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Critical Analysis of Water Pollution and its Impact on Society

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Abstract

Water pollution is a serious environmental issue in India as 70 percent of the surface and groundwater resources are contaminated by various pollutants such as biological, toxic, organic, and inorganic. Among all the largest sources of water pollution in India is untreated sewage. Agricultural runoff and unregulated small-scale industry are the other sources of pollution. Most of the rivers, lakes, and surface water in our country are polluted due to industries, untreated sewage, and solid wastes.

The outcome of this mammoth problem is the rising socio-economic cost of poor water quality. Approximately 40 million liters of wastewater enter rivers and other water bodies every day, with a tiny fraction of the made quietly treated. Due to water pollution, the most badly hit class is the weaker sections of the society as these people primarily reside near central water bodies in India. As per the World Bank report, such releases of pollution in the up streams reduce the downstream areas' economic growth. It reduces the growth of GDP in these regions, which creates a low impact on the overall GDP of the country. Almost half of the GDP is lost. Due to the polluted stretches in India, the agricultural revenues decrease to 9%, and a 16% fall in agricultural yields downstream areas.

Some remedial measures should be adopted to protect the poor masses of the country. Water pollution near oceans, rivers, lakes should be controlled. Waste ingredients should not be disposed of in oceans, rivers, lakes, and groundwater. Controlled use of pesticides and fertilizers should be done to prevent runoffs of the material into nearby water sources. Clean water bodies will result in the sustained development of the country, particularly the vulnerable sections of society. The hour requires to control 'water pollution to achieve the vision of the' healthy nation.

Key Words: *Water Pollution, Unregulated Small Scale Industries, Waste ingredients, Vulnerable Sections.*

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1. Introduction

Water Pollution is a significant environmental problem in our country since 70 percent of surface and groundwater resources are contaminated by various pollutants such as biological, toxic, organic, and inorganic. Among all the largest sources of water pollution in India is untreated sewage. Agricultural runoff and unregulated small-scale industry are the other sources of pollution. Most of the rivers, lakes, and surface water in our country are polluted due to industries, untreated sewage, and solid wastes.

Water pollution is the primary cause of many hazardous diseases in India. The harmful consequences of the polluted water affect the life of the present generation and affect the life of next generations as its effect remains for long. Bhopal gas tragedy case is the most prominent example. It can be said that the Bhopal Gas Tragedy is the world's worst industrial disaster. Various studies by official scientific agencies reveal that groundwater contamination has spread upto 40 meters deep and up to 3.5 km from the abandoned factory in Bhopal. This contaminated water consumed nearly 40000 persons over the last 14 to 20 years. The result is that people are suffering from cancers, congenital disabilities, and diseases related to skin, lungs, brain, kidneys, and liver and are several times more prevalent in that community than in any other place in the country.

There are multifold uses of water, and human beings can't survive without water. Pure and pollution-free water is indispensable for a healthy life. Suppose water is polluted in any particular area. In that case, people or the other living creatures are forced to drink that polluted water due to the unavailability of any other option, nor can they live without it. Pollution relating to water has become a severe problem across the country in recent years, primarily due to untreated waste materials, pesticides, and chemicals in it. The most important source of pollution of surface and groundwater in India is the discharge of untreated sewage water. This particular problem is that our country lacks sufficient treatment capacity and that the sewage treatment plants that exist but do not operate fully and are not adequately maintained.

Most of the time, government-owned sewage treatment plants remain closed due to poor maintenance, improper design, and lack of reliable electricity supply available to operate the plants. Apart from that employees are absent most of the time and there is mismanagement. The wastewater generated in these areas percolates into the soil and evaporates. The uncollected waste/garbage accumulates in the urban areas and causing unhygienic conditions and releasing pollutants that leach into the surface and groundwater. According to a report, 114 Indian cities were dumping untreated sewage and partially cremated bodies directly into the Ganges River. Lack of toilets and sanitation facilities caused open defecation in India's rural and urban pill areas and became a source of surface water pollution. The present article is based on the secondary data collected. The study area covered under the report was the low-lying areas of the river banks of northern India.

2. Clean Water Accessibility

The right to access clean water is the fundamental human right of a person as it is the essential requirement of the human being and is also one of the main substances for the survival of human beings. In daily life, water has a multifunctional role. It is required for drinking, bathing, cleaning, and irrigation, etc. The major water bodies from where people access water are lakes, rivers,

oceans, ponds, and groundwater. People also get Water from the State. On July 28, 2010, the U.N. General Assembly passed a resolution to make water and sanitation right. The Government of India is the trustee of all-natural resources meant for public use and enjoyment by nature, and water is a natural resource. Under Article 15 (2)(b), the Constitution of India provides the right that water is accessible for all irrespective of caste and religion.

