



A CASE STUDY OF STATUS OF WATER QUALITY OF DRAINS IN DELHI

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ABSTRACT

The Yamuna River is the second largest tributary of Ganges. It is originating from the Yamunotri Glacier at a height of 6,387 meters on the southwestern slopes of Banderpooch peaks of the lower Himalaya in Uttarakhand. It travels a total length of 1,376 kilometers. It is one of the most polluted rivers in India. Yamuna river flows only for 54 kilometers from Palla to Baderpur through Delhi, the 22 km stretch from Wazirabad to Okhla, which is the less than 2 percent of the river length of 1370 kilometers from Yamunotri to Prayagraj, accounts of about 76 percent of the pollution level in the river. This 2 percent stretch from Wazirabad to Okhla has maximum discharge of untreated industrial and domestic waste. The undeveloped sewerage system and unavailability of sewerage lines in Delhi are affecting the water quality of Yamuna River by falling of untreated sewage water through the open drains. The 21 drains discharge around 850 MGD (million gallons per day) of sewage into the Yamuna every day. Looking to the severe condition of the sewerage system, it was decided to carry out a study to analyze the effect of open drainage system on water quality (Physico-chemical parameters) of Yamuna River and status of sewage generation and treatment.

Index Terms: Physico-chemical parameters, wastewater, Yamuna River, open drains, sewage generation.

1. INTRODUCTION

The Yamuna river, which is the lifeline of Delhi, is one of the most-polluted river in the country. Discharge of untreated domestic and industrial waste water in the Yamuna river is the main cause of Yamuna river pollution. Yamuna river flows only for 54 kilometers from Palla to Baderpur through delhi, the 22 km stretch from Wazirabad to Okhla, which is less than 2 percent of the river length of 1370 kilometers from Yamunotri to Prayagraj, accounts of about 76 percent of the pollution level in the river. This 2 percent stretch from Wazirabad to Okhla have maximum discharge of untreated industrial and domestic waste. The 21 drains discharge around 850 MGD (million gallons per day) of sewage into the Yamuna river every day. To resolve the problem of direct discharge of wastewater into the river, sewage treatment plants (STPs) have been planned, designed and constructed by Delhi Jal Board so that the waste water can be treated in an efficient way before its discharging into the rivers to reduce the problem of water pollution.

