

THE IMPACT OF HUMAN ACTIVITIES ON THE LAKES OF BRIJ REGION

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ABSTRACT

The landscape is a composite system where the hydrological factors play an important role. It has been unfortunate that the human race has silently damaged many a water body in the ecosystem. The population, affluence and technology are the three factors which have contributed in a major way. The human needs of freshwater are increasing at a phenomenal rate and the rivers, lakes, ponds, wells are not able to sustain the load. The degree of impact is largely dependent on the nature and quantum of the human activities.

This paper is an attempt to present the analysis of the impact on the lakes of the Brij area. Agra has the fortune of having a lake at Keetham which has been completely exploited by the human activity around it. Besides there were several small water bodies in Brij which are now dry and barren.

The Keetham Lake is major component of the water system of Agra and contributes to the water supply in the summer months. It is a special habitat for birds and fishes besides the water loving insects. The past three decades have seen a vast change in the state of this lake. The system of lakes in the Brij Zone has been completely destroyed by the human activities. The climate, wind, rain, waste, deforestation, drainage, infiltration on the water system, urbanization have brought changes in the size, quality and aesthetic value of the lakes.

INTRODUCTION

The 21st century is a century of Environment. The global issues are all based on the elements of life Agni, Vayu, Jal, Prithvi and Aakash. These are all presently facing the wrath of Nature's Gods. Each one is crumbling under the impact of the humans. There have been two kinds of impacts intentional and inadvertent. The 'Brij' and Agra are victims of the latter. The lakes and groundwater bodies in this region are heavily polluted. The causes being several.

The paper presents a brief description of the state of the lakes in Vrindavan and Agra. Although, the number is few, yet they are of immense importance both as water bodies and aesthetics.

LAKES IN THE BRIJ REGION

The "Brij Region" is the land of Radha-Krishna. It buzzes with the chants of Hare Krishna, and Radhe! Radhe! even today. Spread over an area of 126 miles, it is the birth place of Lord Krishna, and also the zone where he spent his childhood. I.e. (Janamsthali and Leela Bhoomi). The Brij Region is a "Biodiversity Park" of the yesteryears. According to the scriptures it has the River Yamuna, Goverdhan, Twelve Forest Regions¹ (Van), Twenty Four Ghats², One hundred Ponds and Lakes³, and was home to a large species of birds and animals. The Brij Region today is dry, and the lakes which are presently on the map are listed below :

(i)	Mansi Ganga, Goverdhan	-	Polluted
(ii)	Kusum Sarovar, Goverdhan Parikrama	-	Polluted
(iii)	Prem Sarovar, Barsana	-	Polluted
(iv)	Radha Kund, Goverdhan Parikrama	-	Polluted
(v)	Krishna Kund, Goverdhan Parikrama	-	Polluted
(vi)	Pamri Kund, Nandgaon, Mansarovar, Nandgaon	-	Polluted
(vii)	Bhanupushkar Lake, Barsana, Pan Sarovar, Nandgaon-	-	Polluted
(viii)	Muktakund and Priyakund, Barsana	-	Polluted
(ix)	Chatikra Kund, Chatikra, Agra-Mathura Road	-	Dry
(x)	Keetham Lake, Keetham, Agra-Mathura Road	-	Water Hyacinth
(xi)	Tota Ka Tal, in Agra city	-	Extinct
(xii)	Budiya Ka Tal, Agra-Tundla Road	-	Dry
(xiii)	Paliwal Park Lake, in Agra city	-	Extinct
(xiv)	Circuit House Lake, in Agra city	-	Extinct
(xv)	Kale Ka Tal, in Agra city	-	Extinct

HUMAN ACTIVITIES AND THEIR IMPACT

The human activities that are most important are :

- (1) Population
- (2) Affluence
- (3) Technology

Population

Human presence in the ecosystem is a major factor. The "lakes" are that segment, which have been influenced heavily. The lakes are the source of water primarily, but all the lakes mentioned are habitat of a large number of species of birds, insects, fishes, plants etc.

The 'lakes' in the Brij Region have been severely effected by this factor. It is a world tourism spot and millions of tourists visits this zone annually. The River Yamuna, is unable to meet the demands of the domestic zone. For all other needs the populace has depended on the local lakes. The over harvesting has rendered them totally dry.

