

Chemistry of Environmental Pollution and How It Affects Human Life

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ABSTRACT

For both developed and emerging nations, environmental contamination is a serious issue. However, this issue is especially prevalent in overpopulated nations. We must first comprehend every issue and how it develops in order to safeguard Vasundhara and all of nature's species. We must accept responsibility for our actions. And everyone in the community must take action. From preschool to college, the curriculum needs to cover topics connected to life and the environment. All curricula must be practical-based. Because research botanists cannot accurately identify plant species as our forefather did easily. Nobody trust on him because allopathic medicine is preferred by botanists for their own use. The curriculum has this shortcoming. In chemistry and other areas, same issue also occurs. There is a need to reform the curriculum because very few chemists are able to describe the chemistry of our surroundings. The primary causes of environmental pollution are our basic demands for food (water), clothing, and shelter. Almost all types of pollution and their cause are we discuss regularly but one factor remain untouchable of cloth industry. We must pay attention to clothing and the industries that produce it since they contribute significantly to water pollution. Forests are being cut down more often to meet the rising population's need for shelter. In the past three to five years, the government were widen roads due to an excessive number of vehicles. All across our nation, trees on both sides are hacked down for the purpose of widening. One another very good alternative is that use electric vehicles like two wheeler and four wheeler its saves environment by air pollution and money also. You may travel for free and save money on the gas and electricity bills for your automobile with the aid of electric created by solar energy. you can completely eliminate your travel expenses by recharging your two-wheeler and electric vehicle by You can travel for free and save money on your car's gas and electricity bills with the aid of electric created by solar energy.

KEYWORDS –Water pollution, Soil pollution, Factor affect human health, landfill, Remedies on soil pollution, Remedies on water pollution.

INTRODUCTION

We all know that the entire planet is plagued by different pollution issues, practically all of them are linked to humans, putting human life in jeopardy. To save Vasundhara and all of nature's creatures, we must first understand all of the problems and how they arise. We studied in depth, and for the most part, many topics were discussed but no one implemented. Everyone tries to show that he is aware of the environment, but others are not, and everyone in the community is accountable for it.

WATER

Only about 3% of the world's water is fresh; the rest is seawater, which is unfit to drink. Over 2.5 percent of this 3 percent is frozen and unavailable to man in Antarctica, the Arctic, and glaciers.

As a result, humanity's fresh water needs must be met entirely by this 0.5 percent. India is a river-rich country with about 500 rivers, including 14 international rivers. India has been known as "Sapta Sindhus Pradesh" since ancient times, which signifies that India's economical and cultural development took place in the river basin. In India, river water is the primary source for all domestic needs. However, as society has progressed, the value of water has greatly increased. As a result, all countries must construct dams on the river. In India, 14 rivers serve 85 percent of the population, and the average daily water use for home and industrial purposes is between 100 and 200 litres per person, depending on living conditions and industrial activities. Water has been used by man for drinking, bathing, cooking, and other purposes since ancient times. However, as society has progressed, the

value of water has greatly increased. As a result, damming rivers has become a need for all governments. Water is extremely important to all types of living things. It is required for human, animal, and plant development to be healthy. Even though some trace elements are needed to man at a high degree, drinking water plays an important part in the body intake of essential elements by humans. When an essential or non-essential element is present in excess quantity, it can induce morphological defects, stunted growth, increased mortality, and mutagenic effects. We get our water from underground as well as reservoirs, lakes, and rivers. Water use is steadily increasing as the world's population and requirements expand. Fresh water is the most valuable and essential resource on the planet. India is a country rich in natural beauty, with a diverse landscape crisscrossed by rivers. India receives over 4000 billion cubic metres of rain every year on average (BCM). According to annual data from the Metrological Department, there are 4000 BCM of available water from precipitation, while the typical flow in the country's rivers is around 1900 BCM.

A complicated hydrological cycle connects all freshwater bodies to the oceans, the atmosphere, and aquifers. Wetlands, ice caps, and biosphere water all contribute to the constant flow of water on the planet. Evaporation and gravity drive the earth's hydrological cycle, which ecosystems and human cultures rely on. Growing population, rapid industrialisation, and increased fertiliser usage in agriculture have all had a significant impact on the quality of natural waters, affecting both the quality and quantity of the hydrological budget. As a result, it was only natural that many scholars were driven to do in-depth research on water bodies, particularly with regard to the biological and chemical quality of the water.

