Original Article

A Survey On Water Pollution And Prevention Techniques: A Case Study Of Man Sagar Lake, Jaipur

Sweeti Sharma[1*], Dr. Garima Sharma[2]

[*1] Research Scholar, Department of Zoology, Apex University, Jaipur, Rajasthan, India
[2] Assistant professor, Department of Zoology, Apex University, Jaipur, Rajasthan, India

***Corresponding author: -** Sweeti Sharma

[*1] Research Scholar, Department of Zoology, Apex University, Jaipur, Rajasthan, India
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Abstract

The natural world has been polluted. The water we use every day comes from rivers and lakes. On Earth, water is the single most important substance. The quality of available water has a direct impact on people's health and ability to make a living. Water pollution is a leading cause of death worldwide. Human activity ruins water. The pollution of Man Sagar Lake is also caused by the entry of partially treated and untreated effluent. Wastewater created this difficulty. The 130-km2 lake is near Jaipur in Rajasthan, India. Raja Man Singh created it in 1610 by damming the Dravayavathi River. Lake pollution stems from untreated wastewater as well as other polluting components such industrial effluents, household garbage disposals, and agricultural waste. Increases in harmful emissions. They all accumulate heavy metals and contribute to water contamination while also altering the water's physicochemical qualities. This causes eutrophication and slits decomposition in this body of water, reducing its quality. All living species that rely on water must adapt when water quality degrades. Total dissolved solids, total alkalinity, total acidity, calcium, magnesium, chloride, sulphate, nitrate, and other parameters were all influenced by the physiochemical studies of water quality. The amount of oxygen required in the body was altered by this study.

Keywords: Water Pollution, Man Sagar Lake, Physiochemical, Waste water, Solids

INTRODUCTION

India has a serious water pollution issue due to the depletion of its groundwater supplies and roughly 70% of its surface water resources by biological, toxic, chemical, and inorganic contaminants. These sources have often become unsafe for use in industrial settings as well as in other contexts, such irrigation. This illustrates how inadequate water quality causes a deficit of water by reducing its availability for both human and environmental use [1].

When unwelcome substances get into the water, it becomes contaminated, which harms the ecosystem and people's health. Water is a vital natural resource that we require for drinking and other life-developmental needs. Clean water is a need for human survival everywhere in the world. Water, the universal solvent, is a key pathogen reservoir. The WHO estimates that 80 percent of all diseases originate in contaminated water. Many countries do not follow WHO recommendations when it comes to drinking water. The poor quality and uncleanliness of the water cause 3.1 percent of deaths.

However, in addition to its numerous negative effects, population growth also contributes to water contamination. Increased creation of solid waste is a natural consequence of population expansion. Rivers and streams are filled with both solid and liquid waste. Additionally, human waste contaminates water. It has been shown that dirty water contains a significant amount of germs, some of which are harmful to human health. The government must increase its capacity in order to provide for the rising demand for fundamental services. Greater access to sanitary amenities is seen in urban areas than in rural ones. Important causes of contamination include the usage of polythene bags and the dumping of plastic waste. Plastic bags are used to contain waste before being thrown away. According to estimates, three out of every ten residents in urban regions urinate in public [2]. 77% of the time, people use flush latrines, compared to 8% who use pit latrines. Urbanization may contribute to the spread of several contagious diseases. In urban areas, severe health issues include overcrowding, filthy living conditions, and tainted water sources. Urban residents make up one-fourth of the population and are susceptible to illness.

Pesticides are chemicals that are used to kill infections, pests, and bacteria. Pesticides among other chemicals have a direct and immediate negative impact on water quality. The ecology of the agricultural environment may be at risk due to the overuse or inappropriate management of pesticides. Only 60% of fertilizers are now applied to soils; the other 40% are polluted by chemicals that leach into the soils and harm the water. Infected water supports cyanobacteria growth, while eutrophication is brought on by phosphate discharge in excess. Due to flooding, heavy rainfall, and overuse of irrigation, chemical wastes interact with river water and enter the food chain. Despite being poisonous to living things, these substances may be found in large amounts in many plants and fruits [3]. Water pollution and a hazard to public health are both caused by the presence of tiny amounts of medication in water.

TYPES OF WATER POLLUTION

Numerous pollutants contribute to water's deterioration. Major sources of pollution include:

Surface water pollution- Surface water contamination occurs in seas, streams, lakes, and rivers. contaminated precipitation runoff pollutes these streams by entering nearby water sources. Runoff from fertilizers used on farms and by homes for lawn care and salts and chemicals used on roads and highways harm water supplies. Surface water pollution may also come from sewage leaks and animal feces. These pollutants are very dangerous to human health and may be deadly if ingested. Even in modest doses, unfiltered dirty water may cause giardia, typhoid, and hepatitis. These health issues may also be caused by swimming in unclean water, which can infect the mouth, skin, and eyes [4].