"Keetham Lake", a source of drinking water for Agra in the scorching summers is today, a "dead lake". It was earlier a place for fishing, boating etc. but in the past decade it is a sewer dump. It is covered totally by Water Hyacinth.

With “human population”, the demand of water, food, land, air has multiplied tenfold. Besides, this the “waste” has increased astronomically. This is the major pollutant. The Keetham Lake, was a habitat of fishes, insects, rare birds and of course supported human beings in a big way as a source of water.

Exotic species have been transported from their natural range into new territory. Conversion of large forest zones around Keetham into housing, agriculture, industries has destroyed the beauty of the lake. This habitat fragmentation effected the processes of biodiversity. Often large populations are broken into small population and the isolated populations do not survive and there is local extinction. This has happened in all the Lakes.

Chatikra Lake, Kusum Sarovar, Mansarovar, Mansi Ganga etc. are victims of the same. The beautiful Sarovars where Radha picked flowers, bathed, washed her hands after marriage, shed tears after Krishna left are but a few pieces of parched land today. Population and deforestation has done the damage.

Affluence

The world has experienced an annual economic growth rate of 2.7% in the last three years. Affluence directly increases the per capita resource utilization, waste creation, increased production and hence increased consumption. This is one of the major causes of the “Lake Water Drying Up”. The lakes of Brij are also victims of this factor. The general lifestyle has contributed heavily to the addition of polythene, tetrapacks, gutka pouches, detergents besides the usual flowers and leaves that devotees throw in the ponds.

Technology

The unprecedented and unplanned growth of the cities of Mathura and Agra have also contributed. The technological progress and urbanization has taken the toll. The toxic discharges effect the biota, bacterial contamination from the human and animal waste occurs, and there is a growth of nutrients that help in the growth of algae and aquatic plants destroying the habitat of the lakes totally. The large number of vehicles that come to Brij contribute to the pollution also. It has been seen that the pilgrims now use automobiles to visit temples, and two-wheelers have increased in large numbers. The growth of buildings in the Brij Area, has resulted in the cutting of trees and small shrubs. Another factor is the stray animals who are seen in large numbers on the streets. They are dependent on the lakes for their water needs and often pollute them.

HYDROLOGICAL IMPACT

The effects whether intentional or inadvertent leave a impact on both the quality and quantity of the local water systems. In the case of the Brij Region, the impacts are – environmentally and economically disastrous.

There are clear evidences that the pace of change has increased markedly in response to the increase in population, affluence, technology and land use activity. In the “Hydrological Cycle”, inputs of precipitation are distributed to a number of stores and are output as channel

flow, evaporation and deep leakage. In other words, water is intercepted by the vegetation and penetrates through the ground.

Moisture held within the soil is subject to evaporation and transpiration, downward percolation and then to the ground water body. The reverse happens in the ground water case. This cycle of nature has been modified due to human activities. A detailed investigation of the urban region reveal numerous features as regards the modification in the cycle.

Water is essential for life. The use of water for the domestic sector was 8% in 1970's and has risen to 30-50% in the 2000's. This is an indicator of the water withdrawal by man. The fraction of water returned by man is about 40%. The lakes are essential components of the water system. They are comparatively small water bodies and are very important in the general ecosystem.

The frequency of the human activities also plays a vital role. The high magnitude events may have low frequency and low magnitude events have high frequency. There is a regional variation, but makes a significant contribution to the lake-system.

QUALITY AND QUANTITY

The 2-Q study of the water in the Lakes indicates that there is a general change in both values. The quantity has reduced largely and the quantity has gone below the human consumption state.

In the Lakes of the Brij Region, there is a constant input of domestic, religious and municipal waste. In and around the lakes, there was dense vegetation of trees and shrubs. The "Vegetation Cover" has been totally removed in some zones of the Goverdhan Yatra, resulting in the extinction of the lakes. The moisture in the soil was reduced heavily and there was no recharging. The nutrient cycle of the lakes was disrupted and there was a change in the growth of plants and aquatic life in the system.

