

Water Pollution

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Abstract:

Water is the essential supply of all organisms in existence and most biological activities, and it is critical to most processes of metabolism. Considering the fact that 70% of our globe has water, just 2.5% of water resources are usable for humans. There could be numerous kinds of organisms (Microorganisms) within one millimeter of water. So that wherever there is water there would be numerous forms of life. The quantity of water remains an issue of significant importance for human civilization over the past few decades. Since nearly all water is not synonymous with other elements of nature, it is partitioned. The natural process of water is the core dynamic of the life and cycles of economic activity. The resources of water are limited and are exposed to numerous human-caused adverse consequences. Pure water resources on our planet compose only 2.5% of our global water resources. Water is a vital resource for all forms of life and has significant worth. There is no such thing as life without water. The availability of plentiful and superior water is an essential ingredient for freshwater ecosystems, along with food availability and equitable economic growth, thus essential for humanity's future. Contamination of the limited natural water sources creates additional pressure on them as well. For treating one liter of generated water, eight liters of purified water is needed and required. Beneficial drinking water is an essential requirement for everyone in this world. Thus, one of the most serious concerns that we should be concerned about is water contamination. Because all living things depend upon water that is free from contaminants. Seawater insufficient for consumption by individuals That being said, this does not give humans the right to contaminate it, harm aquatic life, or destroy out the aquatic ecosystem. Chemical additions are not the only way that water can become contaminated.

Keywords: Water, Treatment, Pollutions.



Introduction

Water, along with various natural resources, and particularly the long-lasting qualities of these factors, are vital to the continued existence of the planet's inhabitants and all living beings. A life hyperlink connects every living thing in the ecosystem to every other organism[1]. Consequently, over time, the system as a whole gets influenced by the harm that takes place among one of its parts. Since water is critical to life and cannot be repaired or replaced, it stands apart from other environmental elements. A significant number of the most pressing problems that humankind has faced recently have to do with the amount and quality of water [2]. Water is required to be preserved and insulated from any contamination. Water It is an essential component of human stability and civilization's prosperity, since wherever there exists water, there is life . as a consequence, contamination of drinking water has become recognized as one of the most serious problems facing the environment. Unsafe water takes many different kinds and has multiple effects, thus there are several definitions of water pollution. It is defined as establishing impairment or contamination to the quality of water, triggering an impairment in its ecosystem, minimizing its ability to accomplish its natural justification and making it hazardous when adopted, or causing it to lose an important percentage of its economic worth [3].

One of the essential ingredients at the core of existence. Life on Earth is not possible without water. However, a variety of hazardous, industrial pollutants have contaminated water supplies, making them unfit for human consumption and hindering irrigation efforts. As a result, there is a shortage of water for both humans and the ecology[4]. On our world, there are two distinct sources of water. The first is surface water, which is the water found in lakes, ponds, rivers, and seas. Many different kinds of plants and animals can be found in water, and their survival depends on both the quantity and quality of the water. Another is groundwater, which is kept in Earth's aquifers below the surface. This water source provides the majority of the drinking water in the world as well as our rivers and oceans. These two water sources can get contaminated in various ways, but they are both essential to life as we know it on Earth. The definition of pollution is contamination, which also includes desecration, soiling, rotting, and destruction[5].

Water Pollutant Sources

One of the main issues facing the environment today is water contamination. When it comes to contamination, water is the most susceptible natural resource. It is estimated that between 75 and 80 percent of water pollution is caused by domestic sewage [6]. The factors that contribute to pollution in the environment include population growth, urbanization, eutrophication, mining, agro-chemical wastes, nutrient enrichment, thermal pollution, oil spills, sediment disruption, acid rain pollution, radioactive waste, and climate change. Research indicates that between 75 and 80% of water pollution is a result of residential sewage. Water is being contaminated by waste from the electroplating industries, which includes pesticides, sugar,



textile, paper, and pulp [7]. The smell of contaminated water and water sources is awful an includes lower types of animals and plant Water contamination is a risk to over 80 percent of the world's population.[8]. Most of the untreated domestic sewage that falls into streams in huge amounts.The contamination of water occurs by the hazardous elements found in domestic wastewater, which also includes plastic trash, solid materials, and microbial particles .One of the main contributors of pollution of the water is various commercial waste that is dumped into rivers untreated)[9].

