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NECESSITY OF MAINTAININGWATER QUALITY STANDARDS OF HOLY WATER BODIES: A CASE STUDY "BRAHMA SAROVAR, KURUKSHETRA"

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ABSTRACT

The present study is to bring into notice the importance of maintaining proper water quality standards of holy water bodies taking one such holy water body as a case study. Water samples were collected and were being tested for certain water quality parameters. The results revealed that the samples were unable to reach the required standards which is harmful to human skin. So, there is a great necessity to look over the problem and provide proper alternative to avoid deterioration of water quality and protect deities from illness.

Keywords: ***Holy water bodies, sample testing, water quality parameters, water quality standards.***

I.INTRODUCTION

The practice of Hinduism encompasses a wide variety of believes. Hindus believe that Hinduism is all about the importance of cleanliness and well-being and it is also believed that water is having those spiritually cleansing powers. This belief had given rise to a consideration of construction of holy water bodies in association with most of the temples in India. These holy water bodies have their immense value in terms of religious aspects, as people are associated emotionally and spiritually with them. This religious association leads millions of people to take holy bath and perform Achaman(drinking water) on special days of every month. As per WHO [1]almost 80% of all the diseases in human bodies is caused by water, so regular monitoring of quality of water must be carried out.

So, for the current study a religious water body in the city of Kurukshetra, Haryana is considered where millions of people perform religious activities on the occasions like solar eclipse and new moon day. But the periodic maintenance and cleaning of the water body is neglected. This negligence lead to deterioration of water quality of such water bodies. This has forced the planners and policy makers to take cognizance of these religious water bodies. Therefore, the current study is about carrying the water quality tests on the water body for finding out the suitability of water for the purpose of taking bath and other rituals.

II.. MATERIALS AND METHODS

2.1 Study Area

Brahma Sarovar and SannihithSarovar of Kurukshetra district of Haryana (Fig.1) were considered for current study which are being considered as one of the most prominent religious water bodies of India. The water to these water bodies is supplied by Thanesar Distributary which is an open channel lined offtake from Narwana

Branch Canal at Jyotisar. This disrubutarypasses through the area of Mirzapur village, Bhatta Colony and Kurukshetra University. The people residing on the banks of the cnal use the ghats for the purpose of bathing, cattle farming, washings of clothes etc. It is observed that solid waste is also dumped in the canal at some places. These unhealthy practises are leading to the deterioration of water quality. And this water without any prior treatment is being directly pumped into the water body.

2.2. Sample Collection

The water to these water bodies is being supplied by Thanesar Distributary which is an open channel lined offtake from Narwana Branch Canal at Jyotisar. This distributary passes through the area of Mirzapur village, Bhatta Colony and Kurukshetra University. The people residing on the banks of the canal use the ghats for the purpose of bathing, cattle farming, washings of clothes etc. It is also observed that solid waste is being dumped into the canal at some places. These unhealthy practises are leading to the deterioration of water quality. And this water without any prior treatment is being directly pumped into the water body. So, samples were collected from different locations along the length of distributary (Table 1), for the purpose of testing.

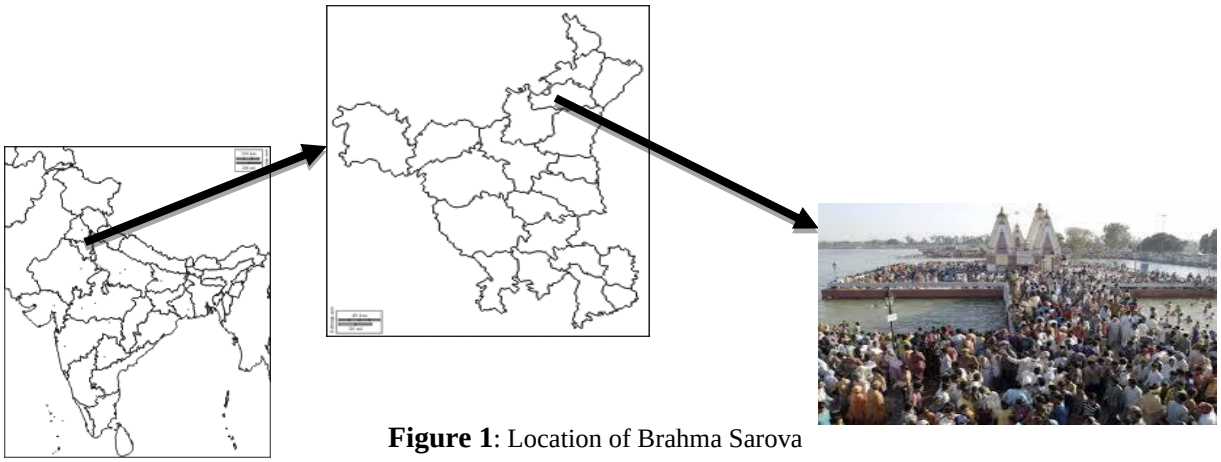


Figure 1: Location of Brahma Sarova

Table 1: Locations of sample collection and activity

S.no	LOCATION	ACTIVITY
1	Narwana branch(source)	-----
2	Mirzapur village	Cattle farming, dumping of waste
3	Kuruksetra University	Washing of clothes
4	Brahma Sarovar	Mass bating