CONCLUSION

Lakes, are categorized on origin. The size, depth and shape depends on the geology. The lakes in the Brij Region are small in size. The larger lakes respond to wind, heating, barometric pressure and tidal forces. The smaller are generally effected more by the river inflow, atmospheric heating and the human activities.

The "Brij Zone Lakes" have been effected by the total dissolved solids (TDS). The Biological Life is dependent on the TDS. The excess of TDS has adversely effected the lakes. The second factor is acidification, which adversely effects the fish and plant life of the lakes. The third major factor is the addition of local pollutants and over use of the water by the people.

PERSPECTIVE

The lakes have been disturbed due to the growth of population centers, intensification of agriculture, over exploitation of the water, urbanization and vehicular pollution. There is a large scale "cultural eutrophication". In the future, demands will increase and a solution is urgently needed.

The problems will magnify, but it is better to address them before they arise. The remedial measures may be effective but not economical. Hence, the lake ecosystems will be managed more by Social Will and less by Technical Ability.

ANNEXURE

LIST OF KUNDS

1.	Krishna Kund	41.	Moti Kund
2.	Shyam Kund	42.	Devi Kund
3.	Radha Kund	43.	Gaya Kund
4.	Balbhadra Kund	44.	Gomti Kund
5.	Vihar Kund	45.	Barch Kund
6.	Shantanu Kund	46.	Dharma Kund
7.	Sueya Kund	47.	Charan Kund
8.	Vaschk Kund	48.	Garuda Kund
9.	Lalita Kund	49.	Sheetal Kund
10.	Bajra Kund	50.	Karna Kund
11.	Vishaka Kund	51.	ParihariKund
12.	Sakhi Kund	52.	Jalvihar Kund
13.	Udhav Kund	53.	Prem Sarovar
14.	Narad Kund	54.	Kadam Kund
15.	Kusum Sarovar	55.	Madhusudan Kund
16.	Mansi Ganga	56.	Mohan Kund
17.	Chandra Sarovar	57.	Kanak Kund
18.	Kanak Sagar	58.	Charh Kund
19.	Sahsra Kund	59.	Nand Pokhar
20.	Ram Kund	60.	Kishori Kund
21.	Ravri Kund	61.	Purenmasi Kund
22.	Arvari Kund	62.	Trish Kund
23.	Surya Kund	63.	Bhavan Kund
24.	Narayan Sarovar	64.	Khelen Kund
25.	Kshira Sagar	65.	Chur Kund
26.	Gauri Kund	66.	Nar Kund
27.	Sankarshan Kund	67.	Kokila Kund
28.	Kesari Kund	68.	Ratnahir Kund
29.	Gandharv Kund	69.	Maya Kund
30.	Govind Kund	70.	Vishekha Kund
31.	Gopsager	71.	Gomti Kund
32.	Surabhi Kund	72.	Vasudev Kund
33.	Hayir Kund	73.	Gwal Kund
34.	Rudra Kund	74.	Kishori Kund
35.	Gulal Kund	75.	Narayan Kund
36.	Revta Kund	76.	Chatikara – 6 Kund
37.	Balbhadra Kund	77.	Mansarovar
38.	Nayen Sarovar	78.	Kanhaiya Kund
39.	Man Sarovar	79.	Indira Sarovar
40.	Yashoda Kund	80.	Ash Kund

LIST OF GHATS

<i>South</i>		<i>North</i>	
1.	Vishram	1.	Ganesh
2.	Prayag	2.	Manas
3.	Kenkhal	3.	Dasheshamev
4.	Bindu	4.	Chakra Tirth
5.	Bengali	5.	Krishna Tirth
6.	Surya	6.	Som Tirth
7.	Chintamani	7.	Brahmalok
8.	Dhruv	8.	Ghantabheem
9.	Rishi	9.	Dharapatan
10.	Moksh	10.	Sargam
11.	Koti	11.	Nav teerth
12.	Buddhi	12.	Asikunda

LIST OF FORESTS (Van)

1. Madhuvan
2. Kumudvan
3. Kamaykevan
4. Bahalvan
5. Bhadravan
6. Khadrivan
7. Shrivani
8. Mahavan
9. Lohaychalvan
10. Bilvan
11. Bheadrivan
12. Vrindavan