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Assessment of Water Quality of Lakes Around Jaipur, Rajasthan

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ABSTRACT: Lakes are the major source of water to the society. It fulfills the demands of humans, animals & plants also. Now days the lakes are degrading & depleting at a rapid rate which causes serious problems in our society. Restoration deals with the establishment of the various techniques & methods, which deals with the origin of the problems and making the cure for all this. In addition to assessing the costs of actions to improve the water & environment, the strategy will begin to explore the wider societal benefits of a better environment. The comparative analysis of water samples will also help us to understand the problems and the actions needed to overcome it.

KEYWORDS: lakes, Jaipur, Rajasthan, water quality, assessment, environment, analysis

I. INTRODUCTION

Chandlai Lake is situated around 30kms away from the Jaipur having coordinated: 26°41'45"N 75°52'36"E. It is a major source for various migratory birds that are coming to the lake during the monsoon season & also to the villagers that are using the water for the agricultural purposes. However, in recent era, the conditions are very exhausted and the natural cycle is very disturbed. The lake is suffered from depletion of water quality and natural resources, which also affects the life of villagers & migratory birds. In order to recreate the healthy conditions, we need to understand the basic problems that are associated with the lake, which causes its deterioration with rapid rate [1,2]

Table 1. Water test on sample water

Properties	Observed values (mg/L)	Permissible values (mg/L)
Total Dissolved solids	1000	500-2000
Total suspended solids	1500	1000
Total solids	1500	2000
Chloride content	35.4	250-1000
Alkalinity	120	200-600
pH	7.15	6.5-8.5
Properties	Observed values (mg/l)	Permissible values (mg/L)
Total hardness	1438.2	300-600
Conductivity	11.66 mho	1.9 mho

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Turbidity	120 NTU	10 NTU
BOD	116	400
COD	928	250
DO	8	9.2

The Man Sagar lake that embodies Jal Mahal might lose all its glory if state and civic authorities don't step in soon to help revive it. A 17th-century artificial lake in Jaipur has gone from being an abode for exotic flora and fauna to a garbage-infested spot sporting plastic bags and sewage. Constructed during the reign of Mirza Raja Man Singh, the 29th Kachwaha Rajpur Raja of Ajmer—one of Mughal emperor Akbar's most trusted and loyal generals—the Man Sagar lake used to be the primary source of drinking water for the people of Jaipur. Embodying Jal Mahal in all its beauty, the lake is not only a picturesque sunrise spot serving up a serene view but also a water body that hosts a variety of marine life. The fauna around it increases tenfold when different endangered bird species fly over its waters during the migrating season, making it a bird watcher's delight. In fact, it (the lake) used to be a popular hunting spot for the Rajput kings of Jaipur. Now, dead fish are found floating on the surface of the lake; garbage is lodged on the banks, and sewage flows in continuously. The lake now struggles to sustain any life possible.[3,4]

The marine ecosystem of the vicinity has been severely affected over the past two decades—a direct byproduct of the ever-evolving landscape. Jaipur's sewage, along with the occasional rainwater, mixes into the lake to form a stench that pushes locals and tourists away from it. To make matters worse, huge piles of garbage disposed of in the lake usually wind up on the banks.

Despite being placed under the Rajasthan Lake Development Authority (RLDA), conservation efforts have failed in making any difference. Sewage, fertilizers, pesticides, human feces, and even illegal encroachments, continue to contaminate this ancient lake. A study conducted by the Rajasthan Pollution Control Board (RPCB) found that the water in Man Sagar lake has turned toxic. The study also revealed that the dissolved oxygen rate in the lake is below the required level to sustain any aquatic life.[5,6] The oxygen rate in the lake stands at 2.33mg per liter as compared to the required minimum of 3mg per liter—which explains the hordes of dead fish found floating on the water's surface. Water reservoirs and lake bodies are of immense importance, especially in arid regions such as Rajasthan. Jaipur has already lost 60 out of 518 rivulets; more than 1000 wells/tube wells have stopped recharging due to an unprecedented increase in the total paved area. Encroachments on natural drains have also made Jaipur prone to flooding. In such cases, lake bodies such as the Man Sagar Lake act as a buffer and absorb the excess rainfall water, preventing flood-like situations. This proves that the lake may be more crucial for the city of Jaipur than any of us had anticipated.[7,8] Although the NGOs are doing a commendable job in their attempts at preserving the lake, their efforts might go in vain if the state doesn't step in. To make sure that the preservation efforts made during 1999-2004 are not misspent, the administration needs to step up to preserve this antique lake.

II.DISCUSSION

The Sambhar salt lake is India's largest salt lake, located in Rajasthan. It has 5700 km square cathment area. Its surface area is 190-230 km square. Lake is spread in Nagaur, Jaipur and Ajmer district. Minimum and maximum temperatures during winter and summer fluctuate between 5°- 45° Celsius. Its average depth is 60cm.-3 meter. In all samples the value of pH range carries between 7.20- 8.30. It means water is alkaline in nature but its not in high range so it can be used for drinking. Electrical conductivity is in the range of 1050µs/cm-8200µs/cm. Carbonate and bicarbonate ions are responsible for alkalinity of water. Carbonate ions range is 90mg/lit.-400mg/lit. Bicarbonate ions range is 970mg/lit.-2900mg/lit.[9,10] Minimum range of TDS is 2200mg/lit and maximum is 4600 mg/lit. Calcium ion ranges from 230mg/lit-830mg/lit. Magnesium ion ranges from 210mg/lit-780mg/lit. Sulphate ion ranges from 90mg/lit-520mg/lit. Sodium ion ranges from 90mg/lit.-175mg/lit. Potassium ion ranges 85mg/lit- 140mg/lit. Nitrate ion ranges

