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WATER POLLUTION REASONS, EFFECTS AND CLARIFICATIONS OF WATER POLLUTION: A STUDY

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ABSTRACT

Water pollution has been increasing rapidly all over the world and mostly in the developing countries. Toxic chemicals, minerals, pesticides and lead and pollutant materials are found in the drinking water in industrialized countries and in the developing countries also. Waste waters and being discharged directly into streams, rivers and lakes and coastal waters. Most of the rivers carry harmful bacteria from human excreta. Water pollution is also caused by the organic pollutants, suspended solids in most parts of the world. In the Industrialized countries, the over use of fertilizers has been causing the water pollution problems. In the industrialized and other countries, Nitrides from the over loaded fields pollute the ground water supplies. High levels of arsenic linked to heavy use of phosphoric fertilizers have been dampening the ground water quality in India. The river waters are being contaminated due to the discharges of industrial pollutants. The growing water scarcity and the increasing levels of pollution are causing most of the environmental problems that culminate in Health Hazards. Human waste disposals into the ponds and rivers are deteriorating the water quality. The capacity of the rivers is also decreased when the decomposition of the pollutants lowers the amount of oxygen dissolved in the water and this threatens the sustenance of aquatic life. The discharge of human sewage and agro industrial effluents are causing the water pollution intensity. With intensive fertilizer use water pollution is increasing by and large. The expansion of industry, mining activities and the increased use of agricultural chemicals has resulted in contaminating the river waters with toxic chemicals and with heavy metals such as lead and mercury which are hard to remove from water. All over the world the river waters have been contaminated and these waters have become unsafe for drinking proposes or for other uses and even for the sustenance of acquitted organisms. Ground water is also polluted due to

the improper and disposal of heavy metals, synthetic chemicals and hazardous waste, a large quantities of such compounds are reaching the ground water owing to the accumulation of waste dumps. Industrial effluents are also discharged directly.

INTRODUCTION

The importance of water for sustenance of life cannot be overemphasized. Whether it is in use of running water in our homes, rearing cattle and growing crops in our farms, or the increased uses in industry, remain immeasurable. It is important therefore, to not that depletion of this commodity either through contamination, or careless use results in serious consequences. Though the intensive agriculture relied on chemical inputs combined with irrigation, the chemicals also reach the ground water. The improper maintenance of septic tanks and sewage systems pollute the surface waters which causes contamination of water. Water scarcity, still further aggravates the problems are the problems waters are-causing more environmental problems that affect the human welfare and economic growth. Water pollution causes several diseases and the human beings are exposed to these diseases, and the health hazards. It also affects the aquatic life and results in damaging the quality of the aquatic life that brings in more dangers through the contamination of food supplies. The major sources of water pollution are industrial waste water, domestic waste water and effluents and agricultural run oil Water pollution from domestic and human waste water causes many severe water bourne diseases. The major water polluting industries are leather, pulp and paper, textiles, chemicals. Metallurgical industries and manufacturing plants belonging to several lines of industry. Many of the rivers, lakes in India are being contaminated from industrial effluents, agricultural runoff with toxic chemicals and heavy, metals that arc hard to remove and costly.

The disposal of urban waste into water bodies, open dumps, and poorly designed landfills causes surface water and ground water contamination. Industrial waste obtaining heavy metals such as mercury, chromium, lead and arsenic destroys the aquatic life either in the rivers or in the seas. Human exposure to volatile organic compounds in water can occur from path ways such as the inhalation of contaminants transferred in to the air from showers, baths, toilets, washing machines and cooling. Cumulative Human exposure through inhalation, in festive and dermal to volatile organic compounds increases the health risks. Most of the metropolitan cities are facing water scarcity and the increasing process of urbanization is also causing the increase of effluents and the water equality has been affected over the years. Water pollution has been imposing serious environmental problems affecting the quality of human life and that of aquatic organism and plant life, imposing serious risks for the maintenance of ecological balance.

WHAT IS WATER POLLUTION?

