

# Environmental and Other Impacts, Due to Water Pollution in India

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“Nature is cheerful, until we use careful”

## INTRODUCTION

Water is an essential resource for human survival. According to the *2021 World Water Development Report* released by UNESCO, the global use of freshwater has increased six-fold in the past 100 years and has been growing by about 1% per year since the 1980s. With the increase of water consumption, water quality is facing severe challenges. Industrialization, agricultural production, and urban life have resulted in the degradation and pollution of the environment, adversely affecting the water bodies (rivers and oceans) necessary for life, ultimately affecting human health and sustainable social development. Globally, an estimated 80% of industrial and municipal wastewater is discharged into the environment without any prior treatment, with adverse effects on human health and ecosystems. This proportion is higher in the least developed countries, where sanitation and wastewater treatment facilities are severely lacking.

## Sources of Water Pollution

Water pollution is mainly concentrated in industrialization, agricultural activities, natural factors, and insufficient water supply and sewage treatment facilities. First, industry is the main cause of water pollution; these industries include distillery industry, tannery industry, pulp and paper industry, textile industry, food industry, iron and steel industry, nuclear industry and so on. Various toxic chemicals, organic and inorganic substances, toxic solvents and volatile organic chemicals may be released in industrial production. If these wastes are released into aquatic ecosystems without adequate treatment, they will cause water pollution (Chowdhary et al., 2020). Arsenic, cadmium, and chromium are vital pollutants discharged in wastewater, and the industrial sector is a significant

contributor to harmful pollutants (Chen et al., 2019). With the acceleration of urbanization, wastewater from industrial production has gradually increased. (Wu et al., 2020). In addition, water pollution caused by industrialization is also greatly affected by foreign direct investment. Industrial water pollution in less developed countries is positively correlated with foreign direct investment (Jorgenson, 2009). Second, water pollution is closely related to agriculture. Pesticides, nitrogen fertilizers and organic farm wastes from agriculture are significant causes of water pollution (RCEP, 1979). Agricultural activities will contaminate the water with nitrates, phosphorus, pesticides, soil sediments, salts and pathogens (Parris, 2011). Furthermore, agriculture has severely damaged all freshwater systems in their pristine state (Moss, 2008). Untreated or partially treated wastewater is widely used for irrigation in water-scarce regions of developing countries, including China and India, and the presence of pollutants in sewage poses risks to the environment and health. Taking China as an example, the imbalance in the quantity and quality of surface water resources has led to the long-term use of wastewater irrigation in some areas in developing countries to meet the water demand of agricultural production, resulting in serious agricultural land and food pollution, pesticide residues and heavy metal pollution threatening food safety and Human Health (Lu et al., 2015). Pesticides have an adverse impact on health through drinking water. Comparing pesticide use with health life Expectancy Longitudinal Survey data, it was found that a 10% increase in pesticide use resulted in a 1% increase in the medical disability index over 65 years of age (Lai, 2017). The case of the Musi River in India shows a higher incidence of morbidity in wastewater-irrigated villages than normal-water households. Third, water pollution is related to natural factors. Taking Child Loess Plateau as an example, the concentration of trace elements in water quality is higher than the average world level,

and trace elements come from natural weathering and manufacture causes. Poor river water quality is associated with high sodium and salinity hazards (Xiao et al., 2019). The most typical water pollution in the middle part of the loess Plateau is hexavalent chromium pollution, which is caused by the natural environment and human activities. Loess and mudstone are the main sources, and groundwater with high concentrations of hexavalent chromium is also an important factor in surface water pollution (He et al., 2020). Finally, water supply and sewage treatment facilities are also important factors affecting drinking water quality, especially in developing countries. In parallel with China rapid economic growth, industrialization and urbanization, underinvestment in basic water supply and treatment facilities has led to water pollution, increased incidence of infectious and parasitic diseases, and increased exposure to industrial chemicals, heavy metals and algal toxins (Wu et al., 1999). An econometric model predicts the impact of water purification equipment on water quality and therefore human health. When the proportion of household water treated with water purification equipment is reduced from 100% to 90%, the expected health benefits are reduced by up to 96%.. When the risk of pretreatment water quality is high, the decline is even more significant (Brown and Clasen, 2012).

To sum up, water pollution results from both human and natural factors. Various human activities will directly affect water quality, including urbanization, population growth, industrial production, climate change, and other factors (Halder and Islam, 2015) and religious activities (Dwivedi et al., 2018). Improper disposal of solid waste, sand, and gravel is also one reason for decreasing water quality (Ustaoglu et al., 2020).

#### Impact of Water Pollution on Human Health

Unsafe water has severe implications for human health. According to UNESCO 2021 *World Water Development Report*, about 829,000 people die each year from diarrhea caused by unsafe drinking water, sanitation, and hand hygiene, including nearly 300,000 children under the age of five, representing 5.3 percent of all deaths in this age group. Data from Palestine suggest that people who drink municipal water directly are more likely to suffer from diseases such as diarrhea than those who use desalinated and household-filtered drinking water. In a comparative

study of tap water, purified water, and bottled water, tap water was an essential source of gastrointestinal disease. Lack of water and sanitation services also increases the incidence of diseases such as cholera, trachoma, schistosomiasis, and helminthiasis. Data from studies in developing countries show a clear relationship between cholera and contaminated water, and household water treatment and storage can reduce cholera. In addition to disease, unsafe drinking water, and poor environmental hygiene can lead to gastrointestinal illness, inhibiting nutrient absorption and malnutrition. These effects are especially pronounced for children.

