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Assessment of Water Pollution in Lakes of JABALPUR

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ABSTRACT: '' Water is vital for life''. Life owes its existence and obtains its sustenance from water, since the beginning, civilizations witnessed growth along rivers and lakes, establishing the significance of water as a driving force in the process of development. Thereby judicious management of water and saving water bodies becomes prime agenda and responsibility for all. Madhya Pradesh is endowed with abundant water resources but due to improper management coupled with excessive exploitation most of the water bodies are severely stressed and depleting. In time to come, water demand and supply gap will grow wider, leading to bigger equity issues in socioeconomic development and environmental sustainability. This paper covers the complete statistical information of the existing water bodies / lakes in Jabalpur along with water quality of some of these lakes and causes of their degradation. This study is helpful to environmental planning and pollution control measures applicable to the area

KEYWARDS: Turbidity, Total Dissolved Solids (TDS), pH, Nitrate, Orthophosphate, Ecosystem; Socio-economic.

I. INTRODUCTION

Jabalpur town is situated in the eastern part of Madhya Pradesh about 300 km from capital Bhopal. It is located at 23° 10′ 32″ N, 79° 53′ 44″ E and MSL 402 M. Jabalpur has been centre hub for the Kalchuri's and Gond's regime. The area is best owed with bountiful of water resources both natural and manmade, important being the river Narmada. The former rulers of the region have reportedly constructed several water bodies to conserve the rain water and to cater recreational, domestic and agricultural needs of the region. There were 52 big water bodies ''Tals'' and 84 small water bodies ''Tallaiyas" reportedly existed in Jabalpur in the past but at present only 36 lakes are in existence within the town. Many of the water bodies of the Jabalpur town have been completely vanished due to change of land use pattern, encroachment, urbanization and anthropocentric activities. Water resources management is a critical issue facing global concern. It covers planning, development, distribution and management of use of water as a resources and meeting the demand of its users in the key to sustainable development. In spite of several initiatives taken by the policy makers at international and national level, water is still facing global crisis today. Government agencies are not able to manage its function solely. A proper monitoring of water and water resources is required, general awareness will help the government to water resources,

- **LAKES OF JABALPUR CITY:**

Jabalpur is a city having highest number of lakes in Madhya Pradesh. A Systematic study has been done by author on lakes of Jabalpur, in coordination with other departments i.e. District Administration Jabalpur, Jabalpur Municipal Corporation (JMC) , Jabalpur Development Authority (JDA) , Madhya Pradesh State Electricity Board (MPSEB), Agriculture Department, Cantonment Board etc., A complete picture of all the lakes within municipal area of Jabalpur has been worked out, and a useful and unique document has prepared in the form of a book named '' Jabalpur ke Sarovar – Anmol Dharohar'' in which complete details of all lakes including their situation, present condition with current photographs, brief history, lake areas (Rakba), Khasra map, recent picture, management agency and geographical location with MSL have been studied.

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Table No 1.
Lakes of Jabalpur