SOIL

Soil is the rocky surface of the Earth's thin layer of organic and inorganic materials. The organic part, which is made up of decomposed plant and animal remnants, is concentrated in the topsoil's darkest layer.

Physical and chemical weathering of bedrock generated the inorganic element of the structure, which is made up of rock fragments in thousands of year. Agriculture requires productive soils to meet global food demands.

RESULT AND DISCUSSION

WATER POLLUTION

Every year, the repercussions of unclean water kill more people than all types of violence combined, including war." Water contamination indicates any chemical, biological, or physical alteration in water quality that harms living organisms or renders water unfit for intended use. Freshwater that is clean, safe, and sufficient is essential for the survival of all living species as well as the proper operation of ecosystems, communities, and economies. Millions of litres of sewage, industrial and agricultural pollutants flow into India's 14 major, 55 minor, and hundreds of small rivers, causing different parameters of Ganga water to exceed the permissible limit. Lake and ground water are also affected by pollution. Leading environmentalists in India have identified water pollution as one of the country's most pressing environmental challenges.

One of the best examples of pollution on a vast scale. Sukinda Valley in Orissa (India) contains 97 percent of India's chromites ore resources, as well as one of the world's largest open cast chromites ore mines and twelve additional mines that produce 30 million tonnes of waste rock each year. Preheat the oven to 350 degrees F. River Brahmani According to the OVHA (Orissa Voluntary Health Association), chromites mine-related sickness was responsible for 84.75 percent of mortality in mining areas and 86.42 percent of deaths in nearby industrial villages.

River Pollution Treat Prevented, according to BBC-UK, disclosed that in July 2000, over 1,00,000 fish were killed in an incident in the River Dee.

Drinking water contamination has turned into a big environmental issue. The drinking water is contaminated either by the pipe distribution system or by ground water directly. The following diagram depicts water contamination and water percolation.

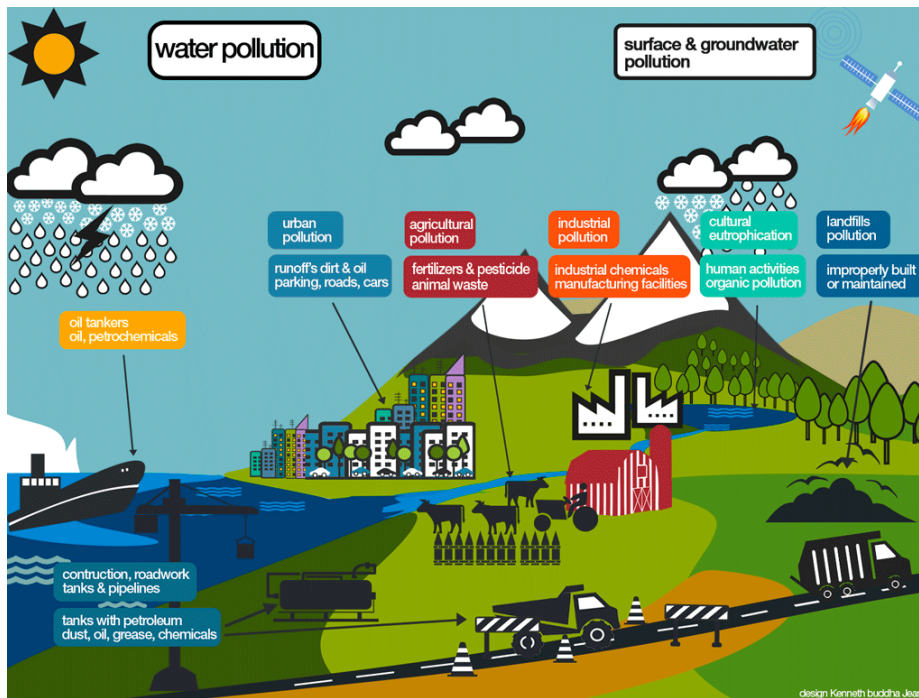


Fig 1.1 Sources of Water pollution

The Ganges, which is a lifeline for millions of people and a place of profound religious significance, is being polluted by untreated residential waste and industrial pollution. This endangers the health of nearly 400 million people who consume water in their everyday lives, both directly and indirectly.

