

Water Quality Monitoring Report of Sindh Sagar, Ishagarh, District Ashoknagar

1. Background

As directed a research team from Environmental Research Laboratory of EPCO visited Sindh Sagar, Isagarh on 23rd September, 2020 to investigate the existing water quality wherein various remedial activities are being implemented for Conservation and Management of the water body under financial assistance through NLCP project of Ministry of Environment, Forest & climate change, Government of India.

2. Team

The team consist of following members:

1. Dr. Subrata Pani, RF, EPCO
2. Chepil Samaiya, Lab/Field Assistant, EPCO
3. Dilip Gaur, Lab/Field Assistant, EPCO
4. Ramkalesh Napit, Lab/Field Assistant, EPCO

In the beginning a meeting was held with the Chief Municipal Officer, Ishagarh to apprise him about the purpose of the visit. CMO thereafter also accompanied the research team of EPCO for site visit and gave valuable inputs regarding works being done for conservation of status of the water body.



During the period of investigations water samples were collected from four different locations of the lake.

3. Description of Sampling Stations

3.1 Station-1 : Barghat Shiv Mandir

This is the first sampling station. This is located near Barghat Shiv Mandir. The fringe area of the water body at this place is mostly occupied with residential units and commercial establishments.

Salient Features:

- The area is prone to anthropogenic activities
- Water colour is muddy/turbid
- Victim of dumping of solid waste



3.2 Station-2: Kalbala Ghat Bus Stand

This is the second sampling station which is near the main bus stand. Water body at this location is also very prone to anthropogenic activities.

Salient Features:

- Water colour is turbid
- Emergent weeds like *Polygonum glabrum* in the fringe area



3.3 Station-3 : Chatri Ghat

This is near the historical palace. The area is also prone to various anthropogenic activities. An Idol immersion Ghat is being constructed to divert the immersion activities from the main water body to its downstream.

Salient Features:

- Highly prone to anthropogenic activities
- Presence of emergent macrophytes like *Polygonum*, *Ipomoea* etc



3.4 Station-4 : Parewa Dongar

This is on the rural part of the water body. The catchment is mostly used for agricultural activities. It is also the area from where the water body receives maximum runoff water during precipitation. The fringe area along this part is also infested with macrophytes like *Ipomoea aquatic*, *Ipomoea fistulosa*, *Polygonum sp.*



Salient Features:

- Highly prone to soil erosion
- Inflow of raw sewage
- Fringe area heavily entirely infested with macrophytes
- Water colour is muddy/turbid

4. Material and Methods:

4.1 Sample Collection: Water Samples were collected on 23rd September, 2020 from the following identified points (Table-1) on different locations of the lake in presence of CMO, Implementing agency and other municipal officials

Sampling stations of Sindh Sagar, Ishagarh.

Station-1 : Barghat Shiv Mandir

Station-2 : Kalbala Ghat Bus Stand

Station-3 : Chatri Ghat

Station-4 : Parewa Dongar

The water samples were collected using Ruttner Water sampler while plankton samples were collected with plankton net of mesh size 25. Collection, preservation and transportation of water samples for various physico-chemical and biological analysis were done as per the standard method prescribed in APHA (2010).

Following parameters (Table-2) are selected as per the guidelines of NRCD, MOEF.

Table-2: Parameters analysed

S. No.	Parameter		
1	Air & Water Temperature (°C)	10	Total Hardness (mg/l)
2	Turbidity (JTU)	11	Calcium Hardness (mg/l)
3	pH	12	Magnesium Hardness (mg/l)
4	Total Dissolved Solids (mg/l)	13	Dissolved Oxygen (mg/l)
5	Conductivity (µS/cm)	14	Calcium Content (mg/l)
6	Free CO ₂ (mg/l)	15	Magnesium Content (mg/l)
7	Total Alkalinity (mg/l)	16	Chloride (mg/l)
8	Carbonate Alkalinity (mg/l)	17	Biochemical Oxygen Demand (mg/l)
9	Bi-carbonate Alkalinity (mg/l)	18	Chemical Oxygen Demand (mg/l)