3. Causes of Water Pollution

The term 'water pollution can be defined in many ways. Rendering the water not suitable for human consumption by changing its natural quality is known as water pollution. It can also be defined as when one or more substances have contaminated water to such an extent that they cause problems for people and animals. Water Pollutants include a wide range of chemicals, micro organisms, and physical chemistry, etc. Most of the chemical substances are toxic. Micro-organisms available in water can produce waterborne diseases. The leading causes of water pollution are:

a. Downstream Untreated Sewage

The leading cause of water pollution in India is sewage discharged from cities, towns, and villages. According to the World Health Organization report, out of India's 3,119 towns and cities, just 209 have partial sewage treatment arrangement, and only 8 have full wastewater treatment facilities. The polluted and untreated water in the downstream areas is used for drinking, bathing, and washing. It was claimed that 114 Indian cities were dumping untreated sewage and partially cremated bodies directly into the Ganges River, making it the worst polluted. Causes open defecation in rural and urban due to lack of toilets and sanitation facilities pill areas of India. It is a significant source of surface water pollution.

Investment is needed to bridge the gap between sewage generated in India and its treatment capacity of sewage per day. Big cities of India produce 38,354 million liters per day (MLD) of sewage, but the urban sewage treatment capacity is only 11,786 MLD. Many Indian rivers are severely polluted as a result of the discharge of domestic wastewater. A scientific analysis of water samples from 1995 to 2018 depicts that the organic and bacterial contamination is severe in water bodies of India, which is mainly due to the discharge of domestic wastewater in untreated form, mainly from the urban areas of India. Approximately 638 million people in India defecate in the open, and 67 percent of Indian households do not treat their drinking water.

b. Presence of Organic Matter

The water quality monitoring was done in the year 2010. It was found that almost all rivers were with high levels of BOD (a measure of pollution with organic matter). In decreasing order, the worst pollution was found in River Markanda (490 mg/l BOD), followed by river Kali (364), river Amlakhadi (353), Yamuna canal (247), 'river Yamuna' at Delhi (70), and river Betwa (58). For context, a water sample with a 5-day BOD between 1 and 2 mg O/L indicates pristine water, 3 to 8 mg O/L indicates moderately clean water, 8 to 20 indicates borderline water, and greater than 20 mg O/L indicates ecologically unsafe polluted water. Near the cities and towns, BOD levels are found severe, but in rural areas of India, the river BOD levels are sufficient to support aquatic life.

c. Level of Coliform

The most coliform polluted water bodies in India are rivers, Yamuna, Ganga, Gomti, Ghaghara, Chambal, Mahi, Vardha, and the Godavari. The amount of coliform must be below 104 MPN/100 ml. If it is preferably absent from water, it is considered safe for general human use and irrigation, where coliform may cause disease outbreaks from contaminated water in agriculture.

d. Industrialization

Industrial waste adds water pollution to the water bodies. Industrial waste is toxic to the life forms that consume this water. The thermal power plants are the largest pollution-creating industry, followed by electroplating units, paper mills, steel plants, textile, and sugar industries. Other large scale and small scale and cottage industries also contribute their share of water pollution. There are around 3 million small and cottage industries in India. They do not have proper pollutant disposal systems but also adopt polluting production technologies like dyes in fabrics, cadmium in ornaments, chrome in tanning leather, and other toxic chemicals. The waste of these industries gets scattered around or dumped, and effluents flow through drains or percolates or get washed away during the next rainy season and pollute the downstream areas.

e. Agricultural malpractices

At the onset of the monsoons, the fertilizers and the pesticides are washed into the nearest water bodies. According to a senior scientist, A.K. Dikshit from Indian Agricultural Research Institute (IARI), New Delhi, Indian farmers mainly engage in fertilizers and pesticides. More doses pollute water, air, and land.

f. Religious and Social Practises

Religious and social practices among the Indians also increase the water pollution in our rivers. As a matter of religious faith, carcasses of cattle and other animals are disposed of in the rivers; dead bodies are cremated on the banks of the rivers. As a matter of ancient rituals, partially bodies are flung into the rivers, which adversely affect the water quality of the rivers. Another environmentally harmful practice is mass bathing in a river during religious festivals. Due to this 'holy dip,' the biochemical oxygen demand (BOD) goes up drastically. Offerings from 'puja' are also immersed in the rivers. People engage these offerings in plastic bags making the situation worst.