The rivers "VARUNA" and "ASI" in Varanasi have become so polluted that they no longer flow as rivers but as torrents of sewage and waste water combining at the beginning and end of the holy city of Varanasi (Varuna Asi).

OVERVIEW OF THE MAJOR PROBLEMS:

DRINKING WATER

India is dealing with two major domestic water issues. One is water scarcity, and the other is water pollution. There is an insufficient and intermittent supply of drinking water in most parts of high density areas and some dry areas. In rural areas and some urban slum areas, there is insufficient piped water supply. Water is lost throughout the transportation (distribution) and storage processes. Insufficient financial resources to make improvements

Metallic pollution has been discovered in chemical and different metal industrial areas, as well as bacterial water pollution in the home sewage area. Waterborne infections afflict 37.7 million Indians each year. Diarrhoea alone is projected to kill 1.5 million children. In the year 2021, 73 million working days will be missed owing to waterborne infections. Poor water quality affects 785 million people in the country, costing the country \$600 million every year.

INDUSTRIAL WATER

Inability of municipal water supply organisations to meet increasing needs of current and new companies due to insufficient implementation of a special water regime for industries using large amounts of water.



Fig 1.2 Industrial waste water near MIDC

"Every day, 150 million gallons of sewage are dumped into the river by residents." River Yamuna is "The main drain for New Delhi's waste" "The Yamuna has been declared clinically dead in New Delhi."



Fig 1.3 Pollution due to urbanisation

The Ganges River is also known as the "River of Dead Bodies." Another concern is improper drainage, since home sewage and industrial waste are discharged into bodies of water without being treated. Flood protection for industrial sites from excess surface water is required. Some industrial organisations are exploiting groundwater without permission.



Fig 1.4 Drainage let into river without treatment.

SOLUTION ON SCARCITY OF WATER

Conserve water

Flush the toilet only when absolutely necessary. Reduce the amount of water needed for each flush by placing a brick or any other device that takes up space. When cleaning your car, use a bucket rather than a hosepipe. Water used to wash vegetables, rice, or dals should not be thrown away. Use it to water plants, clean floors, and so on. Water can be stored in a variety of ways. Placing a drum on a raised platform just beneath the rainwater collection source is a simple method. Wherever possible, construct an underground storage tank with a large capacity that can store rainwater falling on your roof and house yard to meet your demand during the summer or when the weather is dry.

During the rainy season, you can also gather water in a bucket. If a family of four lives in an 800 square foot home and collects rainwater from their roof, they will meet 60% of their annual consumption. Donate to a fund that will be used to support current projects. Every day, try to save one litre of water. Even if the savings are little, every penny counts! Start from yourself, all above are not difficult after few days it become part of life. I already adapted it all. You have the power to change the world.

Keep in mind that you should only utilise what you require. Form a community of people who care about the environment and invite your friends and neighbours to join. In neighbourhood bulletins and bulletin boards, encourage people to save water.

Encourage your friends, neighbours, and co workers to participate, as well. Encourage your family to continue to explore for new ways to save water in and around the house. Make sure your home is clear of leaks. Many houses have unnoticed leaking pipes. While brushing your teeth or washing your face, do not leave the tap running. If you don't want to store rainwater, use a rainwater harvester pit to direct it into the earth. Irrigation Water Management uses deep irrigation instead of direct hosepipe or spray irrigation and scatters dry grass, grain husks, liegemen, and excess portion tree cutting on the ground under large trees or crops to reduce water evaporation. Dam construction should be conducted as part of hydrological projects. Artificial groundwater recharge by a dug well. Soil porosity and water holding capacity increase when soil is dug anyplace on the earth surface, and water is put in the soil. Tree Plantation - Every person should plant 10 trees every year and care for them for at least three years. Avoid planting trees such as ecolaptous (Nilgiri), which reduces the subsurface water level, and instead plant trees such as ficus racemose, banyan tree, Neem, and Pipal.

