated water, fish, fruits, vegetables, plants, and other dietary sources. The severity of negative health impacts is based on the type of heavy metal and its compound form, as well as time and dose. Among other things, speciation is important in metal toxico-kinetics and toxico-dynamics, and it is influenced by valence state, particle size, solubility, biotransformation, and chemical form, among other things. In developing countries, industrial effluents damage around 20% of waterways, while untreated sewage pollutes the remaining 80%. Governments and scientists in most nations have pushed to establish programmes for monitoring and abatement of pollution, particularly seepage effluents in groundwater, in recent years as a result of increased awareness of pollution.

Keywords: - Water, Pollution, Pollutants, Human, Quality.

I. INTRODUCTION

Rivers have always been at the heart of human progress. On the banks of one river or another, all ancient civilizations flourished. Rivers, which were formerly the most important supply of freshwater, became conveyors of effluent as cities grew. Rivers have paid the price for fast economic and technical advancement through damming and pollution. Along with reduced water levels, most rivers now suffer from severe organic, inorganic, and/or pathogenic contamination.

According to a UNEP report titled "A Snapshot of the World's Water Quality: Towards a Global Assessment," one-third of all river sections in Latin America, Africa, and Asia are affected by severe pathogenic pollution. Furthermore, severe organic pollution affects one-seventh of these river sections, whereas salinity contamination affects one tenth. Increased wastewater flow into rivers has been identified as a primary source of water contamination (UNEP 2016). Around 80% of wastewater in poor nations is released untreated, damaging freshwater sources such as rivers, lakes, and ponds (UNESCO n.d.).

II. WATER POLLUTION

Contamination is a word that you hear verging on consistently in the news, at school and in everyday discussions. Our general public has delivered numerous sorts of contamination; some are riskier than others. Researchers are always concentrating how the distinctive sorts of contamination influence the earth and how it can be controlled. Much has been done to diminish and control contamination, however there is still more that should be finished.

Water contamination is a major issue in India as right around 70 for every penny of water assets and a developing rate of its ground stores are sullied by natural, dangerous, natural, and inorganic toxins. Utilization and in addition for different exercises, for example, watering system and mechanical needs. This demonstrates corrupted quality can add to water lack as it restricts its accessibility for both human use and for the biological community.

In 1995CPCB distinguished seriously dirtied extends on 18 noteworthy waterways in India. Regarding general effect on water quality. Other than a quickly draining groundwater table in

various parts, the nation confronts another significant issue on the water front—groundwater defilement—an issue which has influenced upwards of contamination give attractive advantages, for example, lessened water borne ailments, reserve funds in the expense of for family unit, modern and agrarian uses, control of area corruption, and advancement of fish it can likewise produce non-attractive advantages like enhanced ecological comforts, amphibian life, and biodiversity.

III. WATER POLLUTANTS

You have read the various sources from where pollutants enter the water bodies. Let us now learn about the various types of pollutants arising out of these sources. These can be broadly put under the following types.

- (i) Sewage Pollutants (Domestic and Municipal Waste)
- (ii) Industrial Pollutants
- (iii) Agricultural Pollutants
- (iv) Radioactive and Thermal Pollutants

(i) Domestic and Municipal Pollutants: The sewage contains garbage, soaps, detergents, waste food and human excreta and is the single largest sources of water pollution. Pathogenic (disease causing) microorganisms (bacteria, fungi, protozoa, algae) enter the water system through sewage making it infected. Typhoid, cholera, gastroenteritis and dysentery are commonly caused by drinking infected water. Water polluted by sewage may carry certain other bacteria and viruses cannot grow by themselves, but reproduce in the cells of host organisms. They cause a number of diseases, such as, polio, viral hepatitis and may be cancer which are resistant to like the organic matter are oxygen demanding substances. They are responsible for deoxygenation of water-bodies which is harmful for aquatic life.

(ii) Industrial Pollutants: Many industries are located near rivers or fresh water streams. These are responsible for discharging their untreated effluents into rivers like highly toxic heavy metals such as chromium, arsenic, lead, mercury, etc. along with hazardous organic and inorganic wastes

(e.g., acids, alkalis, cyanides, chlorides, etc.). River Ganges receives wastes from textile, sugar, paper and pulp mills, tanneries, rubber and pesticide industries. Most of these pollutants are resistant to breakdown by microorganisms (called non biodegradable), therefore damage the growth of crops and the polluted water is unsafe for drinking purposes.

(iii) Agricultural Waste: Manure, fertilizers, pesticides, wastes from farms, slaughterhouse, poultry farms, salts and silt are drained as run-off from agricultural lands. The water body receiving large quantities of fertilizers (phosphates and nitrates or manures becomes rich in nutrients which leads to eutrophication and consequent depletion of dissolved oxygen. Consumption of water rich in nitrates is bad for human health especially for small children.

