



Water Pollution & Its Hazardous Impacts.

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ABSTRACT:

Water is essential for the survival of life on earth. But because of anthropogenic activities & other pollutants, water pollution has taken a severe form. Water pollution shows a hazardous impact on humans as well as on the environment. In the present work entitled water pollution, an attempt has been made to cover information about water pollution, & the various hazardous impact caused by water pollution.

KEYWORDS: Water pollution, BOD, Polluted river stretches, Ocean acidification, Eutrophication.

1.0] INTRODUCTION:

Water which is also called a Universal solvent & is very essential for the survival of life on earth. A normal human body contains 70 % of water. On the other hand, about 71 % of Earth's surface is covered by water. Oceans hold near about 96.5 % of all earth's water which is saline & only 2.5% of water is freshwater available to sustain life on earth. But because of anthropogenic activities, industrialisation water pollution has risen drastically. When contamination of water occurs because of various pollutants & such water becomes toxic for humans as well as for the environment, it is called water pollution. This pollution is jeopardizing our health. Because of contaminated water, the deaths of so many people occur every year. As per the Composite Water Management Index (CWMI) report 2018 of NITI Aayog, about two lakh people die every year because of inadequate access to safe water¹. As the population is increasing day by day, the demand for freshwater will also increase. By 2030, about 600 million people may face water stress which will constitute 40% of the population at that time (NITI Aayog). In future this water stress problem will become even more severe.

One of the biggest challenges of the 21st century is to ensure quality of water. Water is one of the vital elements because of which we can directly experience the impact of climate change occurring on our life. Near about one-third of the rivers of developing countries may already be affected by severe pollution & high salinity levels (UNEP 2019)². So obviously pressure will be on surface & groundwater resources to meet the need for freshwater. Water pollution not only poses the threat of freshwater crisis, water stress & hazardous impact on life on earth but also shows its impact on other areas of development. Such as increase in pollution may trigger a reduction of annual GDP growth by 30-40% in the case of developing world (UNEP 2019). Water shortage reduces the income of farmers & undercuts food security. Because of climate change we observe rainfall variability, rise in temperature & other such issues. In order to fulfil the needs of growing population, make our economies stronger & achieve sustainable development, appropriate management of water resources is needed.

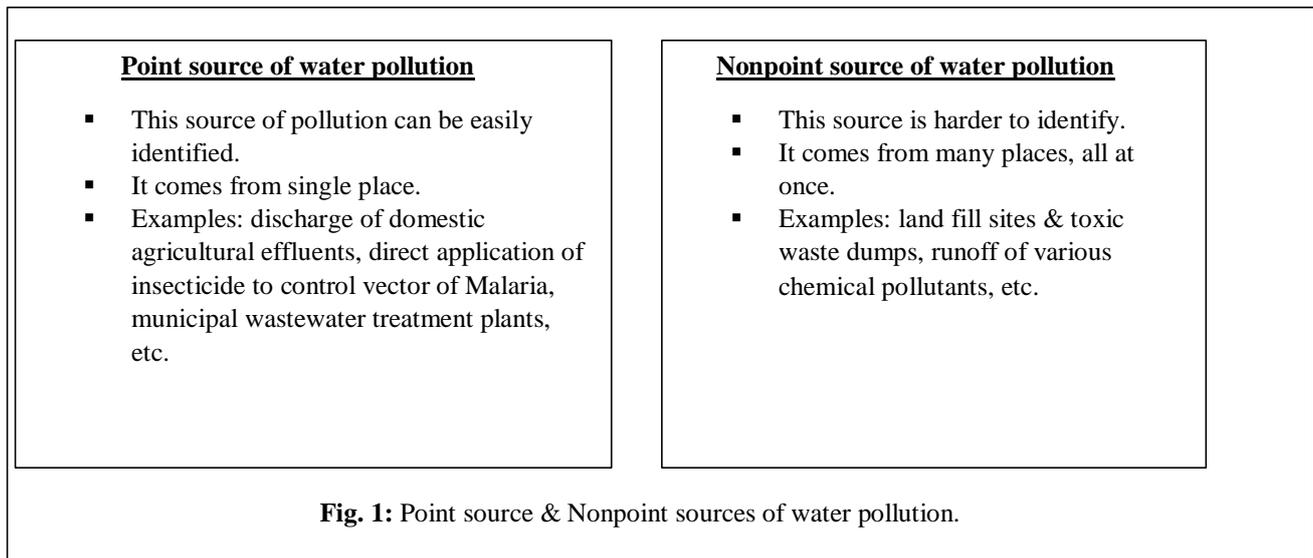
2.0] SOURCES OF WATER POLLUTION:

