

# GROUNDWATER: PRECIOUS BUT CONTAMINATED

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Groundwater, one of the world's most precious resources, is responsible for 85% of drinking water supplies in India. Almost the entire rural population in India is using groundwater sources for their daily water needs. Groundwater helps grow our food, with more than 90% of total extraction is being used in irrigation. India is mostly dependent on groundwater for drinking water supply, irrigation and industrial purposes. India is also the largest user of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year - over 25% of the world's total.

Around a third of the planet's fresh water comes from underground aquifers, and while these are not visible, they are vital to maintaining our agriculture and industry. Unless urgent action is taken, 60% of India's aquifers will be running perilously low on water within next two decades. Not only water is scarce in India, but the extraction of groundwater has been on the rise for decades. The NitiAayog report says that nearly 70% of India's water is contaminated, impacting three out of four people.

But what happens when the groundwater becomes contaminated, undrinkable, and unusable? With groundwater being the largest source of freshwater, the effects of groundwater contamination are

becoming catastrophic, resulting in poor drinking water quality, loss of water supply, increased costs for alternative water supplies, high clean-up costs, and potential health risks.

We often forget that what we put on the ground today ends up under the ground. While groundwater contamination is mostly the result of human activities, but natural disasters can also factor into the contamination of this water source. Industrial, municipal, commercial, agricultural, and residential activities can all pose a threat to groundwater. A large portion of groundwater in India has become contaminated and it is more alarming as majority of rural population is dependent upon it while industrial production is increasingly depending on groundwater sources.

The major causes of groundwater contamination in India can be described as follows:

**Untreated Wastewater:** A huge volume of untreated wastewater in India is being released that not only making the surface water polluted but also contaminating the groundwater sources. A rough estimate suggest that almost over 50 billion litres of municipal wastewater and more than 6 billion litres of industrial wastewater is

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being discharged untreated every day in India. From the public health perspective, it is estimated that the impact of contaminated water in the country affects almost 40 million people annually including the death of 1.5 million children.

**Natural Disasters:** Natural disasters, such as wild fires, hurricanes, heavy floods, earthquakes etc., all have the potential to devastate our water supply. Natural disasters have huge capacity to inflict large amounts of contaminants into groundwater sources, making it polluted and disastrous for large population. The large scale flooding of Indian states and large cities that was witnessed in past 2-3 years damages the drinking water wells, leading to the contamination of groundwater from livestock waste, human sewage, industrial effluent, coloring chemicals, medical waste and other impurities.

**Urban Development:** Rapid urban development and increasing urban population with changing lifestyle is causing water table depletion in cities and further threatening water quality and contamination of groundwater supplies. In urban centres, open drainage contaminating water bodies and groundwater sources resulting in water quality deterioration and health issues. Urban development has a profound effect on groundwater supplies in these areas and unless this groundwater is better protected from contaminants, there will continue to be an increase in scarcity of clean water supplies.

In urban India, there is a lack of availability of piped water supply and over dependence on wells and borewells to compensate for the gap in water supply has led to over exploitation of groundwater resources in many cities. As high as 48% of India's urban water supply comes from groundwater, and in seven of India's 10 most populous cities, groundwater levels have dropped dangerously low over the past two decades.

**Irrigation:** Agriculture is both cause and victim of water pollution. It is a cause through its discharge of pollutants, chemicals from fertilizer and sediment to surface and groundwater. Soil can be over-irrigated due to poor distribution and through net loss of soil by poor agricultural practices that lead to salinization and water logging of irrigated land. Areas drenched by irrigation can become waterlogged, creating soil conditions that poison plant roots through anaerobic decomposition. Where water has been diverted, soils can accrue too much salt into the groundwater.

**Major drinking water sources like tube wells and hand pumps are found to be unsafe as they are known to be carriers of waterborne diseases.**



**PFAS:** Per- and Polyfluoroalkyl Substances (PFAS) in drinking water is an important emerging issue. PFAS are a large group of manmade chemicals which repel water and oil and are resistant to heat and chemical reactions. PFAS are used in the production of non-stick cookware, in waterproof and stain proof coatings, in leak-proof coatings on food packaging materials, in fire-fighting foams, and other applications. PFAS can enter groundwater through industrial release to water, air, or soil; discharges from sewage treatment plants; land application of contaminated sludge; leaching from landfills etc. PFAS are known to cause a variety of health problems including cancer, learning and behavioral problems in adolescents, infertility and pregnancy complications, high cholesterol, and issues with immune systems. With PFAS permeating the atmosphere, rain and snow, soil, they are posing a greater threat to groundwater supplies. If rainwater everywhere contains enough PFAS that it has been classified as unsafe to drink, it is seeping into groundwater supplies and soil.

**Way Forward:** The world does not have shortage of water; it has a shortage of clean and usable water. Groundwater may be seen as a great, hidden resource that is vast and flowing, but this is not the case. Groundwater is like the water in a sponge and moves slowly through the earth and is replenished locally. Groundwater is an important source of drinking water and these supplies have grown vulnerable and threatened. It is not an inexhaustible resource, supply can be exceeded, and streams and wells can dry up. A study of wells in Maharashtra shows that over 70% of them have declining groundwater levels. Much of the water extracted from the underground sources is non-renewable as the recharge rates are much lesser than the extraction rates.

A majority of India's households are using private means such as bore-wells and hand-pumps to extract groundwater without any regulation or concern for



conservation. The policy planning and implementation must have the participation of water stakeholders of our country like farmers, industry, energy producers, government agencies, rural and urban consumers etc. for improving the governance of water.

This is where water treatment companies can make a difference. Whether it is treating municipal and industrial wastewater, contaminated groundwater, monitoring wells and water supplies, or helping to restore clean water after a natural disaster, water treatment are vital in making sure the groundwater is safe, reliable for drinking and other consumptions. New technologies and processing methods are being developed to match the urban requirement of increasing contaminations and chemicals. While our groundwater must be protected and preserved, the water

treatment industry continues to adapt and learn how to meet these challenges.

With a legacy of about two decades, Sahara Industry has helped shaping up water treatment market in the country. With technologically advanced systems and world class quality compliance, it provides specialised industrial water treatment and management system, sewage and effluent treatment system, ultra-pure and reverse osmosis purification plant along with drinking water softener and treatment facilities.

The treatment systems being designed and developed on the parameters of raw water quality that has a wide range from conventional to membrane filtration along with treatment for specific chemical contaminants and various disinfection technologies to meet all drinking water standards. With the leading edge technologies, including membrane filtration and desalination plant, it is a leading name in the water industry. The ISO 9001:2015 certified company; it has proven domain knowledge and experience of implementing sustainable solutions for water sector across India with footprints in several countries globally. With social and environmental consciousness, it always strives to maintain a healthy environment with high performance and sustainable water treatment solutions.

**More than 90 percent of groundwater in India is used for irrigated agriculture.**

◀ **ABOUT THE AUTHOR** ▶

*Mohammed Abdul Rahman, the young entrepreneur with degree in marketing & finance, has successfully steered his company into a leading manufacturer of advanced quality water and wastewater treatment solution provider in India. His modern business approach supported by the technological intervention and dynamic leadership has made his group companies grow efficiently with turnover above INR 1000 million.*

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