2.3 Methodology

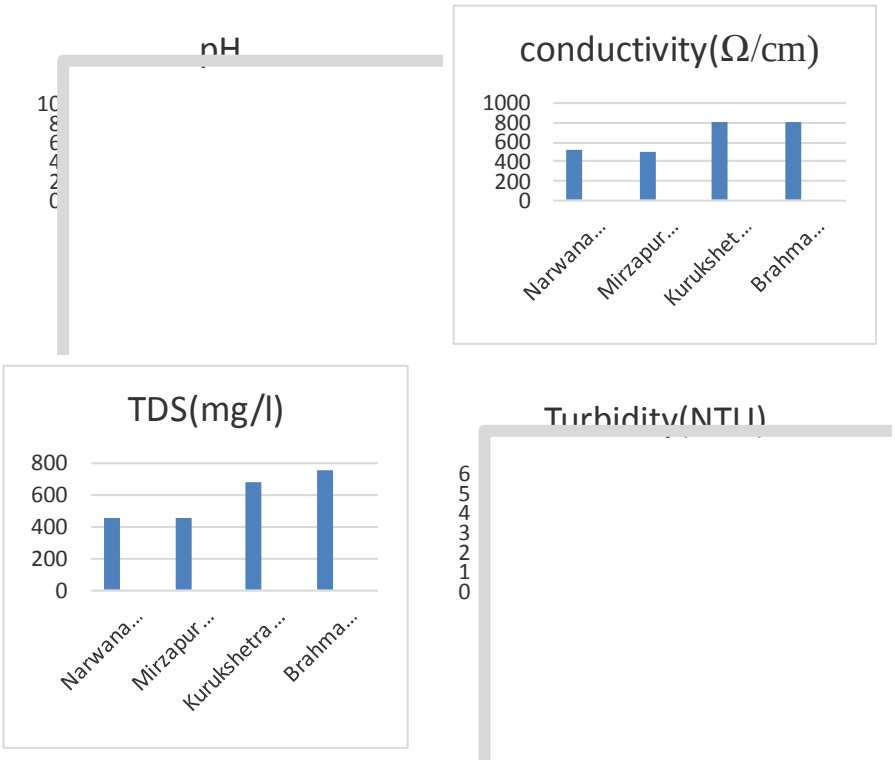
Samples collected are made to undergo proper testing for deciding the standards of water in the water body. The samples are tested for various quality indicating parameters. Parameters taken into consideration are pH, conductivity, total dissolved solids(TDS), turbidity, dissolved oxygen(DO), biochemical oxygen demand(BOD), total alkalinity, total chlorides, total hardness, total sulphate, total nitrate and MPN Index and are determined using the standard procedure followed by APHA[2]. The test results are than compared to standard values that are suitable to public health. Standard values are mentioned below(Table 2).

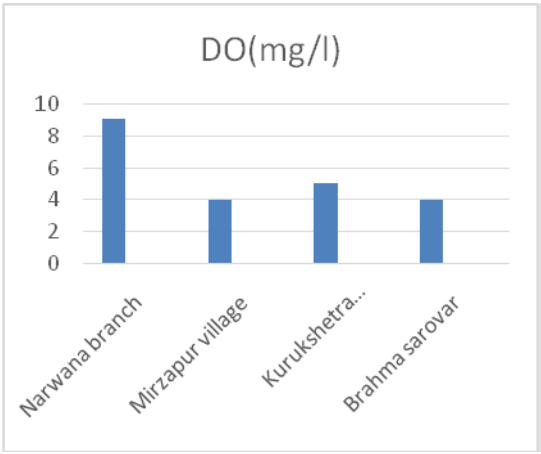
Table 2: Standard values of quality indicating parameters