Avoid pollution by avoiding needless car use. It has been found that during a pandemic crisis (lockdown), pollution levels dropped by 40%. Utilizing electric vehicles, such as two- and four-wheelers, is another excellent solution because it reduces air pollution and fuel costs. Everyone tries to use solar electric generators to cut down on the amount of water used in hydroelectric plants. With the help of electric produced by solar energy, by recharging your two-wheeler and electric vehicle you can travel for free and save money on your car's gas and power bills.

Technologies and Innovations Different new technologies must be applied, which motivates innovation. A sewage water filtration system is an excellent application of technology.

Water Purification Systems sewage water must be purified before being released into a body of Every location where residential contaminated water enters water resources should have such a treatment system.

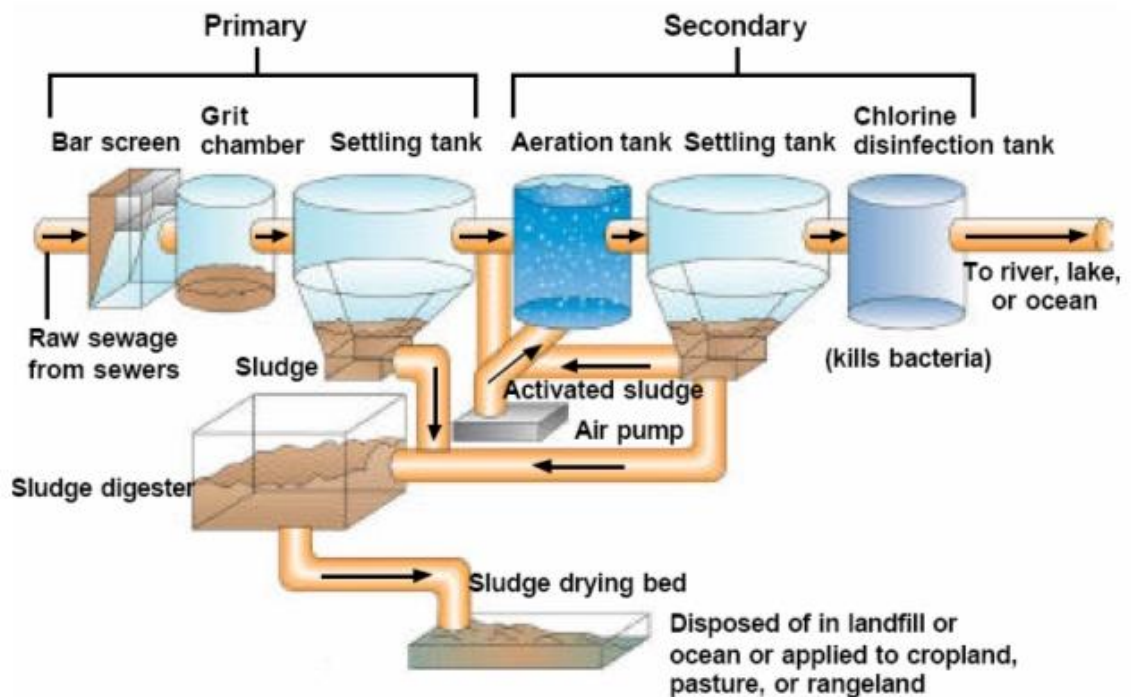


Fig 1.5 Wastewater purification plant diagrammatical representation.

Desalination of seawater We can utilise this strategy whenever there is no other option, but it is not cheap. Water-related issues necessitate consideration of cultural, educational, communicative, and scientific factors.

DEFINITION OF SOIL POLLUTION

Soil pollution is described as the accumulation in soils of persistent poisonous compounds, chemicals, salts, radioactive elements, or disease-causing agents that harm plant development and animal health.



Fig 2.1 Seepage from a landfill

Soil pollution can occur in a variety of ways, including, Seepage from a landfill — A landfill is a rubbish dump where waste is disposed of. Municipal waste, food waste, paper, glass, chemical containers, sanitizer containers, pesticide containers, insecticide containers.

soil and water supplies. They are becoming increasingly contaminated with paper, cardboard, plastics, glass, old construction materials, packaging materials, and toxic or otherwise substances.



Fig 2.2 Municipal waste dumped near the river bank is purported into river water

Industrial garbage is dumped into the ground. Hazardous chemicals, heavy metals, fertiliser waste, insecticide, pesticide waste, and waste water from the pharmaceutical and chemical industries are all discharged into water sources and land.