Nutrient pollution- High nutritional content. Too many nutrients may destroy plant and aquatic life. Wastewater and fertilizers contain plant-growing nutrients. In the water, they cause rapid and uncontrolled growth of plants and algae. This is called eutrophication. Excess nutrition may induce water oxygen depletion. Seagrasses can't grow due to a severe algal bloom. Decomposing algae and seagrass. The degradation process depletes the water's oxygen, resulting in low dissolved oxygen. Fish, crabs, oysters, and other aquatic animals may die. Multiple sources provide nutrients. They may originate from the ocean owing to water current mixing or develop in the watershed due to the weathering of rocks and soil. Scientists are interested in nutrients associated with coastal dwellers because human-related inputs are greater than natural inputs. As coastal populations develop, more nutrients reach coastal rivers via wastewater treatment facilities, urban runoff, and agriculture [5].

Oxygen depletion pollution- Oxygen depletion is a sort of water pollution that affects the water's natural balance, encourages germ development, and kills fish and other species. Biodegradable waste, such as sewage, contributes to oxygen loss. Decomposing trash and sewage consume oxygen in the water. Once the oxygen is gone, bacteria may take over and kill the natural occupants.

Water-loving microorganisms caused pollution that diminished atmospheric oxygen. When a lot of things are mixed with water, bacteria multiply and consume all the oxygen. As the water's oxygen is used up, some harmless bacteria die, leaving only harmful pathogens for us, the environment, and animals. Microbes also poison water. Anaerobic microorganisms cause this. Aquatic microorganisms like biodegradable substances. When these substances end up in the water, microorganisms multiply. They reduce water oxygen. Lack of oxygen kills aerobic bacteria, whereas anaerobic bacteria flourish.

Groundwater pollution- Gasoline, oil, road salts, and pollutants pollute groundwater, making it unsafe to drink. Surface materials may enter groundwater via the soil. More than half the U.S. population drinks groundwater. Groundwater is another important irrigation source. Regrettably, toxins contaminate groundwater. Chemicals, particles, and pesticides cause this. Rainfall contaminates the water supply when toxic chemicals and particles are applied to the surface. Toxins harm underground rivers and waterbeds. This may contaminate wells and boreholes. Pesticides and fertilizers on farms are the most common source. Before the 1970s, military locations and industrial facilities dumped fuels, wasted solvents, and other liquid pollutants into pits.

Thermal pollution- Thermal pollution is the human-caused increase or decrease in water temperature in an ocean, lake, river, or pond. This pollution harms aquatic life. This happens when an industry or facility collects water from a natural resource, alters it, then returns it. Most businesses utilize it to cool equipment or produce items more efficiently. Thermal pollution is commonly caused by wastewater treatment or manufacturing plants. Humans and governments are working to regulate how plants use water to reduce thermal pollution. This is needed to manage thermal pollution [6]. Due to its decreased capacity to store dissolved oxygen and accelerated fish metabolism, heat contaminates water. Game fish like trout need high levels of dissolved oxygen to survive. It is estimated that cooling water released from power plants may increase river temperatures by as much as 15 degrees Celsius (27 degrees Fahrenheit) compared to their ambient temperatures. A rare kind of pollution is thermal pollution. People will assess personal pollution, rubbish, and other changing issues, as well as carbon emissions.

THE CONSEQUENCES OF WATER POLLUTION

Damage to ecosystems, human health, and international trade all result from water that isn't up to par. In a statement on the impacts on the economy, World Bank President David Malpass said that "deteriorating water quality is limiting economic development and worsening poverty in many countries." The indication of organic pollution in water is called biological oxygen demand, and if it rises over a particular threshold, economic growth in the regions included within the interconnected water basins slows by a factor of three. Other effects to consider include the following:

- Destroying biodiversity: Water pollution results in eutrophication, or the unchecked development of phytoplankton in lakes, and destroys aquatic ecosystems.

- Food chain contamination: Food tainted with compounds that are detrimental to human health when consumed may result from the use of sewage for animal and agricultural production or from fishing in polluted waterways.
- A lack of potable water: The UN estimates that millions of people throughout the globe, particularly in rural areas, lack access to sanitary facilities or safe drinking water.
- Illness: According to the World Health Organization, nearly 2 billion people are exposed to illnesses including cholera, hepatitis A, and dysentery because they are forced to drink water that has been polluted by excrement[7].
- Infant mortality: The UN estimates that diarrheal illnesses, which are linked to inadequate hygiene, kill almost 1,000 infants worldwide every day.

AREA OF RESEARCH:

The river that is considered for this research is man Sagar Lake. The city of Jaipur is home to the Man Sagar Lake. In Jaipur, the Nahargarh hills are located on the western side of Mansagar lake, while Amber hill is located on the northern side of the lake, and the Amargah hills are located on the eastern side of the lake. This lake was created in a laboratory. The architectural landmark known as the Jal Mahal may be found in the centre of the artificial lake known as Man Sagar, which was built in the 18th century [8]. The Water Reservoir is the conventional name for the water-harvesting structure at Man Sagar Lake. Its architecture is similar to that of many other traditional hydraulic water storage reservoirs. In the latter half of the 16th century, Raja Man Singh was the one responsible for its creation. The current area covered by the lake is around 300 acres km2 in size.