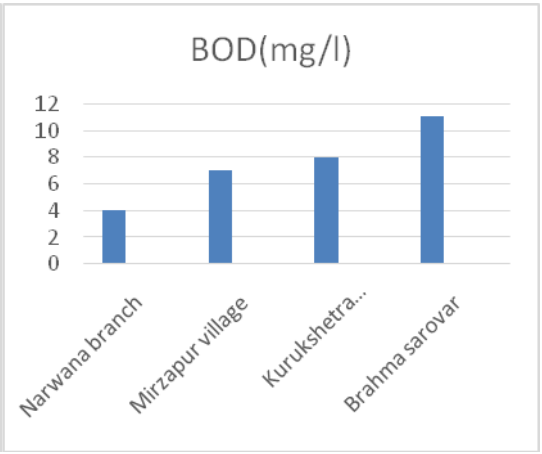
S.no	PARAMETERS	STANDARD VALUES
1	P^H	6.5-8[3]
2	Conductivity(Ω/cm)	3000[4]
3	TDS(mg/l)	1500[4]
4	Turbidity(NTU)	5[5]
5	DO(mg/l)	≥5[6]
6	BOD(mg/l)	≤3[6]
7	Total alkalinity(mg/l)	200[4]
8	Total chloride(mg/l)	350[3]
9	Total hardness(mg/l)	600[7,8]
10	Total sulphate(mg/l)	350[3]
11	Total nitrate(mg/l)	5.6[3]
12	Total coliform(MNP/100ml)	≤500[4,9]

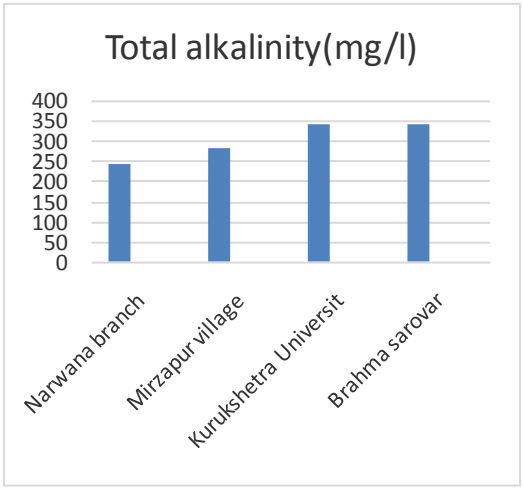
III. RESULTA AND DISCUSSION:

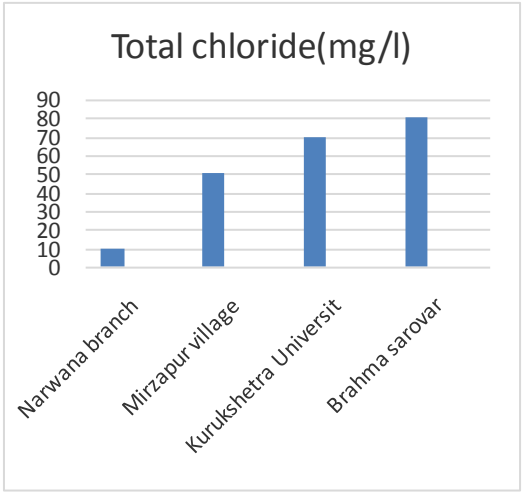
Water samples from different locations are tested for various water quality parameters and are plotted below:

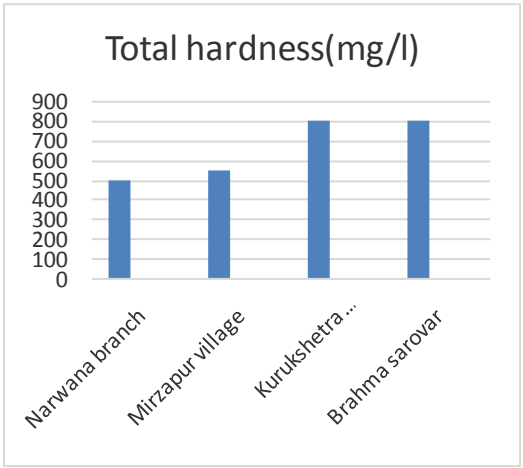


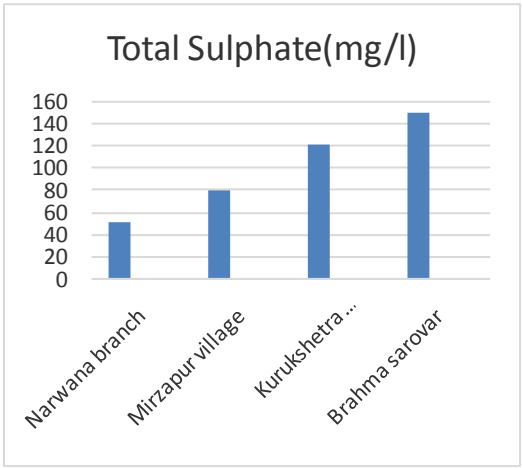

DO(mg/l)
10
8
6
4
2
0
Narwana branch
Mirzapur village
Kurukshetra...
Brahma sarovar