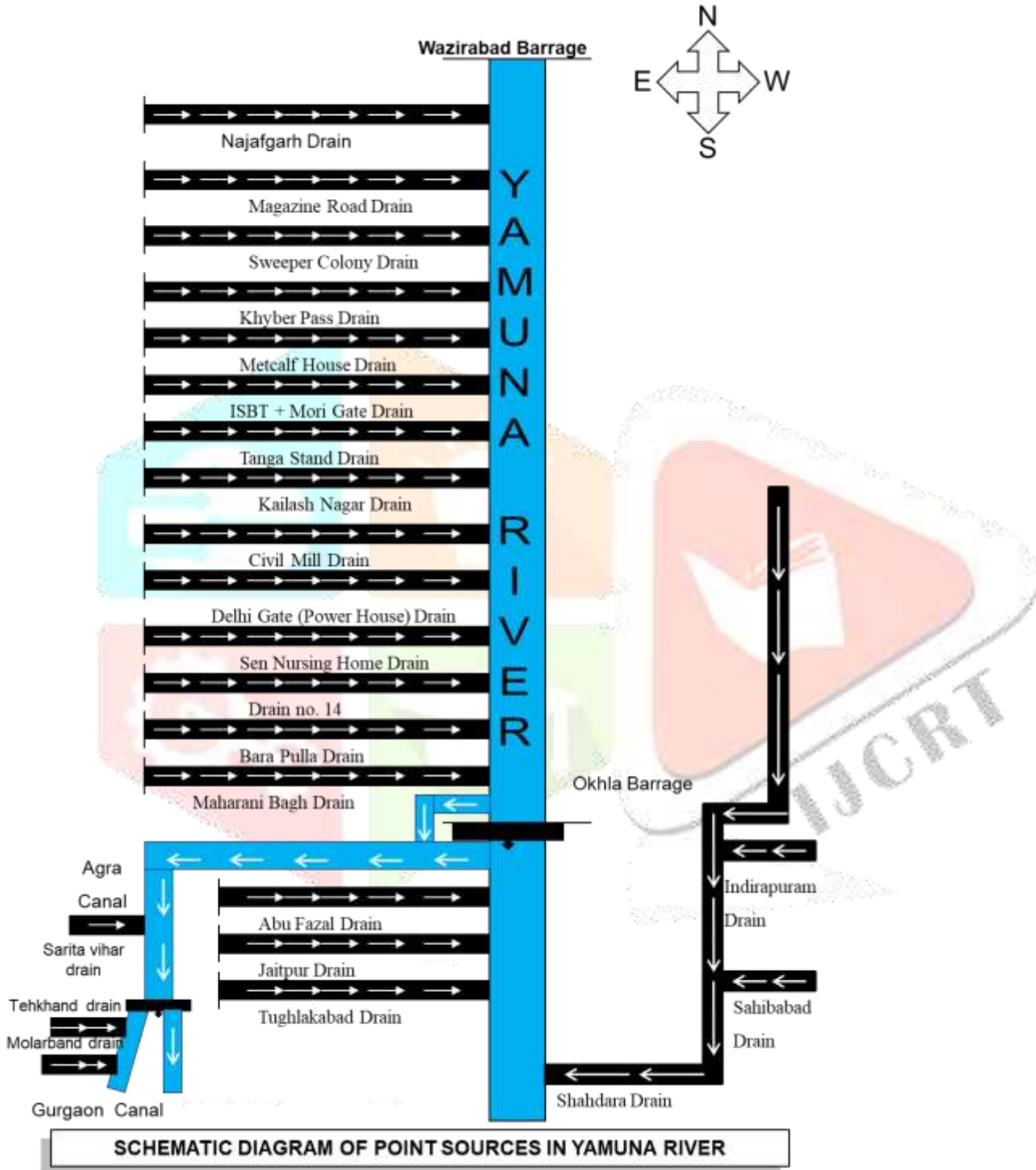
1.1 Aims and Objectives

The aims and objectives of the study are as follows:

1. To study the parameters of wastewater of major open drains in delhi.
2. To evaluate the effect on the quality of river water due to the falling of open drains.
3. To know about the sewerage system of Delhi.



2. Schematic diagram showing point sources in Yamuna River (Wazirabad – Okhla Barrage)



3. Physico-chemical Parameters

The table 1 and 2 shows the prescribed limits of different parameters for discharge of sewage/domestic and industrial wastewater into inland surface sources of water after proper treatment as per the Indian Standards.

Table 1

Tolerance Limits for Sewage Effluents discharged into Inland Surface Water (IS: 4764-1973)

S.No	Characteristic	Tolerance Limites
1.	Total Suspended Solids	Max. 30 mg/l
2.	BOD (5 day at 20 °C)	Max. 20 mg/l

Table 2

Tolerance limits for Industrial Effluents discharged into Inland Surface Water (IS: 2490-1981)

S. No.	Characteristics	Tolerance limit
1.	Total suspended solids	Max. 100 mg/l
2.	pH	5.5 to 9.0
3.	Temperature	Temperature of wastewater should not exceed 40° C in any section of the river within 15 meters downstream from the effluent outlet
4.	BOD (5 day at 20°C)	Max. 30 mg/l
5.	Oil and grease	Max. 10 mg/l
6.	Sulphides (as S)	Max. 2.0 mg/l
7.	Total residual chlorine	1.0 mg/l
8.	COD	Max. 250 mg/l