4.2 Analysis of Water & Biological parameters

Analysis of all the parameters were performed as per the manual “ Standard methods for the examination of water and wastewater” published jointly by American Public Health Association, American Water Works Association & Water Environment Federation, 19th Edition – 2010. Details of methodology for analysis of identified parameters are given below:

5. Water Quality

The water quality of Sindh Sagar, Ishagarh was assessed to evaluate its existing characteristics. The status of the water quality on the basis of analysis of various physico-chemical and biological parameters is depicted below:-

5.1. Physico-chemical Status

Parameters	Station-1 Barghat Shiv Mandir	Station-2 Kalbala Ghat Bus Stand	Station-3 Chatri Ghat	Station-4 Parewa Dongar
Air temperature (°C)	28	28.2	28.3	28.2
Water temperature	26	26.1	26.2	26
Turbidity (JTU)	15	35	15	20
pH (Unit/liter)	7.8	7.6	7.7	7.5
TDS (mg/liter)	200	210	197	200
Conductivity (mS/Cm)	0.32	0.344	0.32	0.32
Free CO ₂ (mg/liter)	6	10	8	10
Total Alkalinity (mg/liter)	70	74	90	80
Carbonate (mg/liter)	Abs	Abs	Abs	Abs
Bi carbonate (mg/liter)	70	74	90	80
Dissolved Oxygen (mg/liter)	6.4	5.6	6.8	6
Total Hardness (mg/liter)	62	66	60	64
Calcium Hardness (mg/liter)	50.4	50.4	52.5	50.4
Magnesium Hardness (mg/liter)	11.6	15.6	7.5	13.6
Calcium Content (mg/liter)	21.16	21.16	22.05	21.16
Magnesium Content	2.81	3.79	1.82	3.30
Chloride (mg/liter)	7.99	11.98	9.99	12.98
BOD (mg/liter)	8	10	8	6
COD (mg/liter)	24	28	20	16

i. Air temperature:

Air temperature during the period of investigation was found within the range of 28 °C to 28.3°C. The minimum value was observed at station - 1 while maximum value was recorded at station-3.

ii. Water temperature:

Water temperature during the period of investigation were found within the range of 26°C to 26.2 °C. The minimum value was observed at station -1& 4 while the maximum value was recorded at station-3.

iii. Turbidity:

Turbidity during the period of investigation was found within the range of 15 JTU to 35 JTU. The minimum value was observed at station –1 while the maximum value was recorded at station-2.

iv. pH :

pH during the period of investigation was found within the range of 7.5 to 7.8. The minimum value was observed at station - 4 while the maximum value was recorded at station-1.

v. Total Dissolved Solids (TDS):

TDS during the period of investigation were found within the range of 197mg/liter to 210 mg/liter. The minimum value was observed at station – 3 while the maximum value was recorded at station-2.

vi. Conductivity:

Conductivity during the period of investigation were found within the range of 0.32 mS/Cm to 0.344 mS/Cm. The minimum value was observed at station – 1,3 &4 while the maximum value was recorded at station-2.

vii. Free CO₂:

Free CO₂ the period of investigation were found within the range of 6 mg/liter to 10 mg/liter. The minimum value was observed at station – 1 while the maximum value was recorded at station-2 & 4.

viii. Total Alkalinity:

Total Alkalinity during the period of Pre monsoon investigation was found within the range of 70 mg/liter to 90 mg/liter. The minimum value was observed at station –1 while the maximum value was recorded at station-3.

ix. Carbonate Alkalinity:

Carbonate Alkalinity during the period of investigation was found absent at all the stations.

x. Bi-carbonate Alkalinity:

Bi-carbonate Alkalinity during the period of investigation was found within the range of 70 mg/liter to 90 mg/liter. The minimum value was observed at station –1 while the maximum value was recorded at station-3.

xi. Dissolved Oxygen:

Dissolved Oxygen values during the period of investigation were found within the range of 5.6 to 6.8 mg/liter. The minimum value was observed at station – 2 while the maximum value was recorded at station-3.

xii. Total Hardness:

Total Hardness values during the period of investigation were found within the range of 60 to 66 mg/liter. The minimum value was observed at station – 3 while the maximum value was recorded at station-2.

xiii. Calcium Hardness:

Calcium Hardness during the period of investigation was found within the range of 50.4 mg/liter to 52.5 mg/liter. The minimum value was observed at station – 1,2 & 4 while the maximum value was recorded at station-3.

xiv. Magnesium Hardness:

Magnesium Hardness during the period of investigation was found within the range of 7.5 mg/liter to 15.6 mg/liter. The minimum value was observed at station – 3 while the maximum value was recorded at station-2.

xv. Calcium Content:

Calcium Content during the period of post monsoon investigation was found within the range of 21.16 mg/liter to 22.05 mg/liter. The minimum value was observed at station –1,2 & 4 while the maximum value was recorded at station-3.

xvi. Magnesium Content:

Magnesium Content during the period of investigation was found within the range of 1.82 mg/liter to 3.79 mg/liter. The minimum value was observed at station –3 while the maximum value was recorded at station-2.

xvii. Chloride:

Chloride values during the period of investigation were found within the range of 7.99 mg/liter to 12.98 mg/liter. The minimum value was observed at station –1 while the maximum value was recorded at station-4.

xviii. Bio-chemical Oxygen Demand (BOD):

BOD values during the period of investigation were found within the range of 6.0 mg/liter to 10 mg/liter. The minimum value was observed at station – 4 while the maximum value was recorded at station-2.

xix. Chemical Oxygen Demand:

COD values during the period of Pre monsoon investigation were found within the range of 16 mg/liter to 28 mg/liter. The minimum value was observed at station – 4 while the maximum value was recorded at station-2.

5.2. Biological status**5.2.1. Phytoplankton Community:**

In Sindh Sagar qualitative analysis of phytoplankton community depicted presence of 6 species of Phytoplankton during the period of investigation. In general blue green algae were observed to be present at all the stations.

1. *Amphora sp*
2. *Epithemia sp*
3. *Melosira sp*
4. *Navicula sp*
5. *Oscillatoria sp*
6. *Pediastrum simplex*

5.2.2. Zooplankton community

Qualitative analysis of Zooplankton community in Sindh Sagar depicted presence of 6 species of zooplankton during the period of investigation. In general class rotifera were observed to be present in most of the stations.

1. *Bosmina longispina*
2. *Brachionus bidentata*
3. *Ceriodaphnia reticulata*
4. *Cyclops viridis*
5. *Cypris sp*
6. *Keratella tropica*

5.2.3. Macrophytes

1. *Trapa bispinosa*
2. *Nymphoides nouchali*
3. *Ceratophyllum demersum*
4. *Myriophyllum spathulatum*

5. *Hydrilla verticillata*
6. *Polygonum glabrum*
7. *Ipomoea fistulosa*
8. *Ipomoea aquatic*
9. *Potamogeton natans*

6. Conclusion

The main observations based on selected limnological parameters during the period of study can be concluded as follows:

- The water quality of the lake in general is moderately good.
- The water colour of the entire lake is slightly Turbidity / muddy due to mixing of water column during existing rainy season.
- The water quality at sampling stations at S-1 and S-3 observed to be better in comparison to rest of the stations, as slightly higher values of dissolved oxygen were recorded in these two stations.
- Higher values recorded for total hardness and total alkalinity at Station-3 may be due to joining of hardness causing ions and salts through surface runoff especially during rainy season.
- The biological characteristics of the Sindh sagar depicted moderate presence of phytoplankton and zooplankton and Macrophyte species.