#### Effects of Water Pollution in India

Some of the most drastic effects of Water Pollution in India include:

- Increased infantile mortality
- Increased malignancy and breathing ailments in adults
- Mass extinction of flora and fauna
- Increased carbon emission
- Global warming
- Water scarcity

The process of saltwater intrusion into a coastal aquifer depends on how much water has been removed from the freshwater aquifer. Aquifers whose waters are periodically recharged are able to keep salt water from intruding. (more)

Groundwater—water contained in underground geologic formations called aquifers—is a source of drinking water for many people. For example, about half the people in the United States depend on groundwater for their domestic water supply. Although groundwater may appear crystal clear (due to the natural filtration that occurs as it flows slowly through layers of soil), it may still be polluted by dissolved chemicals and by bacteria and viruses. Sources of chemical contaminants include poorly designed or poorly maintained subsurface sewage-disposal systems (e.g., septic tanks), industrial wastes disposed of in improperly lined or unlined landfills or lagoons, leachates from unlined municipal refuse landfills, mining and petroleum production, and leaking underground storage tanks below gasoline service stations. In coastal areas, increasing withdrawal of groundwater (due to urbanization and industrialization) can cause

saltwater intrusion: as the water table drops, seawater is drawn into wells.

#### Causes of Water Pollution in India

Water Pollution happens due to the following reasons:

- *Human Waste*

Around 500 million people are living around the river Ganga. Moreover, the sewage from all these houses gets dumped in the river. The chemicals like soaps and detergents, human excreta create pollution.

- *Industrial Waste*

Many industrial cities like Allahabad, Kanpur, and Varanasi lie on the bank of the river. The various factories like chemical plants, tanneries, distillery, chemical plants, hospitals, and slaughterhouses are situated on the river bank. The people dump effluents and add water pollution. Further, industrial wastes are in less quantity when we compare it to human waste but industrial wastes are harmful than human waste. Industrial waste contains non-biodegradable toxic substances and harmful chemicals.

- *Cultural Waste*

The dip in holy water washes away all sins. Hence, a large number of people collect on the banks at the time of the festival. Also, individuals consider that dying by the river is a small way to heaven. Thus, you can observe dead bodies floating on the water.

- *The Pumping Station and Dams*

The human population is growing and is not going to stop. Further, the population needs food and to feed them various irrigation pumping stations and dams are constructed. These dams decrease downstream flow influencing upstream and downstream. You can see the negative effect of dams on the ever-decreasing pollution of dolphins.

- *Mining*

Some of the major mining belts are located near River Ganga. Underground mining requires a wide range of heavy-duty complex refining system. Water is an essential requirement for the mining refineries. Moreover, the large volume of harmful metalloid and remnant mixed water is ejected out of these mining pits into the river causing increased metal dumping

- *Radioactive Waste*

Similar to the mining industry radioactive waste from Nuclear plants Pharmaceutical research labs are all dumped into the river. Thus, it causes a massive spree of pollutants to be dissolved into the usable water unknown to most.

#### Minamata Incident

The Minamata Incident marked one of the worst cases of water pollution

In 1932, a factory in Minamata City, Japan began dumping its industrial effluent – Methylmercury, into the surrounding bay and the sea. Methylmercury is incredibly toxic to humans and animals alike, causing a wide range of neurological disorders.

Its ill effects were not immediately noticeable. However, this all changed as methylmercury started to bioaccumulate inside shellfish and fish in Minamata Bay. These affected organisms were then caught and consumed by the local population. Soon, the ill effects of methylmercury were becoming apparent.

Initially, animals such as cats and dogs were affected by this. The city's cats would often convulse and make strange noises before dying – hence, the term “dancing cat disease” was coined. Soon, the same symptoms were observed in people, though the cause was not apparent at the time.

Other affected people showed symptoms of acute mercury poisoning such as ataxia, muscle weakness, loss of motor coordination, damage to speech and hearing etc. In severe cases, paralysis occurred, which was followed by coma and death. These diseases and deaths continued for almost 36 years before they could be officially acknowledged by the government and the organisation.

Since then, various control measures for water pollution have been adopted by the government of Japan to curb such environmental disasters in the future

#### RESULTS

The quality of drinking water is an essential factor affecting human health. Poor drinking water quality has led to the occurrence of water-borne diseases. According to the World Health Organization (WHO) survey, 80% of the world's diseases and 50% of the world's child deaths are related to poor drinking water quality, and there are more than 50

diseases caused by poor drinking water quality. The quality of drinking water in developing countries is worrying. The negative health effects of water pollution remain the leading cause of morbidity and mortality in developing countries. Different from the existing literature review, this paper mainly studies the impact of water pollution on human health according to the heterogeneity of diseases. We focuses on diarrhea, skin diseases, cancer, child health, etc., and sorts out the main effects of water pollution on human health.

#### FOOT NOTES

- [1] United Nations Conference on the Human Environment, Stockholm, 16 June 1972;
- [2] NO. 6 OF 1974
- [3] Constituted under section 3 of the Water Act 1974
- [4] <https://www.frontiersin.org/journals/environmental-science#editorial-board>.
- [5] <https://www.toppr.com/guides/physics/water/water-pollution-in-india/>
- [6] (pdf) water pollution-sources, effects and control (researchgate.net)
- [7] (<http://response.restoration.noaa.gov/about/media/how-do-oil-spills-get-cleaned-shore.html>)