(iv) Physical Pollutants: Physical pollutants can be of different types. Some of them are discussed below:

(a) **Radioactive Wastes:** Radionuclides found in water are radium and potassium-40. These isotopes originate from natural sources due to leaching from minerals. Water bodies are also polluted by accidental leakage of waste material from uranium and thorium mines, nuclear power plants and industries, research laboratories and hospitals which use radioisotopes. Radioactive materials enter human body through water and food, and may be accumulated in blood and certain vital organs. They cause tumors and cancer.

(b) **Thermal Sources:** Various industries, nuclear power plants and thermal plants require water for cooling and the resultant hot water is often discharged into rivers or lakes. This results in thermal pollution and leads to the imbalance in the ecology of the water body. Higher temperature lowers the dissolved oxygen level (which is very essential for marine life) by decreasing the solubility of oxygen in water. Fish and other aquatic organism can get affected by a sudden change in water temperatures.

IV. WATER QUALITY PARAMETERS

Pure water can be defined to be a colorless, odorless and transparent liquid with density of one. Any deviation from this state of purity e.g. bad odour, taste, turbidity etc. is termed pollution.

It may be quite relevant to discuss the different parameters that determine the quality of water. Various physical, chemical and biological parameters determine the level of contaminants in water. These parameters also determine the suitability of water for specific applications or for discharge from wastewater sources. However, the different uses of water e.g. drinking, irrigation or industrial use determine the actual permissible limits of the parameters.

Physical properties or parameters include

- i.** solids,
- ii.** color and odour
- iii.** Temperature.

i. Suspended Solids

Solid contaminants in water may be present in both suspended and dissolved forms. Suspended solids may be inorganic (grit, clay, silt etc.) or organic (fibers, grease, oil tar, animal and vegetable fats, sawdust, hair, algae, bacteria etc.). Some suspended solids settle down at the bottom quite rapidly. The bottom deposits may contain a mixture of both organic and inorganic solids. They cover the bottom of the water body by a blanket of wastes, thereby destroying the aquatic fauna (which are consumed by fish) and adversely affecting fisheries. Suspended solids may also produce noxious gases like hydrogen sulphide, carbon dioxide and methane.

The solids which float on water surface increase the turbidity of water and hinder photosynthesis by preventing penetration of sunlight. The solids which settle on the stream or lake bed form sludge deposits and considerably damage aquatic life. The biodegradable organic solid wastes deplete the DO content of water. Suspended solids are measured in milligrams per litre of water and should be within 100 mg per litre of water. Some substances get dissolved in water. The dissolved solids mainly comprise inorganic salts. Such solids mostly remain unaffected by biological treatment processes. Unless removed, dissolved solids may lead to increase in the level of total solids in ground and surface water sources. Water containing dissolved solids is harmful for vegetation and unfit for use in irrigation.

ii. Colour and Odour

The dissolved or suspended materials present in water impart colour to it. Many industrial wastewaters (e.g. wastewater from textile dyeing units, food processing units, paper and pulp industries, laundries etc.) are colored due to the presence of various chemicals. Apart from the fact that colored water is aesthetically displeasing, the coloring matters themselves may be harmful contaminants and toxic. The organic substances present in waste matter impart odour to water.

iii. Temperature

Temperature is an important parameter for both natural water and industrial wastewater. The presence of various biological species in natural water as well as their activities is influenced, to a large extent, by the temperature of the water body. Aquatic organisms cannot survive at high temperatures. This is because the solubility of oxygen (which is necessary for respiration of aquatic organisms) is affected by temperature.

The chemical parameters can be sub-divided into organic (which includes carbohydrates, fats, oil and grease, pesticides, phenols etc.), inorganic (which includes alkalinity, chlorides, heavy metals, nitrogen, pH, phosphorous, Sulphur etc.) and gases (which include hydrogen sulphide, methane and oxygen).

V. CONCLUSION

After analyzing the required physical, chemical and toxicological parameters in the study area, a comparative study of surface water and ground water was done to reach up to a conclusion which is also going to help in the water management programmes of the newly born state Uttarakhand. For the comparative study, underground water sample was collected from Delhi-NCR region and surface water was collected from the Yamuna River (Delhi-NCR region) seasonally.

It was reported that underground water is fit for drinking and other domestic purposes in comparison to the surface water. There are lots and lots of reasons behind this which are described in short as under, like the water pH for the surface water is always low while that of ground water is comparatively higher. The reason being, the surface water including various rivers which are highly polluted by dumping garbage and other waste material directly into the water inspite of

decomposing in to separate lands, which gives a sour taste to the water, whereas that for ground water the values show that natural water including springs and underground water it is alkaline in nature. Surface waters are highly turbid due to the discharge of waste material etc. which again is not fit for household purposes. Amount of DO was also reported to be higher in spring water than in comparison to the surface water, as oxygen demand is always directly proportional to amount of organic waste to be degraded. Similarly other parameters like alkalinity, conductivity, BOD, COD, TS, TDS as well as TSS etc reported the same Conclusion that ground water is the only source on which one could be depended directly without any treatment processes, and surface water requires various waste water treatments before consumption which will also be helpful other ways in reducing pollution.

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