Point and nonpoint sources are the two types of water pollution

Table (1) Point and nonpoint resources [10]

Point source	Non points source
1- Oil field, mine, and industrial area runoff	1-agricultural runoff
2- wastewater discharge	2-Activities that produce pollutants on land
3-combined storm and municipal sewage overflows	3-The run-off from mines that were recently abandoned
4- Animal S feedlot waste and infiltration	4-The waste water from sewage
5-Industrial site run-off >2 ha	5-tanks and run-off from malfunctioning septic systems
6-Storm sewage exits from cities with populations greater than 100,000	6- The run-off from range and pasture
7- Waste overflow and leaching	7- atmospheric accumulation on a body of water Runoff from building sites
	8-Urban runoff from areas without sewer systems and with fewer than 100,000 residents

Controlling of Water Pollution

Controlling water pollution involves adopting appropriate methods for treating and disposing of waste. Decisions about the extent of treatment and the proper disposal and utilization of treated waste should carefully consider the functional aspects of each drainage basin to prevent further environmental damage or pollution[11].



Treatment of sewerage

In developed nations, centralized sewage treatment systems typically manage household waste in urban areas. In these regions, urban residents perceive sanitation as a service and are willing to invest in it, given the presence of dependable and efficient service providers [12].

Effectively designed and well-operated systems, such as secondary treatment, can achieve a sewage treatment efficiency of over 90 percent (Singh, 2015). However, only a limited number of plants incorporate additional devices for nitrogen and pathogens control.

Wastewater treatment facilities not only handle wastewater from domestic and commercial origins but also receive wastewater from industrial clients. To prevent contamination of surface and groundwater as well as the transmission of diseases from sewage-related pathogens, it is crucial to treat wastewater before disposal. Technologies for managing solid waste and recovering resources include aerobic composting, sanitary landfill, and incineration [13].

Treatment of industrial wastes

Certain industrial processes generate standard domestic sewage that municipal facilities can treat. However, industries producing wastewater with elevated levels of conventional pollutants, such as oil and grease, necessitate specialized treatment systems. Harmful substances like heavy metals and volatile organic compounds, or unconventional pollutants like ammonia, are examples of toxic pollutants [14].

Some of these systems may have pretreatment facilities constructed for the removal of hazardous components before transferring partially treated effluent to the municipal system. Industries that generate large volumes of wastewater normally have their own full-service treatment facilities on-site. Few industries have been active in revamping their manufacturing processes to minimize or eliminate pollutants using an approach known as pollution prevention [15].

Treatment of agricultural waste is mostly by sand-filled fields being washed off. Erosion controls are a useful tool for farmers to reduce runoff and maintain soil in the fields. Common tactics include planting riparian zones, rotating crops, and contour plowing [16,17]. Contour plowing is the process of adjusting the velocity and/or path of runoff from straight downstream water flow to over the hillslope by connecting through the ridges, furrows, and roughness generated by tillage, planting, and other agricultural operations. Contour plowing reduces the dispersion of contaminants in solution discharge, reducing environmental risk (water quality). Excessive pathogens and chemicals from waste, biosolids, or compost applications; pesticides introduced into surface and ground water; depletion of excessive nutrients in surface and ground water [18].

Conclusion



Water is an essential resource for all living things because it is life itself and is necessary for all living things. Although it keeps them alive, contaminated water is extremely dangerous. Human health suffers greatly when they consume contaminated water. The three primary components of our ecosystem are the soil, water, and air. Environmental education is an important component in the fight against environmental pollution. The primary goal of environmental and water pollution education is to provide students the information, morals, and abilities that will help them safeguard and preserve the environment. The best thing you can do to stop water pollution is to support conservation efforts and other initiatives, as well as educate yourself and others around you about the world's water supply. Teaching people about water pollution is one of the main goals of water education so that the resources can be better protected. Water pollution education is a powerful method for raising public awareness. The following procedures should be followed for water pollution prevention training: Experts should inform producers about adequate fertilization, people on the recycling process and waste products, and people about the dangers of excessive consumption.