Water pollution can be defined in many ways. Usually, it means one or more substances have built up in water to such an extent that they cause problems for animals or people. Oceans, lakes, rivers, and other inland waters can naturally clean up a certain amount of pollution by dispersing it harmlessly. If you poured a cup of black ink into a river, the ink would quickly disappear into the river's much larger volume of clean water. The ink would still be there in the river, but in such a low concentration that you would not be able to see it. At such low levels, the chemicals in the ink probably would not present any real problem. However, if you poured gallons of ink into a river every few seconds through a pipe, the river would quickly turn black. The chemicals in the ink could very quickly have an effect on the quality of the water. This, in turn, could affect the health of all the plants, animals, and humans whose lives depend on the river.

SOURCES OF WATER POLLUTION

- Sewage leakages
- High population density
- oil spillage
- Industrial waste dumped into our waters
- Pollution of ground water through drilling activities
- Flooding during rainy season which carries waste deposits into our waters.
- Building lavatories and visionaries over running water or even the sea as it the practice in some riverine areas.
- Radioisotopes
- Heavy metal
- Combustion
- Toxic waste disposal at sea
- Mineral processing plant (e.g. coal production
- Eroded sediments
- Deforestation
- Mining
- Littering
- Pesticides
- herbicides and fertilizers
- Failing septic system

- House hold chemicals
- Animal wastes.

EFFECTS OF WATER POLLUTION

Water pollution has a dual effect on nature. It has negative effects on the living and also on the environment. The effects of pollution on human beings and aquatic communities are many and varied. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. An estimated 700 million Indians have no access to a proper toilet, and 1,000 Indian children's die of diarrhea every day and so many other countries too. Nearly 500 million Chinese lack access of safe drinking water. Definitely with all these, we can expect that there is going to be a reduction in productivity. Biomass and diversity of communities are to be expected when large amount of toxic materials are released into the streams, lakes and coastal waters in the ocean. Much of aquatic pollution involves sewage in which organic waste predominate. This waste can increase secondary productivity while altering the character of the aquatic community. Most fishes especially the species desired as food by man are among the sensitive species that disappear with the least intense pollution. Water pollution leads to damage to human health. Disease carrying agents such as bacteria and viruses are carried into the surface and ground water. Drinking water is affected and health hazards result. Direct damage to plants and animals nutrition also affects human health. Plants nutrients including nitrogen, phosphorus and other substances that support the growth of aquatic plant life could be in excess causing algal bloom and excessive weed growth. This makes water to have odour, taste and sometimes colour. Ultimately, the ecological balance of a body of water is altered.

WHAT ARE THE EFFECTS OF WATER POLLUTION?

Water pollution causes water borne diseases diarrhoea, dysentery, intestinal worms and hepatitis and these diseases are causing severe health risks particularly on the poor people in the developing countries. Diarrhoea and dysentery account for an estimated 20% of the total burden of disease in developing countries. The polluted water is creating 2 billion cases of diarrhoea in the developing countries Diarrheal diseases are-causing 5 million deaths in year of which 3 million people are children. The contaminated waters have also lead to 900 million and 200 million cases of schistosomias. World Health Organization data indicates that about 20% of all communicable borne diseases in India are water borne diseases. Health hazards such as malaria, typhoid and epidemics such as cholera have been occurring due to water pollution. Children in the rural areas are exposed to parasitic and helminthes diseases owing to water pollution. Water pollution due to the improper disposal of solid wastes imposes several problems for human health and the poor are more vulnerable. Environmental pollution imposes health hazards on the human

beings. Noise pollution causes hypertension and results in deafness and sustained exposure to noise pollution leads to the increase of heart diseases.

Some people believe pollution is an inescapable result of human activity: they argue that if we want to have factories, cities, ships, cars, oil, and coastal resorts, some degree of pollution is almost certain to result. In other words, pollution is a necessary evil that people must put up with if they want to make progress. Fortunately, not everyone agrees with this view. One reason people have woken up to the problem of pollution is that it brings costs of its own that undermine any economic benefits that come about by polluting.

