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"Water, Water Everywhere, Nor any Drop to drink": Water Pollution in Trivandrum District

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Abstract

Kerala is one among the most thickly populated region in the world and the population is increasing at a rate of 14% per decade. As a result of the measures to satisfy the needs of the huge population, the rivers of Kerala have been increasingly polluted by the industrial and domestic waste and by the pesticides and fertilizers in agriculture.The major water quality problem associated with rivers of Kerala is bacteriological pollution. Coliform count in most of the Kerala Rivers and ground water is far above the permissible limits whereas air in most cities is thick with Respirable Suspended Particulate Matter (RSPM). Kerala has the highest chemical/bacterial contaminated drinking water among 28 tested States in the country, according to the Union Ministry of Drinking Water and Sanitation, the State's Economic Review for 2011-2012 has stated. The present study is aimed to find out the causes of water pollution and to identify the effects of water pollution in Trivandrum district.

Keywords: *pollution, Kerala, river, Drinking Water, Sanitation*

Introduction

Thiruvananthapuram the capital city of Kerala is one among the most populated cities in the state. As per census (2011), the entire population of Trivandrum city is 752,490. The

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Municipal Solid Wastes (MSW) generated by the people are disposed in open dumps, thus posing huge threat to the quality of ground water. MSW leachate contains variety of chemicals like inorganic and complex organic chemicals, detergents and metals. The dumping site is in an extremely populated area with no proper maintenance and therefore the people are using ground water for their daily usage. Hence, this work was undertaken to study the effect of open dump landfills and the leachates emanating from these landfills on surrounding ground water quality. Rivers, streams, canals, lakes, and oceans are currently used as receptacles for every imaginable kind of pollution. Waste materials that can eventually decompose in this way are called biodegradable. They are less of a long-term threat to the environment than are more persistent pollutants such as metals, plastics, and some chlorinated hydrocarbons. These substances remain in the water and can make it poisonous for most forms of life. Even biodegradable pollutants can damage a water supply for long periods of time. As any form of contamination accumulates, life within the water starts to suffer. Lakes are especially vulnerable to pollution because they cannot cleanse themselves as rapidly as rivers or oceans. Factories sometimes turn waterways into open sewers by dumping oils, toxic chemicals, and other harmful industrial wastes into them. In mining and oil-drilling operations, corrosive acid wastes are poured into the water. In recent years, municipal waste treatment plants have been built to contend with water contamination. Farm fertilizers in some regions fill groundwater with nitrates, making the water unfit to drink. Agricultural runoff containing dangerous pesticides and the oil, grime, and chemicals used to melt ice from city streets also pollute waterways.

Sources of Water Pollution

There are various classifications of water pollution. The two chief sources of water pollution can be seen as Point and Non Point.

Point refer to the pollutants that belong to a single source. An example of this would be emissions from factories into the water.

Non Point on the other hand means pollutants emitted from multiple sources. Contaminated water after rains that has travelled through several regions may also be considered as a Non point source of pollution.

Causes of Water Pollution

1.Industrial waste: Industries produce huge amount of waste which contains toxic chemicals and pollutants which can cause air pollution and damage to us and our environment. They contain pollutants such as lead, mercury, sulphur, asbestos, nitrates and many other harmful chemicals. Many industries do not have proper waste management system and drain the waste in the fresh water which goes into rivers, canals and later in to sea. The toxic chemicals have the capability to change the colour of water, increase the amount of minerals, also known as Eutrophication, change the temperature of water and pose serious hazard to water organisms.

2. Sewage and waste water: The sewage and waste water that is produced by each household is chemically treated and released in to sea with fresh water. The sewage water carries harmful bacteria and chemicals that can cause serious health problems. Pathogens are known as a common water pollutant; The sewers of cities house several pathogens and thereby diseases. Microorganisms in water are known to be

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causes of some very deadly diseases and become the breeding grounds for other creatures that act like carriers. These carriers inflict these diseases via various forms of contact onto an individual. A very common example of this process would be Malaria.