S.No.	Name of Lake	Situation (Gram)	Area (Hectare)	Management By
1	Madhotal	Madhotal	16.999	Government & JDA
2	Adhartal	Adhartal	16.189	Agricultural dept
3	Kanchanpur	Bhadpura	2.145	Private
4	Gokalpur	Karondi	122.492	Government
5	Khandari	Kota	157.804	Nagar Nigam Jabalpur
6	Hanuman Tal	Jabalpur	6.33	Nagar Nigam Jabalpur
7	Rani Tal	Laxmipur,Hinotiya	10.25	Nagar Nigam Jabalpur
8	Gulauwa Tal	Chavanpur	2.898	JDA
9	Shahi Tal	Kachhpura	1.55	Nagar Nigam Jabalpur
10	Mahraj Sagar	Garha	1.231	JDA
11	Jindahai ki Taliya	Garha	0.151	Private
12	Bagha	Garha	2.793	Private
13	Kola Tal	Garha	1.086	JDA / Osho Ashram
14	Machhahri bijori	Garha	1.193	Private
15	Phool Sagar	Garha	0.672	Private
16	Madkai	Purwa	0.91	Nagar Nigam Jabalpur
17	Suraj Tal	Purwa	5.504	Nagar Nigam Jabalpur
18	Imarti	Purwa	1.793	Nagar Nigam Jabalpur
19	Baksera	Purwa	2.939	Nagar Nigam Jabalpur
20	Awasthi Tal	Purwa	0.866	Medical College
21	Bal Sagar	Purwa	23.057	Medical College
22	Gullu ki taliya	Purwa	0.648	Medical College
23	Sagda	Sagda	1.574	Private
24	Ramnagra	Ramnagra	8.31	Government
25	Sangram sagar	Purwa	15.855	Government
26	Thakur Tal	Badanpur	4.371	MP Govt Forest Deptt.
27	Dev Tal	Garha	1.534	JDA
28	Supa tal	Garha	9.58	Nagar Nigam Jabalpur
29	Ganga sagar	Ganga Sagar	18.636	Nagar Nigam Jabalpur
30	Gaurav Tal	Badanpur	1.619	Private
31	Pandu Tal	Rampur	0.400	MPSEB
32	Jalpari	Rampur	0.350	MPSEB
33	Kakrahi	Gorakhpur	2.855	Private
34	Mahanadda	Mahanadi	5.86	Private
35	Khamb Tal	Cantt Area	2.210	Cantonment Board.
36	Bhita tal	Bhita	4.035	Private

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II. CAUSES of WATER POLLUTION in SOME LAKES of JABALPUR

- **HANUMAN TAL:**

This Lake is situated in the centre of the town and it is one of the important landmarks of Jabalpur town. It is more or less rectangular in shape; walls of the tank are constructed by stone masonry having bathing ghats on all sides. It is a place of historical and religious importance of the town. Hanuman Tal was constructed in the year 1794 during Bhoslaes period. There are several temples situated on the banks of the lake. Entire catchment of the tank is covered by urban settlement. This Tal has many diffuse point sources which carry discharges from drainage channels, during rainfall surface runoff with organic matter, sediment, decaying matter etc into the lake. Solid waste dumping and disposal of religious remains is another problem of this lake. Idol immersion during Durgotsav and Ganeshotsav festival is a big problem with this lake. Environmental problems of the lake are water quality degradation, reduction in storage capacity, growth of aquatic weeds, and inflow of sewage, solid waste dumping, washing clothes and bathing etc. There is a need for treatment of domestic sewage and other sewage flowing into the lake, improving the sanitation, sewage and drainage network around the lake.

Fig No 1. Idol immersion in Hanuman Tal

Fig No 2. Religious remain disposal activity in Hanuman Tal

Fig No 3. Hanuman Tal Lake

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- **DEV TAL**

This Tal is situated at gram Garha at 23° 09′ 18″ N, 79° 53′ 50″ E and MSL 412 M , in front of bajrang math , near Osho Ashram Jabalpur. It is built by earthen embankment with stone steps. There are several ancient temples exists on the bank of Dev Tal lake. The temple has religious importance. Immersion of idols during festivals and disposal of religious remains occurs in this lake. Presently lake is being used for washing / bathing and other nistar activities affecting water quality of lake. Besides this, other problems such as extensive growth of aquatic weed, inflow of sewage are also observed in this lake. An action is required for conservation of the lake include removal of weeds, control on idol immersion and waste inflow and fringe area development.

Fig. No 4 Idol immersions in Dev Tal

Fig. No 5 Religious remain disposal activity in Dev Tal

Fig. No 6 Dev Tal

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- **RANI TAL:**

Rani Tal is situated within three grams Laxmipur, Jabalpur and Hinotiya at 23° 10′ 15″ N, 79° 55′ 10″ E and MSL 391 M. It was reportedly constructed during the period of Rani Durgavati in the 16th century A.D. Initially the area of Rani Tal Lake was 48 hectare, which has now reduced to 10.250 hectare due to reclamation and construction of sports complex. Earthen bunds and fringe area of Ranital is encroached by slum dwellers from three sides. Solid waste of the town is being dumped on one side of lake. Presently it is used for nistar activities. The environmental problems of Rani Tal are, water quality degradation, reduction in storage, growth of aquatic weeds, inflow of sewage, encroachment and solid waste dumping etc.

