"Water Quality Status of Indra Talab of Nalanda''

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Abstract:

Key words: Water quality parameters, Fresh water bodies, physico-chemical parameters,

Due to sewage, agricultural and industrial wastes, abnoxious emissions and anthropogenic activities, the freshwater bodies around the world are becoming polluted. The water body selected for this study is Indra Talab in Nalanda. The Talab receives a large amount of domestic wastes, sewage and industrial effluents. It has floating lotus flowers, which are very useful in improving the Talab's water quality. Authors examined physico-chemical parameters like pH, dissolved oxygen, biochemical oxygen demand, and chemical oxygen demand to ascertain the water quality of this Talab.

Introduction

Water resources in India have reached a point of crisis due to unplanned urbanization and industrialization. Urban water bodies receiving external pressure from human settlements adversely affect nearby aquatic ecosystems. Urbanization has direct negative impacts on water bodies. Water is one of the foremost critical variables for each living life form on this blue planet. Water is basically utilized for washing, drinking, fisheries and other house hold purposes. Lakes are one of the imperative water assets utilized in this region. On the other hand, they too give a living space for spineless creatures, angles and sea-going feathered creatures. Water which is a neutral oxide of hydrogen with formular H_2O is one of the most important oxide known. It is abundant in the earth's crust. Its presence or otherwise is said to influence human settlement. The importance of water to living things cannot be overemphasized. It is believed to be the reason for life on the earth. Human needs water for various purposes, ranging from domestic to industrial uses. All living things depend on water for its existence. Water being a universal solvent has many substances dissolved in it. These include those that are beneficial and those harmful to man. Its quality therefore depends on factors such as geological morphology, vegetation and land use. Water is the natural habitat of fishes and other aquatic animals, it is therefore of great importance to study water quality of pond in Biharsharif. Ponds could be referred to as man-made or natural water a body which holds water for the year or more . It could also be referred to as a pond, Indra Talab intended for fish breeding. These described a pond as a quiet body of water that is so small for wave action and too shallow for major temperature difference from top to bottom. Generally in a pond, the temperature changes with the air temperature and it is relatively uniform. Lakes are similar to ponds, but their temperature is dependent on the seasons. It is said that the productivity of a pond depends on the quality of water. The importance of the environment to good fish farming practices has been reported. It has been pointed out that animal protein is in shortfall in Bihar sharif. The reason, being the constant pollution of the natural water bodies arising from the activities of exploitation. Fish cultivation is therefore a necessity in order to meet the protein demand of the ever increasing populace. This work is therefore aimed at providing relevant information to fish farmers in order to help improve the quality of fish farming. This work therefore determined some physico-chemical properties of selected ponds in Biharsharif.

Use of detergents by washer men as well as by washing four wheelers makes the water alkaline in nature Organic enrichment of the Talab through floral offerings, idol immersion, and decomposition of aquatic weeds are also the significant causes of its eutrophication.Enemous

growth of Plants also cause eutrophication of the Talab. Denting and Painting of four wheelers at its northern bank as well as domestication is also a cause of heavy metals concentration and direct domestic sewage discharge in it.

CLIMATE:

The climate of the whole region is tropical Monsoon in character. The year may be broadly divided into three season's i.e.

(i) **SUMMER SEASON**: from March to mid-June.

(ii) **RAINY SEASON**: from June to October.

(iii) **WINTER SEASON**: from November to February.

The stormy season more often than not begins suddenly with south-west storm. The monsoon begins within the moment week of June with the most elevated precipitation within the month of July and August. The typical yearly precipitation of this locale shifts from around 600 mm. to 1900 mm of which more than 80 percent happens amid the south west monsoon.

The winter season starts from November with lowest temperature in the month of January. The lowest temperature means annual temperature is about 19 degree C while the highest temperature means annual temperature is about 31 degree c, but mean monthly temperature varies between 8.4 degree C in Jan month and 38.2 degree C in April month.

WIND DIRECTION:

Wind blows in two directions one northeast to easterly amid June to September and other westerly amid the rest of the year. The wind blow speed is generally high from May to August month.