These are some of the most significant bodies of water in the city of Jaipur. In Man Sagar Lake, there were many species of fish, birds (including the Great Crested Grebe, the Little Grebe, the Greater Flamingo, the Great White pelican, and the Indian Cormorant), insects, microorganisms, and aquatic plants. Some of the bird species included: the Indian Cormorant, the Great White Pelican, the Greater Flamingo, and the Great White Pelican. In addition, several types of wild animals such as Indian foxes, leopards, deer, jungle cats, and others have been seen in the lake's reserve area at various times. The Nahargarh Fort, whose name literally translates to "home of tigers," can be found in the hills. Views of Jaipur, the Man Sagar Lake, and the Jal Mahal palace are particularly breathtaking from this vantage point. The lake was formed in the 16th century when a dam was constructed over the Darbhawati River, which flows between the stony plains of Nahargarh and the highlands of Khilagarh. Consequently, water was able to be conserved in the valley below[9].

CONTRIBUTION OF THE STUDY:

The primary purpose of this article is to conduct a comprehensive assessment of water quality parameters in Jaipur's man Sagar Lake, and to analyse the parameters' findings along with desired and allowable limits of certain parameters.
The rest of the paper is designed in such a way that chapter 2 deals with the literature review, and chapter 3 describes the parameters that were chosen to evaluate in man Sagar Lake. Chapter 4 discuss the results and chapter 5 concludes the work.

LITERATURE REVIEW

The physicochemical characteristics of Man Sagar Lake were analysed in a recent work [10]. Jaipur's Man Sagar Lake is a popular tourist destination. Since the lake's situation has been so dire, the Indian government included it in their National Lake Conservation Plan back in December of 2002. It was decided to examine the government's water conservation policies and practises. The NPCA classifies Man Sagar Lake as having a pH between 7.16 to 8.85, which places it in the C range but not the A, B, or D ranges. The dissolved oxygen levels range from 3.6-4.8 mg/L for grades B, C, and D. The NPCA does not permit any categories to have a BOD between 15.4 and 27.9 mg/L. The NPCA does not suggest using water from Man Sagar Lake for anything. Controlling BOD and reducing lake pollution requires a variety of measures, including determining the sources of pollution, treating sewage, properly discharging industrial pollutants, withdrawing and dredging sediment, de-weeding and regulating weeds, rehabilitating feeding drainages, implementing therapeutic interventions in the river catchment, managing waste effectively, raising public awareness and participation in preservation efforts, and reviewing conservation programmes on a regular basis. Waterfalls or aerators built at various heights in the lake may improve its aesthetic value and help keep the dissolved oxygen and biological oxygen demand (BOD) levels stable.

The paper [11] discusses the physico-chemical characteristics of Mansagar Lake's water. Water quality is further studied using approximated physico-chemical properties and their distribution by sample location and season. Parameter-relationship analysis using Pearson's method. The author discusses trends in Mansagar Lake's surface water physico-chemical characteristics by location and season. Point and non-point sources pollute the lake. Due to uncontrolled urban growth and a growing population, testing findings revealed this lake was vulnerable to sewage intake and waste disposal. WQI values and physicochemical factor relationships are addressed to estimate water quality for ecological purposes. WQI and Pearson's correlation coefficients may be utilised to enhance lake management. These parameters may be utilised to establish a quality-assured water-body monitoring network.

There has to be less room for interpretation and more clarity on the state of India's Chambal River, the research [12] analyses a "Fuzzy River Health Index" (FRHI). Indeterminate and subjective standards exist for water quality. The centroid method is used for defuzzification, whereas triangle membership functions are used for fuzzification. Both C-

TSI and EHI were used to evaluate performance (EHI). For the time being, the FRHI Fuzzy model predicts that the Chambal River's health will remain unchanged. FRHI estimations are most consistent, according to the average of three indices at each sample location. The river's health decreases from its excellent pre-monsoon state (83.0-87.2) to its worse post-monsoon state (83.0). (79.7–86.4). This must be corrected to maintain the river's health. At any time throughout the study period, for every measure of river health, the FRHI fuzzy model estimates perform better than the EHI and C-TSI. When river health changes across space and time, the practical application of FRHI becomes even more important.

This project [13] aims to investigate the chemical quality of drinking and irrigation water in Mothkur, Telangana. Mothkur's geology is Archaean crystalline. Most people consume, clean, and irrigate using groundwater. Levels of sodium, magnesium, chloride, and fluoride, location of the research are all higher than the recommended upper limits set by the World Health Organization and the International Standards Organization (BIS). U.S. soils can make use of 44% of surface water and 60% of groundwater samples, respectively, according to a salinity chart. Wilcox categorises groundwater samples as good for irrigation in 36% of cases, uncertain in 40%, and unsuitable in 20% of cases. 56% of surface and groundwater testing show sodium levels below the thresholds for irrigation. Based on residual sodium carbonate levels, all surface water samples and 56% of groundwater are suitable for irrigation. The irrigation water used in the research area has a high permeability index.