Industrial activities & agricultural activities, increasing human population are the major causes of pollution (Eguabor 1998)³. Generally, actions performed by humans are responsible for water pollution. Development rate is high in urban areas because of industrialisation. Hence water pollution is also much severe in urban areas as compared to rural areas. Also, the demand of freshwater is more in urban areas. There are various activities which are responsible for water pollution. Few of those activities are mentioned below:

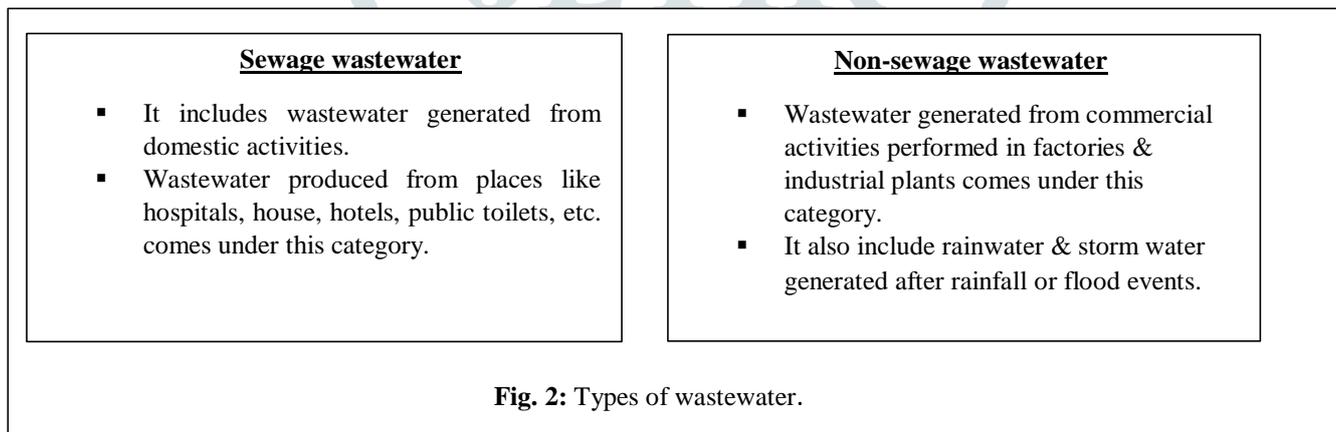
- Groundwater pollution because of drilling activities.
- Deforestation.
- Mining.
- Use of pesticides, herbicides & fertilizers.
- Household chemicals.
- Industrial waste dumping directly into water bodies.
- Agricultural runoff, etc.

Water pollution can have two type of sources:

- Point source.
- Nonpoint source.



Wastewater generated from various industrial and nonindustrial sectors is also major source of water pollution. Wastewater generated from these sectors include storm water runoff, agricultural, industrial and domestic (Blackwater, Greywater & Yellow water) wastewater. Generally, wastewater can be categorized into following two broad categories:



3.0] STATUS POLLUTED RIVER STRECHES IN INDIA:

As per the 'Polluted River Stretches for Restoration of Water Quality-2022 report', the 603 rivers in India were assessed. It is found that there are 311 polluted river stretches in 279 rivers in 30 states & union territories⁴. This assessment indicate that organic and microbial contamination of aquatic resources are the major concern for both the rivers & static water bodies.

In order to identify polluted river stretches in India, water quality data of river monitoring locations with respect to Biochemical Oxygen Demand (BOD) parameter is considered by CPCB. River stretches which have BOD more than 3mg/L are identified as polluted river stretches. Based on maximum BOD level observed, polluted river stretches are categorized into five priority classes. Following table 1 shows priority wise number of polluted river stretches in India:

| Priority class | BOD Concentration (in mg/L) | Number of polluted river stretches |
|----------------|-----------------------------|------------------------------------|
| I | 30.0 | 46 |
| II | 20.0-30.0 | 16 |
| III | 10.0-20.0 | 39 |
| IV | 6.0-10.0 | 65 |
| V | 3.0-6.0 | 145 |
| Total | | 311 |

Table 1: Priority-wise number of polluted river stretches in India⁴.