Materials and Methods

The samples were collected from a depth of 1ft below the surface using Nansen type water sampler and kept in polythene containers (500 mL) with the addition of 2 mL concentrated HNO3 at 2 mL in order to preserve the metals and also to avoid precipitation. The pH of water samples was determined using pH-meter with electronic glass electrode and conductivity was measured by conductivity-meter. For the analysis of total heavy metals (dissolved and suspended), water (200 mL) samples were digested with 5 mL of di-acid mixture (HNO3: HClO4 :: 9: 4 ratio) on a hot plate and filtered by Whatman No. 42 filter paper and made up the volume to 50 mL by double distilled water for analysis of heavy metals using atomic absorption spectrophotometer.

Unstable parameters such as temperature and pH were measured in-situ. Temperature was determined using the mercury in bulb thermometer while pH was measured with a portable pH meter after calibration with pH buffer. Conductivity was determined that measures in microsimens/centimeter (µs/cm). Turbidimeter. Total Dissolved Solids (TDS) and total suspended solids (TSS) were determined gravimetrically. Samples for dissolved oxygen and biochemical oxygen demand were sampled with a 250mL dark coloured reagent bottles. These water samples were fixed at site by adding 1.0 mL of Winkler's solution 1 (Manganese (II) tetraoxosulphate (VI), Monohydrate – MnS04. H2O) and 1.0mL of Winkler's solution II (Sodium hydroxide and Sodium iodide) using a micro-pipette. To this solution 1.0mL of concentrated tetraoxosulphate (VI) acid was added below the solution inside the reagent bottle with a pipette. This is to dissolve the precipitate of Manganese (II) hydroxide formed. All samples were then taken to laboratory for further determination. Dissolved oxygen (DO)) was then determined on the fixed sample using the Winkler's titration. The biochemical oxygen demand (BOD) was then determined on the DO sample after incubation in the dark for 5 days at ± 20 degree C.

Alkalinity was determined by titration procedure where a known volume of water sample was titrated with 0.02M HCl. Total water hardness was measured by titrating 0.01N ethylenediammetetracetic acid (EDTA) using Eriochrome black T as indicator. Phosphate – Phosphorous was determined by the ascorbic acid method.

Nitrate – nitrogen in water sample was determined using the phenoldisulphonic acid method. Sulphate was determined using the colorimetric method.

Parameters based on titration

Observed values showed the seasonal variations of the year 2011-12 of all the three seasons (Summer season, winter season, and Post-monsoon season. Observed Values of Different Ponds of Summer Season of Different Parameters –

Parameters	First Sampling	Second Sampling	Third Sampling	Average
Temp0C(A/W)	29/27	27/24	20/18	25.3/23
Ph	8.01	7.80	7.40	7.73
D.O.(mg/L)	3.1	2.4	6	3.83
Conductivity	360	380	121	287
BOD(mg/L)	6	6.4	3.2	5.2
Total Alkalinity(mg/L)	146	240	52	146
Chloride (mg/L)	16	42	12	23.33
Total hardness(mg/L)	134	160	210	168
Ca-hardness(mg/L)	84	70	176	110
Mg-hardness(mg/L)	52	75	22	49.66
Total solid(mg/L)	204	305	90	199.66
Turbidity NTU	20	30	20	23.33
Nitrogen as Nitrate (mg/L)	0.2	0.070	0.200	0.156
Ammonia (mg/L)	ND	ND	0.240	0.08
Phosphorous as Phosphate (mg/L)	0.1174	0.214	0.014	0.1151
TC	4200	9400	44000	19200
FC	2500	4400	24000	10300

Conclusion

The sewage from domestication and decomposition of Plants are the main causes of increase value of BOD & COD. Heavy metals like iron, zinc & lead are accompanied due to denting & painting of four wheelers on its pound. Iron is also prevailing due to latterite found in the earth crust of this region. Alkalinity in water is mostly due to use of detergents by Washermen as well as by the washing of four wheelers in the IndraTalab. dissolution of soil and dust by washing four wheelers in the Indra Talab. Therefore washing of four wheelers in the Talab should be banned. The growth of Plants should be stopped by cutting them from the root, which will prevent Eutrophication of the Indra Talab.Municipal wastages dumped near the pond contains plenty of dead and decayed organic substances and several inorganic chemicals which are the major sources of ammonia and nitrate contamination in water of Indra Talab.

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