Current study [1] explores industrial effluents' impact on aquatic systems in India, notably Uttar Pradesh. Increasing industry to suit the needs of a growing population has created a difficulty. Accidental releases and/or poor management of untreated wastewater are a global concern because they may harm aquatic life. Untreated trash in rivers is a major cause of pollution in Uttar Pradesh's riverside industry. Population growth slows industrialization, a measure of a country's development. The difficulty for India, as a growing nation, is to maintain a balance between these and the environment. India's industries boomed after independence. Uttar Pradesh has a large population. Large and medium-sized industries damage the water with complex and diversified effluents. The Indian government has made treating effluents before disposal mandatory, with heavy penalties for noncompliance. All of these industries must build a waste water treatment facility or unit to limit or eliminate sludge/effluent contamination.

This research [2] investigates (1) the reactions of Thai small and medium-sized enterprises (SMEs) to industrial water pollution, and (2) the effectiveness of local governments in dealing with the problem. Despite the rising importance of SMEs to the economy, their operations often have negative effects on the natural world. Local governments are more qualified to tackle environmental issues than the federal government. Local governments may design and organise community-specific solutions. Business owners, local governments, affected communities, and non-governmental groups were interviewed about 30 industrial water pollution instances. No one stakeholder contributes significantly to environmental consequences. Two case studies highlight how corporations, local governments, and communities interacted through time and how it affected the environment. Interactions affected pollution entrepreneurs' replies. Even if they had the capacity and competence, local governments can't address water pollution alone. Local governments must work with others to fulfil this role.

Author [6] in order to increase the amount and quality of water given to a country situated farther down a shared watershed, it has been brought to light that existing international bilateral agreements need to be enforced and the EU's Water Framework Directive has to be put into practise (Romania and Serbia). By analysing the geographical distribution of the WQI and its subindices, we may pinpoint the primary sources of pollutants in this basin. The author examined WQI readings for 10 parts of Romania's southwest and Serbia's northeast's two main Banat Rivers [14]. The Water Quality Index (WQI) was calculated using long-term data (2004-2014) to assess water quality by considering annual extremes and averages for a variety of physical, chemical, and biological indicators. It was also stressed how vital it is to employ the water quality index, which has been proved to boost river water quality but hasn't been properly researched in Romania or for transboundary rivers.

METHODOLOGY

The sample of water is collected from man Sagar Lake. In laboratory, analysis of water sample is done. There are two major properties of water to examine the quality of water [15]-

- Physical examination of water

(Such as color test, temperature test, turbidity test, taste and odor test)

- Chemical examination of water

(Such as acidity, alkalinity, pH, free CO_2, hardness of water)

Table 1: parameter analysis

Physical examination of water	Color test	• The presence of colored organic matter is responsible for the color in drinking water. • Color of water is measure by Platinum cobalt scale. • This was introduced in 1892 by chemist Allen Hazen.
	Temperature test	• By ordinary thermometer water temperature is measure.
	Turbidity test	• Presence of different types of suspended particles in water called turbidity. • Measured by Shining light through a sample. • If more particles are present in water solution then higher turbidity is occur.
	Taste and Odor test	• It may be result different types of dissolve gases or microorganism and mineral. • Odor test is measured by Osmoscope in 20˚to 25℃.
Chemical examination of water	Acidity	• The capacity of water to neutralize bases called acidity, represent the total acid in water sample. • Measured by titration method.
	Alkalinity	• The capacity of water to neutralize acids called alkalinity, represent the total base in water. • Measured by titration method and introduced by Wilhelm Dittmar in 1884.
	pH	• Pure water pH id 7. It is considered neutral because it has neither acidic nor basic. • Measured by Colorimetric method.
	Free CO_2	• Free CO_2 is present in water in the form of dissolved oxygen. • Measured by titration method.
	Hardness of water	• It is expressed as milligrams of calcium carbonate equivalent per liter. • It is divided into two types – temporary and permanent. • Measured by EDTA titration method.

RESULTS AND DISCUSSION

Table 2: Parameters unit and values

Parameter	Unit	Result	Test Method
pH Value	----	7.34	IS-3025
Total Dissolved Solid	mg/l	1934	IS-3025
Total Alkalinity (as $CaCO_3$)	mg/l	254.3	IS-3025
Total Hardness (as $CaCO_3$)	mg/l	413.2	IS-3025
Calcium (as Ca)	mg/l	43.9	IS-3025
Magnesium (as Mg)	mg/l	98.4	IS-3025
Chloride (as Cl)	mg/l	539.2	IS-3025
Sulphate (as SO_4)	mg/l	59.3	IS-3025
EC	µmho/cm	830	IS-3025
Sodium (as Na)	mg/l	49.2	IS-3025
Potassium (as K)	mg/l	8.3	IS-3025
Nitrate (as NO_3)	mg/l	4.3	IS-3025
Phosphate (as PO^4)	mg/l	0.87	
Total Suspended Solids	mg/l	81.3	IS-3025
Biological Oxygen Demand (BOD) 3 days at 27 Deg C	mg/l	104.3	IS-3025
Chemical Oxygen Demand (COD)	mg/l	491.2	IS-3025