Organic and inorganic substances are both present in landfill waste. Organic matter accounts for more than half of all waste materials. Because of poor landfill waste management, hazardous gases are released into the atmosphere, posing a major threat to human health. Landfills, on the other hand, provide a natural habitat for a variety of microorganisms and arthropods. The population of harmful disease-carrying insects, bug scavengers, and pollinators has been identified. [1]Contaminated water is percolated into the soil from home sewage, hospitals, and slum areas. Underground storage tanks containing various industrial chemicals bursting. Oils and fuels seep into the earth.



Fig 2.3 Pesticides, herbicides, and fertilisers used excessively in farming are carried by rainwater and percolated into long patch soil.

TYPES OF SOIL POLLUTION

Agricultural soil pollution resulted by use of Excess fertiliser, insecticide, and pesticide

Surface soil pollution is caused by landfills, dumps, solid waste, and garbage.

Subsurface soil - Seepage of landfill, industrial waste, and underground tank leakage pollutes subsurface soil. Industrial effluents and solid wastes pollute the soil. Disturbances in the soil profile caused by mining, Pollution caused by human activity in cities.

CAUSES OF SOIL POLLUTION

The presence of man-made chemicals or other changes in the natural soil environment produce soil pollution. The application of pesticides, percolation of polluted surface water into subsurface strata, oil and fuel dumping, leaching of wastes from landfills, or direct discharge of industrial wastes to the soil are all examples of this form of contamination.

Petroleum hydrocarbons, solvents, insecticides, lead, and other heavy metals are the most prevalent compounds involved. The degree of industrialisation and the intensity of chemical use are linked to the incidence of this phenomena.

Excessive fertilisation and carelessness were mentioned, but there were also soil salinity, heavy metal accumulation, water eutrophication, and nitrate accumulation to consider in terms of air pollution from nitrogen and sulphur-containing gases, which can cause problems such as the greenhouse effect. The goal of this review is to show the environmental and health consequences of incorrect fertilisation.[2]



Fig 2.4 Wind carry pesticides to other field, grazing areas, human settlements

The indiscriminate use of fertilisers, pesticides, and herbicides is linked to soil pollution.

Food-producing plants are under attack by insects, fungi, bacteria, viruses, rodents, and other animals, and must fight for nutrients with weeds. Pesticides are used by farmers to eliminate unwanted populations in or on their crops. DDT (dichlorodiphenyltrichloroethane) and gammaxene were the first insecticides to be widely used after World War II. Pesticides are chemical compounds that are used to kill fungi and animals. Pesticides can be carried into aquatic environments by runoff, and pesticides can be carried to adjacent fields, grazing areas, human settlements, and undeveloped areas by wind. Repeated application builds pest resistance, while the effects on other species can encourage resurgence. Pesticides not only have a hazardous effect on humans and animals, but they also reduce soil fertility. Some pesticides are quite stable, and biodegradation might take weeks or even months. Scientists are looking for alternatives to pesticides because of issues like resistance, resurgence, and health impacts. Pheromones and hormones have been suggested to attract or repel insects, as well as the use of natural enemies or radiation sterilisation. Because paper and food waste make up a large portion of urban solid waste, the bulk of it is recyclable or biodegradable in landfills. On a preliminary estimate, Indian cities produce 50,000-80,000 metric tonnes of solid garbage every day. Similarly, most agricultural waste is recycled, while mining waste is left on site. Oils, battery metals, and heavy metals from smelting are examples of hazardous solid waste. We must pay special attention to the hazardous components of solid waste, such as lubricants, battery

metals, heavy metals from smelting industries, and organic solvents. They also contaminate aquifer sources for drinking water. Chemical, petroleum, and metal-related sectors produce more than 90% of hazardous waste, while small businesses like dry cleaners and gas stations also contribute.