Take oil spills, for example. They can happen if tankers are too poorly built to survive accidents at sea. But the economic benefit of compromising on tanker quality brings an economic cost when an oil spill occurs. The oil can wash up on nearby beaches, devastate the ecosystem, and severely affect tourism. The main problem is that the people who bear the cost of the spill (typically a small coastal community) are not the people who caused the problem in the first place (the people who operate the tanker). Yet, arguably, everyone who puts gasoline (petrol) into their car or uses almost any kind of petroleum-fuelled transport contributes to the problem in some way. So oil spills are a problem for everyone, not just people who live by the coast and tanker operators.

Sewage is another good example of how pollution can affect us all. Sewage discharged into coastal waters can wash up on beaches and cause a health hazard. People who bathe or surf in the water can fall ill if they swallow polluted water yet sewage can have other harmful effects too: it can poison shellfish (such as cockles and mussels) that grow near the shore. People who eat poisoned shellfish risk suffering from an acute and sometimes fatal illness called paralytic shellfish poisoning. Shellfish is no longer caught along many shores because it is simply too polluted with sewage or toxic chemical wastes that have discharged from the land nearby.

Pollution matters because it harms the environment on which people depend. The environment is not something distant and separate from our lives. It's not a pretty shoreline hundreds of miles from our homes or a wilderness landscape that we see only on TV. The environment is everything that surrounds us that gives us life and health. Destroying the environment ultimately reduces the quality of our own lives and that, most selfishly, is why pollution should matter to all of us.

WATER POLLUTANTS

Domestic and Municipal Pollutants: The sewage contains garbage, soaps, detergents, waste food and human excreta and is the single largest source of water pollution. Pathogenic (disease causing) microorganisms (bacteria, fungi, protozoa, algae) enter the water system through sewage making it infected. Typhoid, cholera, gastroenteritis and

dysentery are commonly caused by drinking infected water. Water polluted by sewage may carry certain other bacteria and viruses cannot grow by themselves, but reproduce in the cells of host organisms. They cause a number of diseases, such as, polio, viral hepatitis and may cancer.

Industrial Pollutants

Many industries are located near rivers or fresh water streams. These are responsible for discharging their untreated effluents into rivers like highly toxic heavy metals such as chromium, arsenic, lead, mercury, etc. along with hazardous organic and inorganic wastes (e.g., acids, alkalis, cyanides, chlorides, etc.). River Ganges receives wastes from textile, sugar, paper and pulp mills, tanneries, rubber and pesticide industries. Most of these pollutants no biodegradable, therefore damage the growth of crops and the polluted water is unsafe for drinking purposes. Factories manufacturing plastic, caustic soda and some fungicides and pesticides release mercury (a heavy metal) along with other effluents in nearby water body. Mercury enters the food chain through bacteria, algae, fish and finally into the human body.

Agricultural Waste

Manure, fertilizers, pesticides, wastes form farms, slaughterhouse, poultry farms, salts and silt are drained as run-off from agricultural lands. The water body receiving large quantities of fertilizers (phosphates and nitrates or manures becomes rich in nutrients which leads to eutrophication and consequent depletion of dissolved oxygen. Consumption of water rich in nitrates is bad for human health especially for small children.

Radioactive Wastes

Water bodies are polluted by International Journal of Academic Research and Development 941 accidental leakage of waste material from uranium and thorium mines, nuclear power plants and industries, research laboratories and hospitals which use radioisotopes. Radioactive materials enter human body through water and food, and may be accumulated in blood and certain vital organs. They cause tumours and cancer.

Thermal Sources

Various industries, nuclear power plants and thermal plants require water for cooling and the resultant hot water is often discharged into rivers or lakes. This results in thermal pollution and leads to the imbalance in the ecology of the water body. Higher temperature lowers the dissolved oxygen level (which is very essential for marine life) by decreasing the solubility of oxygen in water.

Sediments

Soil particles carried to streams, lakes or oceans form the sediments. The sediment become polluting due to their large amount.

Petroleum Products

Petroleum products are widely used for fuel, lubrication, plastics manufacturing, etc. and happen to be poisonous in

nature. Crude oil and other related products generally get into water by accidental spillage from ships, tankers, pipelines etc.