People should be informed about the importance of all natural resources for life through the use of the media. Water protection activities and presentations should be held on a regular basis. The most effective strategy to prevent diffuse pollution of streams is to restrict or eliminate the use of chemicals for agricultural, industrial, and home purposes.

References:

1. Zolkefli, N., Sharuddin, S. S., Yusoff, M. Z. M., Hassan, M. A., Maeda, T., & Ramli, N. (2020). A review of current and emerging approaches for water pollution monitoring. *Water*, 12(12), 3417.
2. Hasan, M. K., Shahriar, A., and Jim, K. U. (2019). Water pollution in Bangladesh and its impact on public health. *Heliyon*, 5(8).
3. Kilic, Z. (2021). Water pollution: causes, negative effects and prevention methods. *İstanbul Sabahattin Zaim Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 3(2), 129-132.
4. Kamble, SM. (2014). Water pollution and public health issues in Kolhapur city in Maharashtra. *International Journal of Scientific and Research Publications*, 4, 1-6.
5. Owa, FD. (2013). Water pollution: sources, effects, control and management. *Mediterranean Journal of Social Sciences*, 4, 65- 8.
6. Evans, A. E., Mateo-Sagasta, J., Qadir, M., Boelee, E., & Ippolito, A. (2019). Agricultural water pollution: key knowledge gaps and research needs. *Current opinion in environmental sustainability*, 36, 20-27.
7. Desa N mt, V. (2014). A study on the water pollution based 4 3 vironmental problem. *Indian Journal of Research*, 3, 95-96



8. Carpente, SR., Caraco, NF., Correll, DL., Howarth, RW., Sharpley, AN., and Smith, VH. (1998). Non point pollution of surface waters with phosphorus and nitrogen. *Ecological Applications*, 8, 559-568.
9. Obinna, I. B., & Ebere, E. C. (2019). A review: Water pollution by heavy metal and organic pollutants: Brief review of sources, effects and progress on remediation with aquatic plants. *Analytical Methods in Environmental Chemistry Journal*, 2(03), 5-38.
10. Xue, J., Wang, Q., & Zhang, M. (2022). A review of non-point source water pollution modeling for the urban–rural transitional areas of China: Research status and prospect. *Science of the Total Environment*, 826, 154146.
11. Adesogan, S. (2013). "Sewage Technology in Nigeria: A Pragmatic Approach". *Science Journal of Environmental Engineering Research*, 226(1991), 1–9.
12. Djuwita, M. R., Hartono, D. M., Mursidik, S. S., & Soesilo, T. E. B. (2021). Pollution Load Allocation on Water Pollution Control in the Citarum River. *Journal of Engineering & Technological Sciences*, 53(1).
13. Singh, S. K. (2015). "Water Pollution in Developing Countries". *Nat. Con. on Inn. Res. in CPMSSED-2015*. Pp 1-5 ISBN: 978-93-85822-070
14. Han, D., Currell, M. J., and Cao, G. (2016). "Deep challenges for China's war on water pollution". *Environmental Pollution*, 218, 1222-1233
15. Bhatnagar, A., Kaczala, F., and Hogland, W. (2014). Valorization of solid waste products from olive oil industry as potential adsorbents for water pollution control a review.
16. Zhang, S., Wang, J., Zhang, Y., Ma, J., Huang, L., Yu, S., ... and Wang, X. (2021). Applications of water-stable metal-organic frameworks in the removal of water pollutants: A review. *Environmental Pollution*, 291, 118076.
17. Yang, X., Cui, H., Liu, X., Wu, Q., & Zhang, H. (2020). Water pollution characteristics and analysis of Chaohu Lake basin by using different assessment methods. *Environmental Science and Pollution Research*, 27, 18168-18181.
18. Cheng, D., Ngo, H. H., Guo, W., Chang, S. W., Nguyen, D. D., Liu, Y., ... & Wei, D. (2020). A critical review on antibiotics and hormones in swine wastewater: Water pollution problems and control approaches. *Journal of hazardous materials*, 387, 121682.