7. Inferences:

During the period of one time investigation most of the parameters in general were observed to be low and within permissible limits as depicted in the guidelines/standards of Central Pollution Control Board. However a distinct differences in water quality parameters at all the stations was not observed since entire water column due to incessant rains was disturbed and mixed up. However on the basis of the present observations the river water quality may be placed in the category of class – C of Central Pollution Control Board, New Delhi, under designated best uses of water for irrigation and drinking water after conventional treatment.

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	<ul style="list-style-type: none"> Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organised)	B	<ul style="list-style-type: none"> Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	<ul style="list-style-type: none"> Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	<ul style="list-style-type: none"> pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	<ul style="list-style-type: none"> pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria



अशोकनगर 28-09-2020

निरीक्षण • वाटर ट्रीटमेंट प्लांट का काम पूरा, अफसरों ने की तालाब के पानी की जांच

एप्को के अधिकारियों ने सिंह सागर तालाब के पानी का लिया सैंपल

भास्कर संवाददाता | ईशागर

सिंह सागर तालाब का जीर्णोद्धार होने के बाद पर्यावरण नियोजन एवं समन्वय संगठन (एप्को) के अधिकारियों ने तालाब का निरीक्षण किया। निरीक्षण के दौरान उन्होंने तालाब के पानी में होने वाले सुधार की जांच के लिए पानी के सैंपल लिए। इन सैंपलों की जांच भोपाल में की जाएगी।

सिंह सागर तालाब के संरक्षण एवं संवर्धन योजना के तहत नगर परिषद ने जीर्णोद्धार का कार्य कराया था। इन कार्यों के तहत तालाब में वाटर ट्रीटमेंट प्लांट लगाया गया है। इससे तालाब में आने वाले गंदे पानी को साफ करने के बाद ही तालाब में छोड़ा जाएगा। तालाब के पानी में होने वाले सुधार की जांच के लिए पर्यावरण नियोजन एवं समन्वय संगठन (एप्को) भोपाल द्वारा पानी के सैंपल लिए गए। टीम ने सिंह सागर तालाब में अलग-अलग स्थानों से पानी के सैंपल लिए। जांच के लिए भोपाल से आई टीम में डॉ. सुब्रतो पाणी, चेपिल समैया, दिलीप कुमार गौड़ शामिल हैं। इस मौके पर सीएमओ कैलाश नारायण तिवारी, उपयंत्री हरिप्रसाद सिंह कुशवाह आदि मौजूद थे।

झील संरक्षण योजना...3 चरणों में किया तालाब का जीर्णोद्धार



सिंह सागर तालाब के पानी का सैंपल लेते भोपाल से आए अधिकारी।

जीर्णोद्धार होने के कारण नए स्वरूप में नजर आने लगा सिंह सागर तालाब

शहर का एकमात्र सिंह सागर तालाब जीर्णोद्धार के बाद नए स्वरूप में नजर आने लगा है। नगर पंचायत ने 10.78 करोड़ रुपये की झील संरक्षण कार्य योजना के तहत जीर्णोद्धार का काम कराया था। यह कार्य तीन चरण में होना था। पहले चरण में तालाब के गहरी करण का काम लगभग पूरा हो गया है। दूसरे चरण में वाटर ट्रीटमेंट प्लांट का भी कार्य लगभग पूरा हो चुका है। इससे तालाब में आने वाले गंदे पानी को साफ कर तालाब में छोड़ा जाएगा। इससे तालाब के स्वच्छ पानी का उपयोग लोग कर सकेंगे। तीसरे चरण में तालाब के घाटों का सौंदर्यीकरण और बाउंड्री की मरम्मत का काम भी हो चुका है। योजना में अब भुजरिया तालाब को सिंह सागर तालाब से जोड़ने का काम किया जाना शेष रह गया है।

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