Eutrophication

Eutrophication is a process by which a water body slowly becomes rich in plant nutrients such as nitrates and phosphates due to soil erosion and run off from the surrounding land. Let us try to understand this phenomenon. A water system like a lake or any reservoir may get a large inflow of organic matter from domestic wastes and run off from the surrounding land. Increasing human population, intensive agriculture and rapid industrial growth have led to an increasing release of domestic waste, agricultural residues, industrial wastes and land run-off into various water bodies. Nutrients are released from organic waste by aerobic (oxygen requiring) bacteria which start decomposing it. Dissolved oxygen is consumed in this process. As more and more organic matter enters a water body, more is the deoxy generation of the water body and larger is the production of nutrients. These nutrients fertilize an abnormal growth of algae and other large water plants such as duckweed. As more plants grow, some of them die also due to larger oxygen demand and therefore oxygen deficiency in the water body (i.e., deoxygenating of the water body). Such a water body is said to be atrophied and the process is called eutrophication.

Biological Oxygen Demand (BOD)

The quantity of oxygen used up by microorganisms at 27°C and in darkness during 3 days in breaking down organic wastes in a water body is called its biological oxygen demand (BOD). It can be explained in the following manner. You know that there are many organic compounds or waste present in a water body. The microorganisms present in the system act upon this waste for their own consumption and growth. In the process the metabolic activity requires oxygen which is met by the dissolved oxygen present in water. It is this amount of oxygen which is defined as biological oxygen demand (BOD). The BOD value of an aquatic system depends upon.

CATEGORIES OF WATER POLLUTION

Groundwater

When rain falls and seeps deep into the earth, filling the cracks, crevices, and porous spaces of an aquifer (basically an underground storehouse of water), it becomes groundwater one of our least visible but most important natural resources. Nearly 40 percent of Americans rely on groundwater, pumped to the earth's surface, for drinking water. For some folks in rural areas, it's their only freshwater source. Groundwater gets polluted when contaminants from pesticides and fertilizers to waste leached from landfills and septic systems make their way into an aquifer, rendering it unsafe for human use. Ridding groundwater of contaminants can be difficult to impossible, as well as costly. Once polluted, an aquifer may be unusable for decades, or even thousands of years. Groundwater can also

spread contamination far from the original polluting source as it seeps into streams, lakes, and oceans.

Surface water

Covering about 70 percent of the earth, surface water is what fills our oceans, lakes, rivers, and all those other blue bits on the world map. Surface water from freshwater sources (that is, from sources other than the ocean) accounts for more than 60 percent of the water delivered to American homes. But a significant pool of that water is in peril. According to the most recent surveys on national water quality from the U.S. Environmental Protection Agency, nearly half of our rivers and streams and more than one-third of our lakes are polluted and unfit for swimming, fishing, and drinking. Nutrient pollution, which includes nitrates and phosphates, is the leading type of contamination in these freshwater sources. While plants and animals need these nutrients to grow, they have become a major pollutant due to farm waste and fertilizer runoff. Municipal and industrial waste discharges contribute their fair share of toxins as well. There's also all the random junk that industry and individuals dump directly into waterways.

Ocean water

Eighty percent of ocean pollution (also called marine pollution) originates on land whether along the coast or far inland. Contaminants such as chemicals, nutrients, and heavy metals are carried from farms, factories, and cities by streams and rivers into our bays and estuaries; from there they travel out to sea. Meanwhile, marine debris particularly plastic is blown in by the wind or washed in via storm drains and sewers. Our seas are also sometimes spoiled by oil spills and leaks big and small and are consistently soaking up carbon pollution from the air. The ocean absorbs as much as a quarter of man-made carbon emissions.

Point source

When contamination originates from a single source, it's called point source pollution. Examples include wastewater (also called effluent) discharged legally or illegally by a manufacturer, oil refinery, or wastewater treatment facility, as well as contamination from leaking septic systems, chemical and oil spills, and illegal dumping. The EPA regulates point source pollution by establishing limits on what can be discharged by a facility directly into a body of water. While point source pollution originates from a specific place, it can affect miles of waterways and ocean.