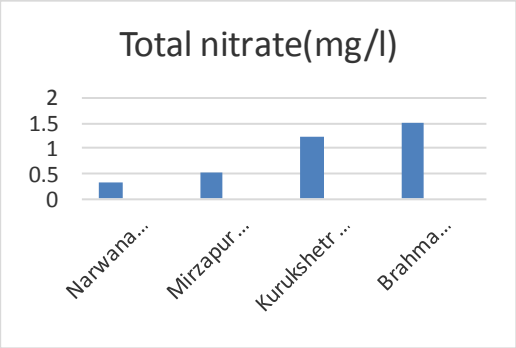

BOD(mg/l)
12
10
8
6
4
2
0
Narwana branch
Mirzapur village
Kurukshetra...
Brahma sarovar


Total alkalinity(mg/l)
400
350
300
250
200
150
100
50
0
Narwana branch
Mirzapur village
Kurukshetra Universit
Brahma sarovar


Total chloride(mg/l)
90
80
70
60
50
40
30
20
10
0
Narwana branch
Mirzapur village
Kurukshetra Universit
Brahma sarovar


Total hardness(mg/l)
900
800
700
600
500
400
300
200
100
0
Narwana branch
Mirzapur village
Kurukshetra...
Brahma sarovar


Total Sulphate(mg/l)
160
140
120
100
80
60
40
20
0
Narwana branch
Mirzapur village
Kurukshetra...
Brahma sarovar



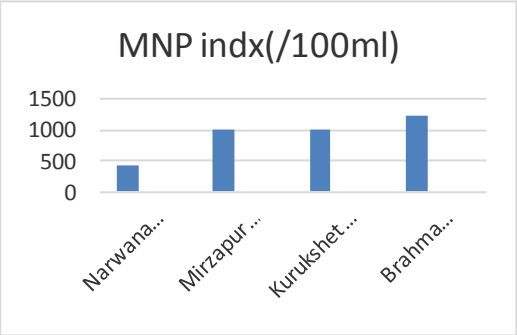


Table 3:Comparison with standard values

S.no	Parameter	Standard values	Values at Brahma Sarovar
1	P^H	6.5-8[3]	9.2
2	Conductivity(Ω/cm)	3000[4]	800
3	TDS(mg/l)	1500[4]	750
4	Turbidity(NTU)	5[5]	3
5	DO(mg/l)	≥5[6]	4
6	BOD(mg/l)	≤3[6]	11
7	Total alkalinity(mg/l)	200[4]	340
8	Total chloride(mg/l)	350[3]	80
9	Total hardness(mg/l)	600[7,8]	850
10	Total sulphate(mg/l)	350[3]	150
11	Total nitrate(mg/l)	5.6[3]	1.8
12	Total coliform(MNP/100ml)	≤500[4,9]	1200

Nitrate is considered as a very important parameter as it has great impact on human skin as referred by T. Hemalatha et al. [10]. As it can be observed from above comparison that total nitrate is below the permissible limits which depicts that water is safe from impact of nitrates.

The chloride content is considered to be one of the major parameter with conformity to findings by B.R.Kiran et al.[11], Gupta et al.[12]. Munawar [13] has notified that high concentration of chlorides indicated high degree of organic pollution. Total chlorides (80<350)is under controlled limits.

Total dissolved solids(TDS) as depicted by Gupta et al. [12] has a great impact on conductivity, but it can be seen that both TDS and conductivity are in range of permissible limits.

The higher values of total alkalinity may be due to presence of sodium along with calcium and magnesium as recorded by Jadhav et al.[14].

pH(9.2) of water is observed to be very high and is not suitable for basic human needs mentioned by Peter H. Gleick [15].

Presence of hardness can be injurious to human health and can lead to many chronic diseases as noted by Henry A. Schroder [16]. Hardness as per the test results is much higher than the limits mentioned which states that water is harmful. The higher values of parameters like alkalinity, pH, hardness is due to addition of detergents at a ghat in Kurukshetr University.

Bacteria and coliform group are considered as the primary indicators of faecal contamination by Raina et al. [17]. This have been correlated with incidence of gastrointestinal disorders (Moraco and McKenzie [18]). Infectious diarrhea is also because of poor microbial water quality an mentioned in [19-21]. MNP was observed to be drastically high which may be because of cattle farming at Mirzapur village and also may be due to mass bathing as notified by Sood et al. [22]. Because of presence of coliform group high values of BOD was also observed.

IV. CONCLUSION

The results of current study depict that major parameters like pH, BOD, alkalinity, hardness, and MNP index are beyond their permissible limits. So, any of the rituals like holy bathing if performed may cause a negative impact on health of the pilgrims. Thus, the water in Brahma Sarovar is observed to be injurious to human health. So, proper measures must be taken to control the quality of water from getting deprived.

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