EFFECTS OF SOIL POLLUTION

On Agricultural- Reduced soil fertility, reduced nitrogen fixation, increased erodibility

Larger loss of soil and nutrients, Deposition of silt in tanks and reservoirs, reduced crop yield

Imbalance in soil fauna and flora, Industrial Dangerous chemicals entering underground water

Cause Ecological imbalance, Release of pollutant gases, Release of radioactive rays causing health problems, increased salinity, reduced vegetation

SOIL EROSION AND DEFORESTATION- Deforestation is destroying the world's most productive flora and fauna areas, as well as enormous swaths of a very significant CO₂ sink. Soil Erosion occurs when weathered soil particles become loosened and carried away by wind or water, resulting in deforestation. This erosion is exacerbated by deforestation, agricultural development, temperature extremes, precipitation, particularly acid rain, and human activities. Construction, mining, timber cutting, over farming, and overgrazing all help to accelerate this process. Floods and soil degradation are the result. Many scientists believe that these trees contain a multitude of medicinal compounds, including cancer, blood pressure, heart attack, diabetes and HIV cures.

Several biodegradable elements such as vegetables, animal wastes, papers, timber pieces, corpses, and plant wastes are generated by urban activities. Many biodegradable materials (such as vegetables, animal wastes, papers, wooden pieces, carcasses, plant twigs, leaves, cloth wastes, and sweepings) and many non-biodegradable materials (such as plastic bags, plastic bottles, plastic wastes, glass bottles, glass pieces, stone / cement pieces) are generated by urban activities. Pollution of the underground soil occurs. If they are not collected and degraded, they can create a variety of issues, including: Drain clogging: Causes major drainage issues, such as burst or leaky drainage pipes, which can lead to health issues. The foul odour is caused by dumping garbage somewhere. Many hazardous compounds, such as cadmium, chromium, lead, arsenic, and selenium products, are prone to end up in subsurface soil. Similarly, sanitary wastes damage subsurface soil, which produces several dangerous compounds. Decomposed and partially decomposed materials of sanitary wastes. Purposeful injection into groundwater as a disposal method. These can damage the normal activities and ecological balance in the underground soil. Interconnections between aquifers during drilling (poor technique). Septic tank seepage, Lagoon seepage, Sanitary/hazardous landfill seepage, Cemeteries, Scrap yards (waste oil and chemical drainage), Leaks from sanitary sewers

CONCLUSION

Thus we have analyzed about what are the causes of soil & water pollution and effects of soil and water pollution. Since we have to realize the importance of soil prevention and steps to be taken to reduce water and soil pollution. Some remedies are suggested below.

Planted the *Ficus racemosa* (Oudumber in Marathi) tree on the both side of riverbank and surrounding to the waterbody. Plant *Ficus racemosa* has great tendency to purify water and holding capacity of water. Use way of natural farming is very effective alternative to prevent soil and water pollution

From preschool to college, the curriculum needs to cover topics connected to life and the environment. All curricula must be practical-based. For example research botanists cannot accurately identify plant species as our forefather did easily. Nobody trust on him because allopathic medicine is preferred by botanists for their own use. The curriculum has this shortcoming. In chemistry and other areas, same issue also occurs. There is a need to reform the curriculum because very few chemists are able to describe the chemistry of our surroundings. The primary causes of environmental pollution are our basic demands for food (water), clothing, and shelter. Almost all types of pollution and their cause are we discuss regularly but one factor remain untouchable of cloth industry. We must pay attention to clothing and the industries that produce it since they contribute significantly to water pollution. Forests are being cut down more often to meet the rising population's need for shelter. In the past three to five years, the government were widen roads due to an excessive number of vehicles. All across our nation, trees on both sides are hacked down for the purpose of widening. One another very good alternative is that use electric vehicles like two wheeler and four wheeler its saves environment by air pollution and money also. You may travel for free and save money on the gas and electricity bills for your automobile with the aid of electric created by solar energy. you can completely eliminate your travel expenses by recharging your two-

wheeler and electric vehicle by Electric produced by solar energy saves your electricity bill and automobile charge, making travel completely free.

We must take one step that separates degradable (waste of vegetable, fruit) and non-degradable substance in order to prevent soil degradation by landfill. Only non-biodegradable materials should be put in the garbage trucks used by municipal corporations. And you can create high-quality manure for your plant with the aid of biodegradable materials. We can avoid dumping rubbish generated by municipal corporations. Making tar roads out of plastic is another way to deal with plastic trash. An Indian scientist and professor at Thiagarajan College of Engineering, RajaGopalan Vasudevan, built a plastic-tar road.

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