4. Impact of Water Pollution

Water pollution is a global problem and has reached a dangerous mark in India. Rivers are the primary victims of excessive water pollution. Approximately 70% of the surface water is unfit for consumption in India. The impact of water pollution is:

a. Loss to Flora and Fauna

Water contamination is threatening biospheres and the ecosystem. Chemicals, effluents, and sewage is causing the species of aquatic life to extinct or migrating. Migratory birds shun the rivers and, as a result, face extinction. The existence of many species of flora and fauna is threatened due to rising pollution in India.

b. Impact on Livelihood

Indian water banks were once flourished with fish farms and fishers. They are finding it challenging to catch edible fishes. Fishes from polluted water are found to be contaminated with mercury, lead, and cadmium and thus found to be unfit for human consumption. Edible fishes are found infected with Salmonella, Shigella, and other harmful microbes found in human feces, which are dangerous for consumption.

c. Waterborne and Water-washed Diseases

Due to rising pollution in water bodies, approximately two-thirds of the Indian masses do not get safe and clean drinking water, increasing the risk of waterborne diseases. Diarrhea is one of the most significant killer diseases in India caused due to water pollution. According to Niti Aayog, a whopping 200,000 people losses their lives every year due to consuming polluted water. The health hazards due to infected water range from cancer to gastrointestinal disorders, depletion of calcium from bones of humans and animals (Osteoporosis), impotence among men, tuberculosis, sterility among women, and other severe diseases. Water-washed diseases as skin and eye infection are caused due to lack of clean water.

d. Makes water Hard

The TDS level of water increases due to an excessive amount of pollution, which makes it hard. The TDS level of water rises as water is a suitable solvent, quickly picking up the impurities. Total Dissolved Solids (TDS) consist of inorganic salts like calcium, magnesium, potassium, and some organic matter, which makes water hard by getting dissolved in it.

e. Loss to Agricultural produce

Agriculture is badly affected by the rising pollution. The use of excessive pesticides, herbicides, and fertilizers results in the falling productivity of the agricultural land as contaminated water by industrial effluents cannot be used for irrigation. Polluted Water leads to stunted seed growth, depriving farmers of bumper crop production, which hampers the country's target of attaining self-sufficiency in food.

f. Loss of Export Revenue

Fishes found in India, such as Hilsa, Rohu, Katla, and prawns, once had the highest demand in the Middle East. Due to the increased water pollution in India, these varieties of fishes got infected with disease-causing microbes and chemicals. As a result, several countries banned importing these fishes, which in return causes a severe loss of export revenue for India.

5. Remedies to Curb Water Pollution

Water conservation in India is gaining pace. Both Central and State governments are taking various steps to conserve water for a sustainable future. The higher class protects themselves from water pollution by taking self-protective steps, but the worst-hit class is the weaker class which does not have adequate resources to save themselves. Some remedial actions must be taken to reduce this growing mammoth problem. Specific remedies to control water pollution are:

a. Management of Floating Pollution

Plastic bottles and bags make water more toxic and hazardous. These pollutants should be managed appropriately and trapped. Strict measures should be taken to prevent these floating pollutants from reaching waterways to reduce the increasing menace of plastic pollution.

b. Treatment of Industrial water treatment

Treatment of industrial waste includes removing solid particles, reducing organic waste material, and using safe chemicals to get rid of any leftover impurities or chemical contaminants. It aids the safety of wastewater before it releases into the environment.

c. Denitrification

It is an ecological process used to prevent the leaching of nitrates in the soil so that underground water is not contaminated with nutrients. Intercropping plants can help the excess nitrogen is converted into gas like nitrous oxide, nitrogen, and nitrogen di-oxide.

d. Septic Tanks

Individual homesteads should use septic tanks. The sewage from the residential buildings should flow into septic tanks where it is treated before water can flow out of tanks. First solid and liquid matters are separated, and substantial value is degraded with the help of the biological process.

e. Minimum use of Detergents or Bleach

People should use such products for cleaning, which causes minor damage to the environment. An adequate amount of detergents and natural bleach products can serve as a better alternative contaminated water will always end up affecting the quality of water. This water is used by the people of the weaker sections of society.

6. Conclusion and Suggestions

The findings of this article reviewed that there is a lack of clean drinking water and sanitation in India. The quality of water problem and incidence of various water-related diseases had an economic impact on weaker households in the society in India. It can be said that weaker sections of society are most vulnerable to water pollution and the diseases caused by it. The water-related conditions, which mainly affected children, were diarrhea, malaria, cholera, skin infections, etc. The number of days spent in illness led to a loss of school days among children and loss of workdays, and the consequent loss of income among adults. It put a significant economic burden on the households due to the cost of treatment. These people spend the maximum share of their earnings on diseases. The low-income families spend a relatively higher proportion of their income to cope with water-related conditions, which further compounded their economic stress. This article unravels that the wastewater treatment plants in India are either not adequate or do not function well. Efforts are being made but not coping with the growing problem. Various measures are taken to improve the agricultural yield, and rapid industrialization is also graving the situation in India. Immediate development measures taken by the government are leading to an increasing number of water diseases. The unplanned household practices like the use of excessive water in household chores and careless drainage further engrave the situation and affect the sustainability of the water.

The article suggests that several central and state government institutions and departments are functioning to monitor water quality. However, these efforts and investments in the water supply and sanitation sector and various pollution control boards have not helped improve health outcomes. The article suggests a dire need to focus on the sustainability of water resources shortly and the quality of water, as poor water quality can further affect the already dwindling water resources. An adequate water policy is the need of the hour.

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