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3. Mining activities: Mining is the process of crushing the rock and extracting coal and other minerals from underground. These elements when extracted in the raw form contains harmful chemicals and can increase the amount of toxic elements when mixed up with water which may result in health problems. Mining activities emit several metal waste and sulphides from the rocks and is harmful for the water.

4. Marine dumping: The garbage produce by each household in the form of paper, aluminium, rubber, glass, plastic, food if collected and deposited into the sea in some countries. These items take from 2 weeks to 200 years to decompose. When such items enters the sea, they not only cause water pollution but also harm animals in the sea.

5. Accidental Oil leakage: Oil spill pose a huge concern as large amount of oil enters into the sea and does not dissolve with water; there by opens problem for local marine wildlife such as fish, birds and sea otters. For e.g.: a ship carrying large quantity of oil may spill oil if met with an accident and can cause varying damage to species in the ocean depending on the quantity of oil spill, size of ocean, toxicity of pollutant.

6.Burning of fossil fuels: Fossil fuels like coal and oil when burnt produce substantial amount of ash in the atmosphere. The particles which contain toxic chemicals when mixed with water vapor result in acid rain. Also, carbon dioxide is released from burning of fossil fuels which result in global warming.

7.Chemical fertilizers and pesticides: Chemical fertilizers and pesticides are used by farmers to protect crops from insects and bacterias. They are useful for the plants growth. However, when these chemicals are mixed up with water produce harmful for plants and animals. Also, when it rains, the chemicals mixes up with rainwater

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and flow down into rivers and canals which pose serious damages for aquatic animals.

8. Leakage from sewer lines: A small leakage from the sewer lines can contaminate the underground water and make it unfit for the people to drink. Also, when not repaired on time, the leaking water can come on to the surface and become a breeding ground for insects and mosquitoes.

9. Global warming: An increase in earth's temperature due to greenhouse effect results in global warming. It increases the water temperature and result in death of aquatic animals and marine species which later results in water pollution.

10. Radioactive waste: Nuclear energy is produced using nuclear fission or fusion. The element that is used in production of nuclear energy is Uranium which is highly toxic chemical. The nuclear waste that is produced by radioactive material needs to be disposed off to prevent any nuclear accident. Nuclear waste can have serious environmental hazards if not disposed off properly. Few major accidents have already taken place in Russia and Japan.

11. Urban development: As population has grown, so has the demand for housing, food and cloth. As more cities and towns are developed, they have resulted in increase use of fertilizers to produce more food, soil erosion due to deforestation, increase in construction activities, inadequate sewer collection and treatment, landfills as more garbage is produced, increase in chemicals from industries to produce more materials.

12. Leakage from the landfills: Landfills are nothing but huge pile of garbage that produces awful smell and can be seen across the city. When it rains, the landfills may leak and the leaking landfills can pollute the underground water with large variety of contaminants.

13. Animal waste: The waste produce produce by animals is washed away into the rivers when it rains. It gets mixed up with other harmful chemicals and causes various water borne diseases like cholera, diarrhoea, jaundice, dysentery and typhoid.

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14. Underground storage leakage: Transportation of coal and other petroleum products through underground pipes is well known. Accidentals leakage may happen anytime and may cause damage to environment and result in soil erosion.

Water pollutants also include both organic and inorganic factors. Organic factors include volatile organic compounds, fuels, waste from trees, plants etc. Inorganic factors include ammonia, chemical waste from factories, discarded cosmetics etc. The water that travels via fields is usually contaminated with all forms of waste inclusive of fertilizers that it swept along the way. This infected water makes its way to our water bodies and sometimes to the seas endangering the flora, fauna and humans that use it along its path.

The current scenario has led to a consciousness about water preservation and efforts are being made on several levels to redeem our water resources. Industries and factory set-ups are restricted from contaminating the water bodies and are advised to treat their contaminated waste through filtration methods. People are investing in rain water harvesting projects to collect rainwater and preserve it in wells below ground level.

Water Pollution is common, and is an area of high alert. Water needs to be preserved and respected today, for us to live a tomorrow.