According to the data shown above, the PH value determined with the IS-3025 test is 8.17. According to IS-3025, the yield of total dissolved solids is 1934 mg/l. According to the IS-3025 test, the total alkalinity is 254.3 Mg/l (CaCO3). In accordance with the standards set out by test method IS-3025, the total hardness (expressed as CaCO3) is 413.2 Mg/l. 43.9 mg/l (as Cl) is the calcium concentration obtained with the IS-3025 test. Magnesium is expressed as 98.4 Mg/l (as Mg) for the IS-3025 test. The amount of chloride measured with IS-3025 is 539.2 mg/l. The amount of sulphate formed in the IS-3025 test is 59.3 mg/l. The EC test method IS-3025 yields 830 Mho/cm. The findings of the sodium test (IS-3025) are 49.2 mg/l . IS-3025 is a potency test that yields 8.3 Mg/. Nitrate concentrations of 4.3 mg/l are obtained with IS-3025. The result of the RTHTS-07 phosphorus test is 0.87 mg/l. Total suspended solids in IS-3025 are 81.3 mg/l. IS-3025 has a DO value of 21.4 mg/l. Using Standard Test Procedure IS-3025, the Biological Oxygen Demand is 104.3 Mg/l. IS-3025 determines a Chemical Oxygen Demand of 491.2 Mg/l.

Table 3: Desirable and permissible limits of parameters

Parameter	Unit	Result	Desirable limits as per IS 10500 2012	Permissible as per IS 10500 2012	Test Method
pH Value	----	8.45	0.5 – 6.5	---	IS-3025
Total Dissolved Solid	mg/l	1022	Max 500.0	Max 2000.0	IS-3025
Total Alkalinity (as $CaC0_3$)	mg/l	284.3	Max 200.0	Max 600.0	IS-3025
Total Hardness (as $CaCO_3$)	mg/l	382.4	Max 200.0	Max 600.0	IS-3025
Calcium (as Ca)	mg/l	54.5	Max 75.0	Max 200.0	IS-3025
Magnesium (as Mg)	mg/l	79.4	Max 30.0	Max 100.0	IS-3025
Chloride (as Cl)	mg/l	334.3	Max 250.0	Max 1000.0	IS-3025
Sulphate (as SO_4)	mg/l	58.3	Max 200.0	Max 400.0	IS-3025

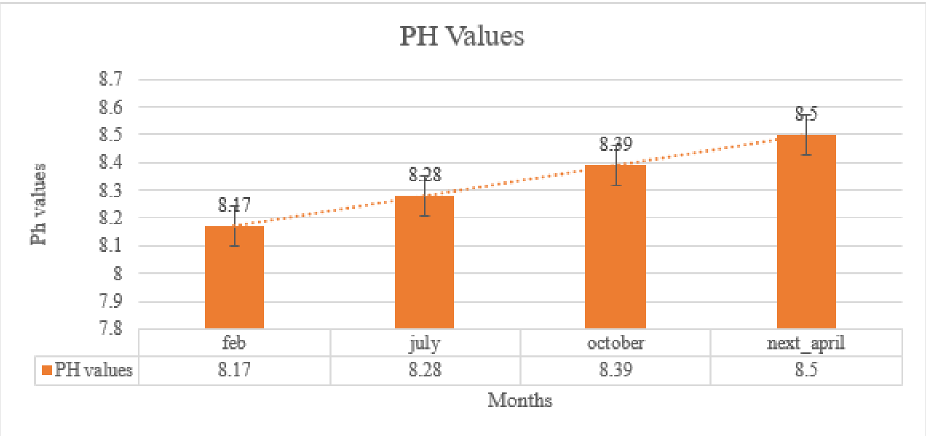
As can be seen in the given data, the PH value for the IS-3025 test was 8.39. Total dissolvable solids in IS-3025 test: 1022 mg/l. According to IS-3025, the total alkalinity is 284.3 Mg/l (CaCO3). According to the IS-3025 test, the overall hardness is 382.4 mg/l. According to IS-3025, the calcium concentration is 54.5 mg/l (as Cl). Magnesium (Mg) production at IS-3025 is 79.4 Mg/l. Tested chloride concentration was 304.67 mg/l using IS-3025. Sulphate output is 58.3 mg/l, as measured by test method IS-3025. IS 10500:2012 recommends a pH between 0.0 and 0.5, a maximum TDS of 500.0, a maximum TDS of 200.0 for alkalinity and hardness respectively, a maximum TDS of 30.0 for calcium and 30.0 for magnesium, a maximum TDS of 250.0 for chloride, and a maximum TDS of 200.0 for sulphate.

IS 10500:2012 allows for maximum values of 2.0 pH, 2000 TDS, 600 TAA, 200 TDH, 200 Ca, 100 Mg, 1000 Cl, and 400 SO42.