Fig No 7 Sewage waste dumping at Rani Tal

Fig. No 8 Weeds growths at Rani Tal

Fig. No 9 Rani Tal

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Table No 2.

Water quality of various lakes in Jabalpur City

S. N.	Name of Water Body	pH	Turbidity NTU	Conductivity mS/cm	TDS Mg/l	Nitrates Mg/l	Orthophosphate Mg/l
Standards as per BIS		6.5- 8.5	5-10	< 1	500 max	20	
1	Madhotal	8.21	26	0.47	287	1.225	0.625
2	Adhartal	8.25	14	0.56	342	1.157	0.854
3	Gokalpur Tal	8.12	26	0.47	287	1.225	0.625
4	Hanuman Tal	8.21	58	0.215	131	1.541	1.025
5	Rani Tal	8.25	54	0.56	362	1.12	0.954
6	Gulauwa Tal	8.56	63	0.57	348	1.381	0.896
7	Shahi Tal	8.56	84	0.96	586	1.268	0.236
8	Mahraj Sagar	8.23	36	0.85	519	0.988	0.581
9	Phool Sagar	8.52	35	0.36	220	1.447	0.362
10	Madkai Tal	8.25	24	0.41	250	1.432	1.023
11	Bal Sagar	8.54	53	0.65	397	1.698	0.774
12	Sagda Tal	8.63	36	0.25	153	2.015	1.236
13	Sangram sagar	8.15	54	0.45	275	1.574	0.985
14	Dev Tal	8.54	109	0.36	220	1.574	1.023
15	Supa Tal	8.41	25	0.84	512	1.49	1.65
16	Ganga Sagar	8.45	47	0.58	354	2.224	1.246
17	Machharhi Bijori Tal	8.14	25	0.54	329	4.126	3.256
18	Baksera Tal	8.25	29	0.69	421	0.849	0.741

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III. OBSERVATION

Studies carried out in present investigation revealed that one of the most important causes of water pollution is unplanned urban development without adequate attention to suitable management of sewage and waste material. Lake Conservation Authority of Madhya Pradesh has done a survey to measure the quality of water of some lakes of Jabalpur and it is observed that almost all the lakes of Jabalpur are affected with pollution. Supatal, Balsagar and Shahital are polluted with high TDS and this is because of pollutants which comes with the effluents from nearby drains, water is highly turbid in maximum lakes and value of turbidity exceed the permissible limits, Nitrare percentage is more in Gangasagar, Sagda Talab and Machrhi Bijori Lake, although it is within permissible limit and pH range of 6.5 to 8.5 is normally accepted as per guideline suggested by WHO. In this study pH values were found in the range of 7.5 to 8.5 in the water samples. This shows that pH was observed to be slightly alkaline in nature in all the lakes of Jabalpur city.

IV. DISCUSSIONS

Lakes are an inherent part of the ecosystem. Lakes have traditionally served the function of meeting water requirements of the population for drinking, household usage like washing, for agriculture, fishing and also for religious and cultural purposes. Apart from these functions, which involve direct use of the lake water, lakes are also utilized to recharge ground water, channelize water flow to prevent water logging and flooding. Lakes are also host to a wide variety of flora and fauna, especially birds. The state of the world's resources remains fragile, making it imperative to adopt an integrated and sustainable approach for water resources management. Available water resources are under great stress as a result of high population growth, unsustainable consumption patterns, poor management practices, pollution and inadequate investment in basic infrastructure and low efficiency in water demand and supply management. The need to initiate efforts to restore, conserve, manage and maintain the lakes as a valuable part of the whole ecosystem could no longer be ignored. Above mentioned title is primarily focused to educate, empower and enlighten masses about sustainable management of water and water resources by adopting various education application and awareness practice in the country.

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