Table 3

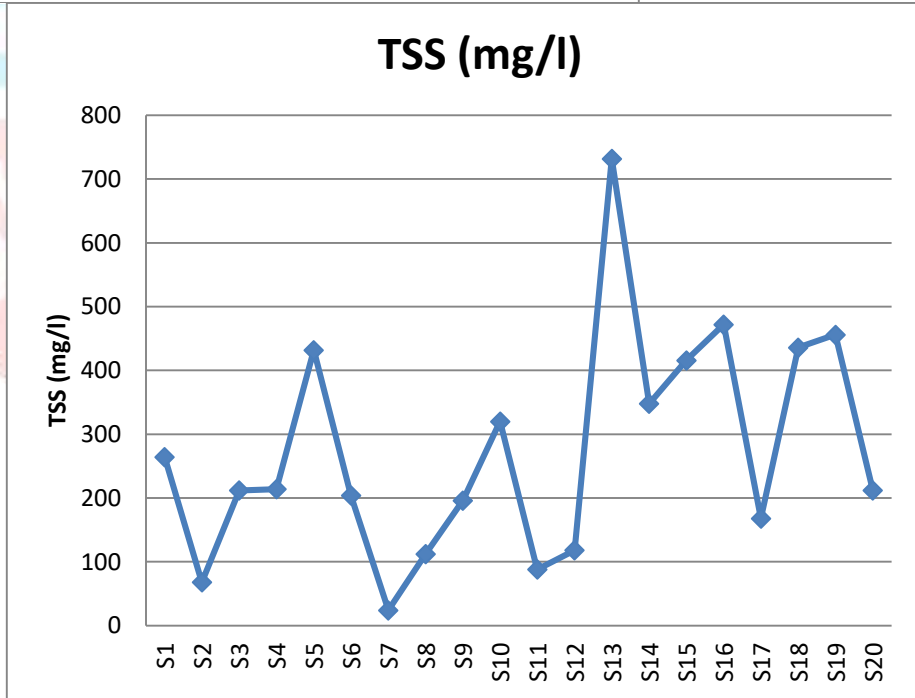
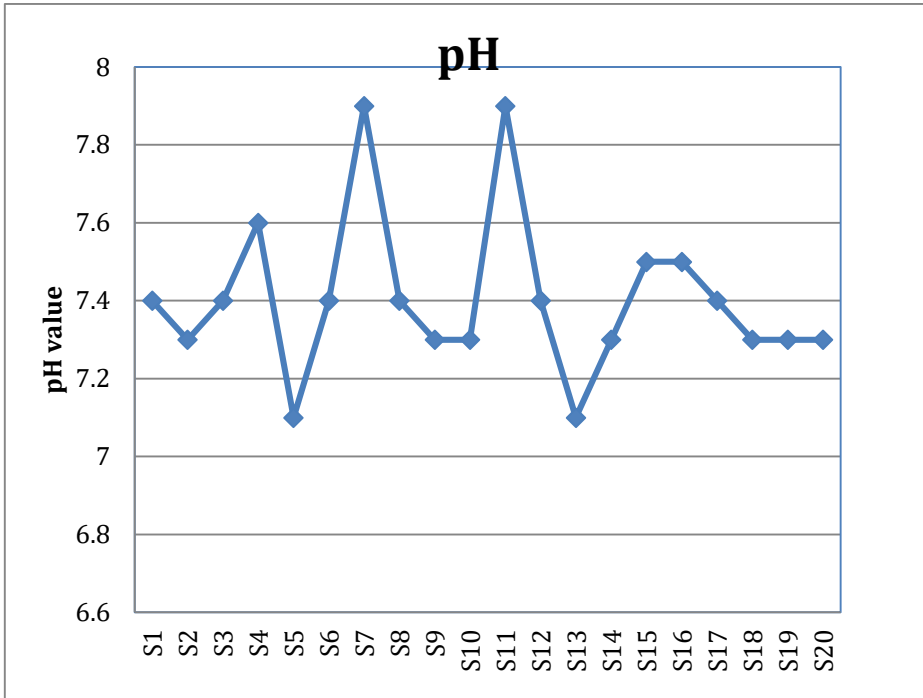
Sample Locations and Their Coding