It was observed that Maharashtra has highest number of polluted river stretches i.e. 55, followed by Madhya Pradesh (19), Bihar (18) and Kerala (18). Whereas Andhra Pradesh (3), Delhi (1) & Tripura (1) have the lowest polluted river stretches in India.

4.0] IMPACT OF WATER POLLUTION:

Water pollution show its impact both on living beings and on the environment. In human beings its effects can be observed in terms of diseases caused because of polluted water. On environment, its impact can be observed via phenomenon such as ocean acidification, altered ecological balance of water bodies, death of aquatic animals, etc. Various pollutants such as organic chemicals, inorganic chemicals, pathogens, agricultural runoffs, radioactive materials, heavy metals, etc. are involved in water pollution. The hazardous impacts of water pollution are mentioned below:

- Heavy metals such as Cr, Zn, Ni, Pb, Cd, Hg, & Fe are the pollutants which find in wastewater generated from various Industries. Phenols and phenolic compounds are also one of the major pollutants of industrial wastewater. Untreated toxic wastewater when released into water bodies it shows its harmful effect on life forms. For example, when intake of such toxic heavy metal is done by any aquatic animal, it shows its detrimental effect on health of other animal & also on humans through food chain. It poses threat of Biomagnification. These heavy metals can be teratogenic, carcinogenic, etc. They can also cause reduced growth, organ damage problems in living beings. Phenolic compounds can cause respiratory failure, reflex loss, lowering of body temperature⁵.
- In order to gain higher agricultural yield lot of fertilizers, pesticides, etc. are being used by farmers. Due to agricultural runoff, toxic chemical pollutants present in the soil enter into water bodies & it affecting the life of the aquatic ecosystem. It creates sharp imbalance in aquatic ecosystem. It can cause phenomenon of Eutrophication in which the increased levels of ammonia and phosphate promotes the algal bloom. Because of which sunlight gets blocked & reduction of oxygen level is observed in that aquatic ecosystem. Due to this, aquatic animals present in that ecosystem suffer because of lack of resources needed them for survive.
- In 2015, 322 million tonnes of plastic was produced. Still its production is going on. Also near about 8 million tonnes of plastic gets dumped in ocean every year. Ingestion of this marine plastic waste & entanglement with this waste is causing harm to near about 600 marine species out of which 15 % are endangered species (UNEP) ⁶.
- Sewage wastewater is the biggest pollutant of freshwater. It shows its effect in the form of a reduction in the dissolved oxygen of that water body. Because organic matter present in sewage stimulates decomposers i.e. microorganisms to break down suspended solid particles of sewage. These microorganisms use dissolved oxygen & as a result, biological oxygen demand gets reduced. Aquatic animals present in such water bodies die because of suffocation.
- Water pollution also affects human health. Contaminated water contains many harmful pathogens & microorganisms. Consumption of such contaminated water leads to various kinds of diseases. Some of the diseases caused by contaminated water & their causative agents are mentioned below⁷:

| Pathogen | Disease | Causative agent | Mode of spread | Symptoms |
|-----------|---------------------|-------------------------------|--|--|
| Bacteria | Typhoid | <i>Salmonella typhi</i> | Consumption of contaminated food, water, milk, etc. | Continuous fever, body aches & Haemorrhage from ulceration in the small intestine. |
| Bacteria | Leptospirosis | <i>Leptospira</i> | Primary hosts are rodents, the patient gets infected by wadding or swimming in water contaminated with rodent's urine. | Fever, pain in legs, nausea, vomiting, congestion conjunctival blood vessels around the corneas of the eyes. |
| Virus | Infective hepatitis | Hepatitis virus | Water contaminated with animal's stool. | Loss of appetite, nausea, vomiting, diarrhoea accompanied by fever, eye & skin have yellow colouration. |
| Helminths | Guinea worm | <i>Dracunculus medinensis</i> | Unfiltered water containing infected copepods. | Blisters near the ankle, burns around the blister, allergy and aches |

Table 2: diseases occurring to humans because of water pollution.

These are the hazardous impact of water pollution. There are lot of rules and regulations to control water pollution. But there is a need to focus on the implementation of these laws to tackle water pollution & to protect the environment.

NOTE: This is an informative article. The author does not have competing interests.

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