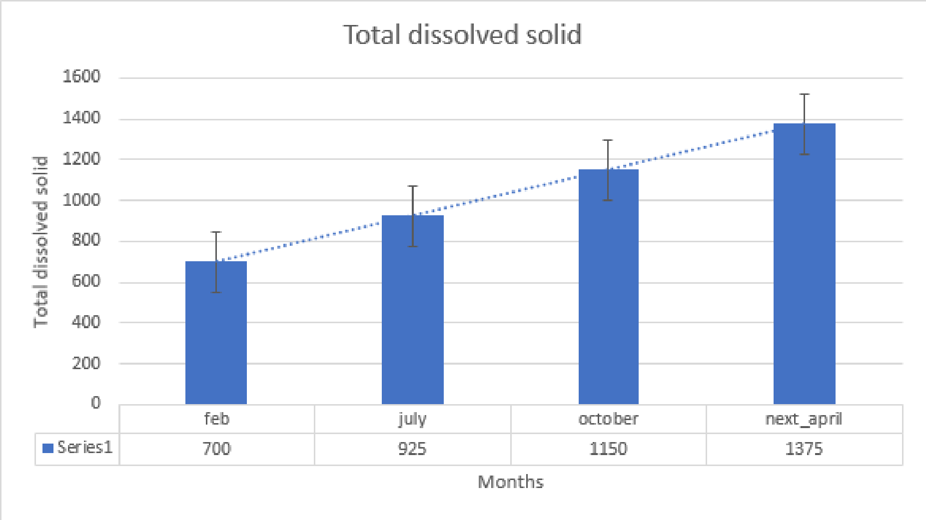
Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
PHvalue	4	.33	8.17	8.50	8.3350	.14201	.020	.000	1.014	-1.200	2.619
Totaldissolvedsolid	4	675.00	700.00	1375.00	1037.5000	290.47375	84375.000	.000	1.014	-1.200	2.619
Totalalkanity	4	52.50	262.10	314.60	288.3500	22.59240	510.417	.000	1.014	-1.200	2.619
Totalhardness	4	28.21	374.49	402.71	388.5975	12.14180	147.423	.000	1.014	-1.200	2.619
Calcium	4	12.63	29.87	42.50	36.1850	5.43509	29.540	.000	1.014	-1.200	2.619
Magnesium	4	7.35	65.70	73.05	69.3750	3.16294	10.004	.000	1.014	-1.200	2.619
Chloride	4	87.20	275.61	362.80	319.2025	37.52275	1407.957	.000	1.014	-1.200	2.619
Sulphate	4	69.00	18.60	87.60	53.1000	29.69287	881.667	.000	1.014	-1.200	2.619
EC	4	210.00	900.00	1110.00	1005.0000	90.36961	8166.667	.000	1.014	-1.200	2.619
Sodium	4	21.60	28.20	49.80	39.0000	9.29516	86.400	.000	1.014	-1.200	2.619
Potassium	4	.60	2.80	3.40	3.1000	.25820	.067	.000	1.014	-1.200	2.619
Nitrate	4	1.05	3.90	4.95	4.4250	.45185	.204	.000	1.014	-1.200	2.619
Phosphate	4	.06	.58	.64	.6100	.02582	.001	.000	1.014	-1.200	2.619
TotalSuspendedsolids	4	3.30	80.60	83.90	82.2500	1.42009	2.017	.000	1.014	-1.200	2.619
Dissolvedoxygen	4	.42	1.56	1.98	1.7700	.18074	.033	.000	1.014	-1.200	2.619
BiologicalOxygen Demand	4	48.90	128.30	177.20	152.7500	21.04321	442.817	.000	1.014	-1.200	2.619
ChemicalOxygen Demand	4	38.40	386.60	425.00	405.8000	16.52473	273.067	.000	1.014	-1.200	2.619
Valid N (listwise)	4										

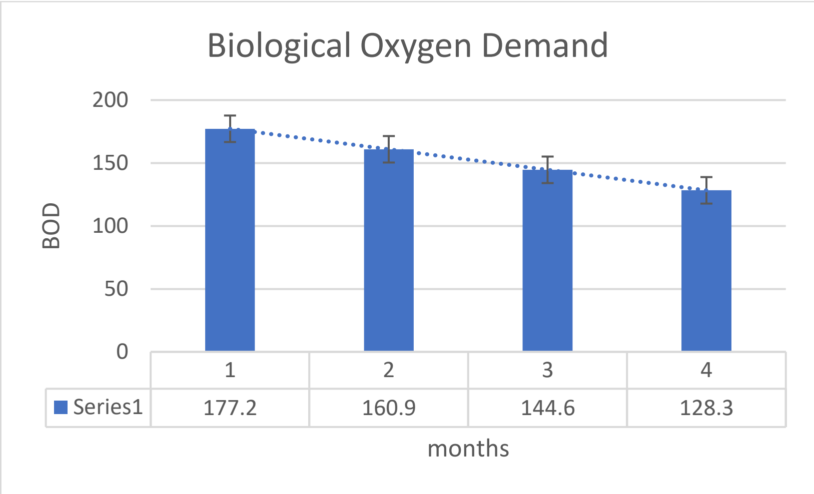
According to above table describe some graphical analysis as follows,