S.No	Name of Sample	Sample Code
1	Najafgarh Drain	S1
2	Metcalf House Drain	S2
3	Khyber Pass Drain	S3
4	Sweeper Colony Drain	S4
5	Magazine Road Drain	S5
6	ISBT Drain	S6
7	Tonga Stand Drain	S7
8	Civil Mill Drain	S8
9	Power House Drain	S9
10	Sen Nursing Home Drain	S10
11	Drain No. 14	S11
12	Barapulla Drain	S12
13	Maharani Bagh Drain	S13
14	SaritaVihar Drain (Mathura Road)	S14
15	Tekhhand Drain	S15
16	Tuglakabad Drain	S16
17	Drain Near SaritaVihar Bridge	S17
18	Shahdara Drain	S18
19	Sahibabad Drain	S19
20	Indrapuri Drain	S20

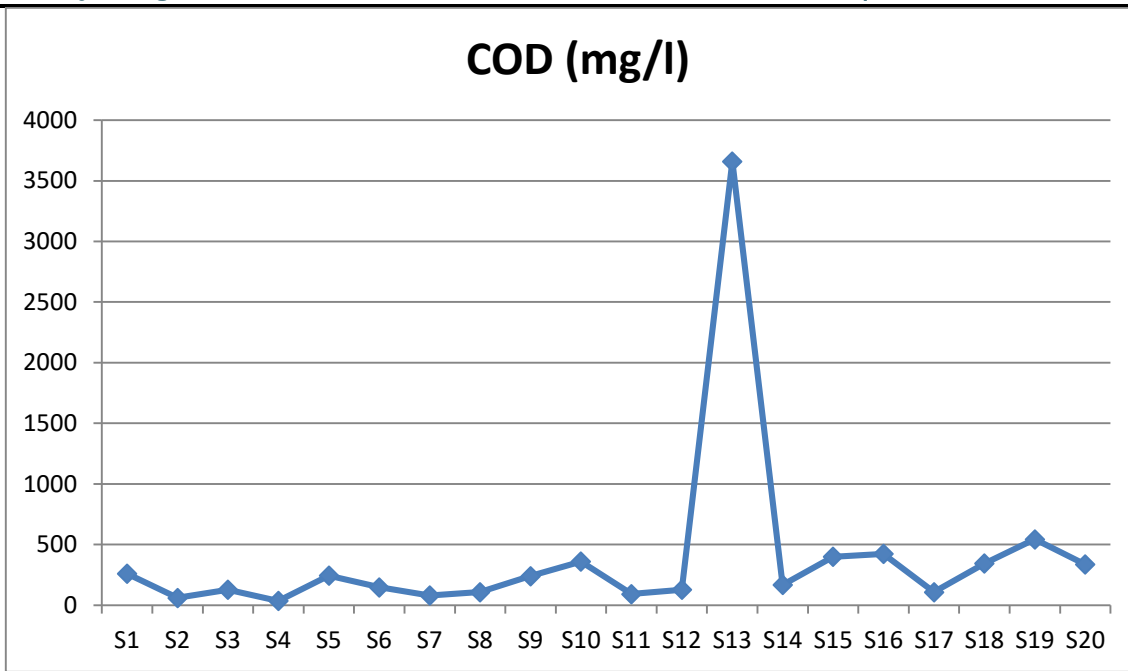
Table 4
Physico-Chemical Parameters of Wastewater Samples

S.NO	SAMPLE CODE	pH	TSS (mg/l)	COD (mg/l)	BOD (mg/l)
GENERAL STANDARD		5.5-9	100	250	30
1	S1	7.4	264	260	90
2	S2	7.3	68	60	22
3	S3	7.4	212	128	42
4	S4	7.6	214	36	11
5	S5	7.1	432	244	80
6	S6	7.4	204	148	50
7	S7	7.9	24	80	28
8	S8	7.4	112	108	32
9	S9	7.3	196	240	80
10	S10	7.3	320	360	120
11	S11	7.9	88	92	30
12	S12	7.4	118	128	43
13	S13	7.1	732	366	120
14	S14	7.3	348	168	52
15	S15	7.5	416	400	135
16	S16	7.5	472	424	140
17	S17	7.4	168	108	35
18	S18	7.3	436	344	115
19	S19	7.3	456	544	180
20	S20	7.3	212	336	110