Effects of water Pollution

Polluted drinking water or water polluted by chemicals produced waterborne diseases like, Giardiasis, Amoebiasis, Hookworm, Ascariasis, Typhoid, Liver and kidney damage, Alzheimer's disease, non-Hodgkin's Lymphoma, multiple Sclerosis, Hormonal problems that can disorder development and reproductive processes, Cancer, heart disease, damage to the nervous system, different type of damages on babies in womb, Parkinson's disease, Damage to the DNA and even death, meanwhile, polluted beach water contaminated people like stomach aches,

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encephalitis, Hepatitis, diarrhoea, vomiting, gastroenteritis, respiratory infections, ear ache, pink eye and rashes (Water Pollution Effects, 2006). Loss of wild life is directly related to pollution (Progressive Insurance, 2005) and according to Water Pollution Effects (2006) on animals i) Nutrient polluted water causes overgrowth of toxic algae eaten by other aquatic animals, and may cause death; it can also cause eruptions of fish diseases, ii) Chemical contamination can cause declines in frog biodiversity and tadpole mass iii) Oil pollution can increase susceptibility to disease and affect reproductive processes and negatively affect development of marine organisms and it can also a source of gastrointestinal irritation, damage to the nervous system, liver and kidney damage iv) Mercury in water can cause reduced reproduction, slower growth and development, abnormal behavior and death v) Persistent organic pollutants may cause declines, deformities and death of fish life and Fish from polluted water and vegetable/ crops produced or washed from polluted water could also make impact on human and animal health. More sodium chloride (ordinary salt) in water may kill animals and plants, plants may be killed by mud from construction sites as well as bits of wood and leaves, clay and other similar materials and plants may be killed by herbicides. For tree and plants water pollution may disrupt photosynthesis in aquatic plants and thus affecting ecosystems that depend on these plants .

The effects of water pollution are varied and depend on what chemicals are dumped and in which locations. Many water bodies near urban areas are highly polluted. This is the result of both garbage dumped by individuals and dangerous chemicals legally or illegally dumped by manufacturing industries, health centres, schools and market places.

Death of aquatic (water) animals

The main problem caused by water pollution is that it kills life that depends on these water bodies. Dead fish, crabs, birds and sea gulls, dolphins, and many other animals often wind up on beaches, killed by pollutants in their habitat.

Disruption of food-chains

Pollution disrupts the natural food chain as well. Pollutants such as lead and cadmium are eaten by tiny animals. Later, these animals are consumed by fish and shellfish, and the food chain continues to be disrupted at all higher levels.

Diseases

Eventually, humans are affected by this process as well. People can get diseases such as hepatitis by eating seafood that has been poisoned. In many poor nations, there is always outbreak of cholera and diseases as a result of poor drinking water treatment from contaminated waters.

Destruction of ecosystems

Ecosystems can be severely changed or destroyed by water pollution. Many areas are now being affected by careless human pollution, and this pollution is coming back to hurt humans in many ways.

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Conclusion

Water plays a crucial role in our life. Safe drinking water is an absolute necessity for maintaining good health. It is one of the most badly supplied resource by the government to day. Every day one giant pipe is damaged and the water we get is contaminated with every type of pollutant. Toxic organic water pollution is very common More than 10000 synthetic organic substances are used by various industries. There are metals, acids, salts and mercury. Plastic is a major pollutant of water. Pathogenic Organisms are plenty in drinking water. The source for drinking water in urban areas is mainly streams, lakes and rivers. Chlorination is the commonly used method to disinfect water. Coliform Organisms are common in drinking water. World Health Organization has put forward a program Health For All' and it's first agenda is zero bacteria drinking water. More than 80 communicable diseases are spread through contaminated water. Even tap water has to be boiled only by boiling the water for full 5 minutes the Pathogenic Organisms can be destroyed. Most of the bottled water are not safe Many reports have come questioning their purity. Even filtered water is not safe Only boiled water is safe. Diarrhoea, dysentery, typhoid, gastroenteritis, Eamoebias is and hepatitis - A are transferred through contaminated water. A study conducted by health department showed about 85% of mineral water has E coli and other harmful Organisms in it Strong determination from the administrators and participation from public is essential to ensure safe drinking water for everybody.

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