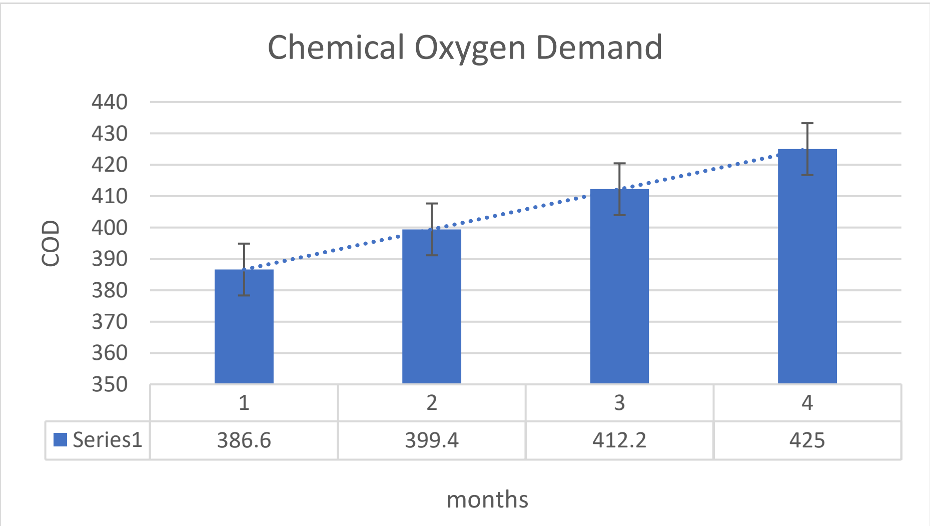
The graph above shows how the PH of water changes over time. The PH value in February is 8.17, and it rises significantly over time.



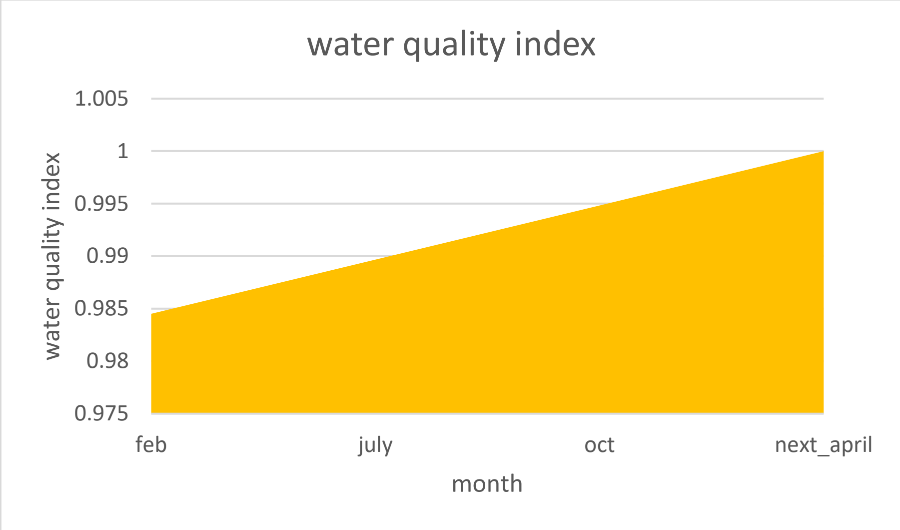
It can be seen from the graph above that the total dissolved solid in water varies over time. The total dissolved solid value is 700 in the month of February, and it increases through time.



The graph that is seen above demonstrates that the amount of biological oxygen demand that is present in water fluctuates throughout time. The value of biological oxygen demand is at its lowest 177.2 in the month of February, and it continues to decreases over time.



The graph that is seen above demonstrates that the amount of chemical oxygen demand that is present in water fluctuates throughout time. The value of chemical oxygen demand is at its lowest 386.6 in the month of February, and it continues to increases over time.



Above graph shows the quality of the water over time. It is observable that, in the month of February water pollutant is low, water quality is at 0.984. in the month of next April, it increases to 1. It means the water pollution increases over time.

a	b	Equation
0.11	8.06	Y=0.11a+8.06
225	475	Y=225a+475
-17.5	332.1	Y=-17.5a+332.1
9.405	365.085	Y=9.405a+365.085
-4.21	46.71	Y=-4.21a+46.71
2.45	63.25	Y=2.45a+63.25
-29.065	391.865	Y=-29.065a+391.865
23	-4.4	Y=23a+-4.4
70	830	Y=70a+830
7.2	21	Y=7.2a+21
0.2	2.6	Y=0.2a+2.6
0.35	3.55	Y=0.35a+3.55
0.02	0.56	Y=0.02a+0.56
1.1	79.5	Y=1.1a+79.5
-0.14	2.12	Y=-0.14a+2.12
-16.3	193.5	Y=-16.3a+193.5
12.8	373.8	Y=12.8a+373.8

Above, you'll find a table including the formulas used to assess each parameter (PH value, total alkalinity, total hardness, calcium, magnesium, chloride, sulphate, sodium, potassium, nitrate, phosphate, total suspended solids, dissolved oxygen, BOD, COD).