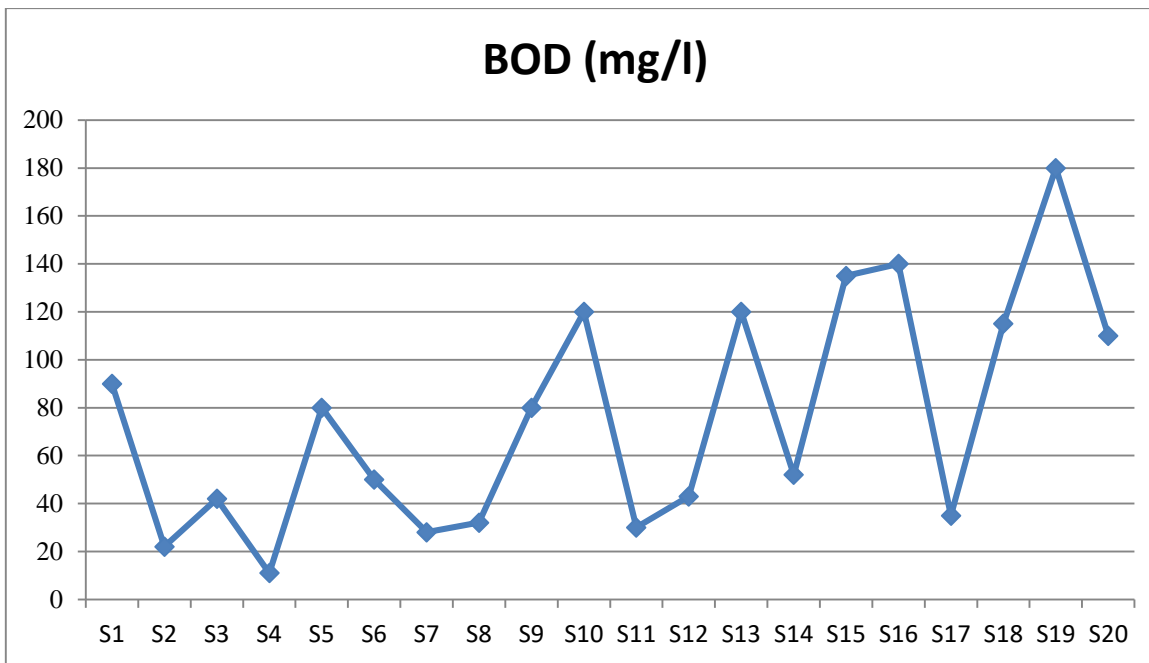
Graph 1: pH values for wastewater samples



Graph 2: TSS values for wastewater samples



Graph 3: COD Values for Wastewater Samples



Graph 4: BOD Values for Wastewater Samples

5. CONCLUSIONS

This study shows that Delhi city lacks proper system for treatment and drainage of wastewater. There waste water from household, industries etc. discharge to the lifeline of the city, Yamuna River. There is high need for connecting

the sewer lines throughout the sewers of the city so that the wastewater can be easily transported to the Sewage Treatment Plant (STP) for its treatment before discharge it into the river.

This study also highlights the fact that parameters viz., BOD, COD and TDS and pH of all samples from various locations are alarmingly higher than the prescribed limits by IS 4764:1973 and IS 2490:1981. These values exceeding above their respective limits may cause heavy damage to aquatic plants and animals.

Approximately 720 MGD of wastewater is produced by the city, out of which only 459 MGD is treated daily through 34 STP's running in the Delhi city. Balanced 261 MGD is dumped directly into the Yamuna River through open drains. Hence there is a urgent need for a new STP's in the Delhi city.

6. REFERENCES

- (1) Delhi Pollution Control Committee report .
- (2) NGT reports.