Nonpoint source

Nonpoint source pollution is contamination derived from diffuse sources. These may include agricultural or storm water runoff or debris blown into waterways from land. Nonpoint source pollution is the leading cause of water pollution in U.S. waters, but it's difficult to regulate, since there's no single, identifiable culprit. Tran's boundary it

goes without saying that water pollution can't be contained by a line on a map. Tran's boundary pollution is the result of contaminated water from one country spilling into the waters of another. Contamination can result from a disaster like an oil spill or the slow, downriver creep of industrial, agricultural, or municipal discharge.

The Most Common Types of Water Contamination

Not only is the agricultural sector the biggest consumer of global freshwater resources, with farming and livestock production using about 70 percent of the earth's surface water supplies, but it's also a serious water polluter. Around the world, agriculture is the leading cause of water degradation. In the United States, agricultural pollution is the top source of contamination in rivers and streams, the second-biggest source in wetlands, and the third main source in lakes. It's also a major contributor of contamination to estuaries and groundwater. Every time it rains, fertilizers, pesticides, and animal waste from farms and livestock operations wash nutrients and pathogens such as bacteria and viruses into our waterways. Nutrient pollution, caused by excess nitrogen and phosphorus in water or air, is the number-one threat to water quality worldwide and can cause algal blooms, a toxic soup of blue-green algae that can be harmful to people and wildlife.

Sewage and wastewater

Used water is wastewater. It comes from our sinks, showers, and toilets (think sewage) and from commercial, industrial, and agricultural activities (think metals, solvents, and toxic sludge). The term also includes storm water runoff, which occurs when rainfall carries road salts, oil, grease, chemicals, and debris from impermeable surfaces into our waterways. More than 80 percent of the world's wastewater flows back into the environment without being treated or reused, according to the United Nations; in some least-developed countries, the figure tops 95 percent. In the United States, wastewater treatment facilities process about 34 billion gallons of wastewater per day. These facilities reduce the amount of pollutants such as pathogens, phosphorus, and nitrogen in sewage, as well as heavy metals and toxic chemicals in industrial waste, before discharging the treated waters back into waterways. That's when all goes well. But according to EPA estimates, our nation's aging and easily overwhelmed sewage treatment systems also release more than 850 billion gallons of untreated wastewater each year.

Oil pollution

Big spills may dominate headlines, but consumers account for the vast majority of oil pollution in our seas, including oil and gasoline that drips from millions of cars and trucks every day. Moreover, nearly half of the estimated 1 million tons of oil that makes its way into marine environments each year comes not from tanker spills but from land-based sources such as factories, farms, and cities. At sea, tanker spills account for about 10 percent of the oil in waters around the world, while regular operations of the shipping industry—through

both legal and illegal discharges contribute about one-third. Oil is also naturally released from under the ocean floor through fractures known as seeps.

Radioactive substances

Radioactive waste is any pollution that emits radiation beyond what is naturally released by the environment. It's generated by uranium mining, nuclear power plants, and the production and testing of military weapons, as well as by universities and hospitals that use radioactive materials for research and medicine. Radioactive waste can persist in the environment for thousands of years, making disposal a major challenge. Consider the decommissioned Hanford nuclear weapons production site in Washington, where the clean-up of 56 million gallons of radioactive waste is expected to cost more than \$100 billion and last through 2060. Accidentally released or improperly disposed of contaminants threaten groundwater, surface water, and marine resources.

CONCLUSION

Water pollution is an environmental problem that is of major concern to us. Human contribution to water pollution is enormous by way of defecating; dumping of refuse, industrial wastes and washing of clothes etc. practicing the habits of cleanliness, efforts for prevention of water pollution, controlling and monitoring, using water pollution control equipment's may play a great role in providing pure water and keeping water for future. Environmental education may be of immense importance. In this way they will be less inclined to pollute our waters. The effects of pollution on human beings and aquatic communities are many and varied. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. An estimated 700 million Indians have no access to a proper toilet, and 1,000 Indians children's die of diarrhea every day and so many other countries too. Nearly 500 million Chinese lack access of safe drinking water. Definitely with all these, we can expect that there is going to be a reduction in productivity. Biomass and diversity of communities are to be expected when large amount of toxic materials are released into the streams, lakes and coastal waters in the ocean. Much of aquatic pollution involves sewage in which organic waste predominate. This waste can increase secondary productivity while altering the character of the aquatic community.

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