CONCLUSION

Pollution affects all three environments. All of our drinking water comes from lakes and rivers. There is a severe water shortage. All other substances are dissolved in water. Water, which is odourless, tasteless, colourless, and transparent, is the most vital material on Earth. Clean drinking water is a need. A lack of access to safe water threatens people's health and ability to make a living. Polluted water is a leading cause of illness and death worldwide. Individual human needs are met by it. When water is contaminated by human activities, it becomes unusable. Man Sagar Lake's pollution problem stems from the lake's constant and increasing exposure to wastewater, raw sewage and sewage that has only been partly cleansed can contain dangerous amounts of pollution. The introduction of wastewater is to blame for this issue. Approximately 130 square kilometres in size, the lake may be found in the Indian state of Rajasthan, not far from the city of Jaipur. In 1610 AD, Raja Man Singh constructed it by damming the Dravayavathi River. Discharges of untreated wastewater and other polluting components, including as effluents from industrial activities, household trash, and agricultural waste, are contributing to the lake's continually increasing pollution level. Each year, this pollution becomes much worse. All of these items contribute to pollution by collecting heavy metals and altering the physicochemical characteristics of the water in which they are found. As a direct result, this body of water experiences a deterioration in quality due to processes including eutrophication and slit decomposition. As water quality continues to deteriorate, all creatures that rely on it will need to make behavioural changes. The results of the physiochemical studies had an effect on the water's value, total dissolved solid, total alkalinity, acidity, calcium, magnesium, chloride, sulphate, and nitrate concentrations. The Board of Directors was also swayed by the findings of these probes.

REFERENCES

1. S. Singh, R. K. Tiwari, and R. S. Pandey, “Water Pollution due to Discharge of Industrial Effluents,” vol. 9, no. April 2019, pp. 111–121, 2018.
2. K. Tevapitak and A. H. J. (Bert) Helmsing, “The interaction between local governments and stakeholders in environmental management: The case of water pollution by SMEs in Thailand,” J. Environ. Manage., vol. 247, no. November, pp. 840–848, 2019, doi: 10.1016/j.jenvman.2019.06.097.
3. T. Xu et al., “Wetlands of international importance: Status, threats, and future protection,” Int. J. Environ. Res. Public Health, vol. 16, no. 10, 2019, doi: 10.3390/ijerph16101818.
4. V. Chaudhary and S. Satheeshkumar, “Assessment of groundwater quality for drinking and irrigation purposes in arid areas of Rajasthan, India,” Appl. Water Sci., vol. 8, no. 8, pp. 1–17, 2018, doi: 10.1007/s13201-018-0865-9.
5. G. S. Colares et al., “Floating treatment wetlands: A review and bibliometric analysis,” Sci. Total Environ., vol. 714, p. 136776, 2020, doi: 10.1016/j.scitotenv.2020.136776.
6. M. Dunca, “Water pollution and water quality assessment of major transboundary rivers from Banat (Romania),” J. Chem., vol. 2018, 2018, doi: 10.1155/2018/9073763.
7. L. A. Al-Maliki, S. L. Farhan, I. A. Jasim, S. K. Al-Mamoori, and N. Al-Ansari, “Perceptions about water pollution among university students: A case study from Iraq,” Cogent Eng., vol. 8, no. 1, 2021, doi: 10.1080/23311916.2021.1895473.
8. S. S. Pathak and P. Mishra, “A Review of the Ganga River Water Pollution along Major Urban Centers in the State of Uttar Pradesh, India,” Int. Res. J. Eng. Technol., 2020.
9. Syafiuddin and R. Boopathy, “Effect of Algal Cells on Water Pollution Control,” Curr. Pollut. Reports, vol. 7, no. 2, pp. 213–226, 2021, doi: 10.1007/s40726-021-00185-5.
10. P. Res, M. Suppl, S. Sharma, and M. P. Choudhary, “ASSESSMENT OF WATER QUALITY PARAMETERS OF MAN SAGAR LAKE JAIPUR , RAJASTHAN , INDIA,” vol. 40, pp. 90–96, 2021.
11. Y. Singh and M. K. Jain, “Pearson ‘ s correlation and trend analysis for physico-chemical parameters of Mansagar Lake , Jaipur,” no. September, 2021, doi: 10.20944/preprints202109.0237.v1.
12. Kumar, M. P. Sharma, and S. P. Rai, “A novel approach for river health assessment of chambal using fuzzy modeling, India,” Desalin. Water Treat., vol. 58, no. January, pp. 72–79, 2017, doi: 10.5004/dwt.2017.0144.
13. G. Sakram and N. Adimalla, “Hydrogeochemical characterization and assessment of water suitability for drinking and irrigation in crystalline rocks of Mothkur region, Telangana State, South India,” Appl. Water Sci., vol. 8, no. 5, 2018, doi: 10.1007/s13201-018-0787-6.
14. P. Joshi and P. K. Gupta, “Assessing Groundwater Resource Vulnerability by Coupling GIS-Based DRASTIC and Solute Transport Model in Ajmer District, Rajasthan,” J. Geol. Soc. India, vol. 92, no. 1, pp. 101–106, 2018, doi: 10.1007/s12594-018-0958-y.
15. V. Sharma and Y. Walia, “Water Quality Assessment Using Physico-Chemical Parameters and Heavy Metals of Gobind Sagar Lake, Himachal Pradesh (India),” Curr. World Environ., vol. 10, no. 3, pp. 967–974, 2015, doi: 10.12944/cwe.10.3.28.