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130mg/lit-640mg/lit. Chloride ion ranges 430mg/lit-1880mg/lit. Due to organic pollution high chloride concentration occurs. We have reached at that result, water of Sambhar salt lake is reached in ions like chloride, sodium, dissolved solids etc. but it has no side effect on health it has required to be treated. Based on the investigation we have to know the physico-chemical parameters of Sambhar Salt Lake. In the lake Chloride, Sulphate, magnesium, carbonate and bicarbonate all ions concentration is very high. It means the lake's water is very polluted it is need to be treated.

Jaipur is blessed with an artificial lake of Ramgarh. Among the quaint scenery of Ramgarh, the lake attracts tourists from all over the world which is at a stone's throw distance of twenty-five kilometers from Jaipur. The lake has provision for boating that makes it a favorite picnic spot for the tourists. The temple of "Jamwa Mata" and the remnants of the historical fort are some of the added fascinations of the place with well-equipped library and a museum that provides insight into the rich cultural heritage of the ancient times.[11]

Located on the south side of the city of Amer, close to Amber fort. There is a garden in the center of Maota Lake namely Kesar Kyari Bagh with star shaped flowerbeds and saffron flowers. The lake provides a placid setting from which to look up at Amer Fort on the hillside: reflected on the water's surface. A perfect gateway for this pleasing monsoon season.

One of the best kept secrets of the city of Amer is a 17th century lake 'Sagar', which was the initial source of water for the adjoining forts of Amer and Jaigarh as well as the city of Amer and its people. Skidded away beyond Kheri Gate & the Anokhi Museum, the lake can be reached by car and then one can walk around its borderline, which is divided into two parts- the Upper Sagar and the Lower Sagar. If you are visiting Amer or the Anokhi Museum in the evening, do stop by. The sunset turns the mud-plastered walls of Amer into a golden warren waiting to be explored.[11]

III. RESULTS

Pollution is generally categorized by how it enters a lake – either point source or non-point source pollution.

Point Source Pollution: Contaminants that enter a water body that can be traced back to a specific source, location, and offender. Point source pollution is easier to manage compared to non-point source pollution.

Non-Point Source Pollution: Contaminants that enter a water body that cannot be traced back to a specific source, location, and offender. Rather, this pollution comes from many diffuse sources and often enters in small amounts but can become concentrated in lakes and other freshwater resources.

Examples of point source pollution include dumping of industrial waste, effluent from sewage treatment facilities, illegal dumping, and other hazardous chemical deposition (e.g. nuclear waste). Heat can also be a pollutant. For example, power plants often use water to cool overheating components. Once used, this hot water is released into nearby lakes where it alters the lake's temperature. This heat is a form of pollution because it can be harmful and kill aquatic life including sensitive fish species. Another example of widespread pollution is the legal discharge of sewage and other chemicals. [9,10]

When pollution emerges from locations far away from a water body or there are many small, diffuse sources, it is considered non-point source. Without an identifiable source, this type of pollution is often difficult to manage; it is harder to estimate how much pollution is actually occurring and what sort of impacts it is having. Non-point source pollution includes agricultural runoff (pesticides, fertilizers, manure), acid rain, nitrate deposition, and leaching from septic tanks. Non-point source pollution accounts for most of the contamination in water systems.

Regardless of the source, pollution can disrupt aquatic life in many ways. In general, pollution reduces water quality. It can also reduce the diversity of wildlife, especially sensitive species (see bioindicators section to learn more). Fertilizers and pesticides from agricultural and urban runoff and sewage seepage from the groundwater enter lakes and cause elevated levels of nitrates and phosphates. These can lead to harmful algal blooms and eutrophication, which can be harmful to both aquatic life and human health. Industrial runoff can contain heavy metals, such as lead and mercury, which can find their way into the food chain. This can cause illness or death to fish, other animals, or humans that

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consume them. Sediment washed away from construction activities and urban or agricultural activity enter lakes, reducing water clarity and water quality, and can be lethal to aquatic organisms by becoming trapped in gills. Finally, atmospheric pollutants — from car exhaust pipes or industrial power generation can enter lakes as acid rain or other forms of acidic precipitation.[11]

IV.CONCLUSIONS

Pollution affects water quality in lakes and other freshwater resources around the globe. It can take many forms from industrial, agricultural, or municipal sources; a few common examples include pesticides, herbicides, sewage, and litter. Lakes often contain high pollution levels relative to the surrounding landscapes and environment. Rivers and streams drain pollutants from the landscape where they concentrate in lakes and other water bodies. Aquatic species such as fish can be extremely high in contaminants as some pollutants don't readily dissolve and dilute in water and are instead taken up into organisms. Some species of aquatic organisms are particularly sensitive to pollution; they are used as indicators of pollution and are called bioindicators. Because lakes drain a large surrounding landscape, they reflect the processes and actions that operate around them. When chemicals are spilled, they can drain into nearby streams and be transported downstream into lakes.[11]

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