Need for the strict wastewater discharge standards at STPs in India: Benefits and the challenges before it.

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Abstract:

Due to the uneven distribution of water resources, unpredictable rainfall in the past few years, rapid urbanization due to the industrialization, and the deployment of the high yielding varieties in agriculture, a decline in the per-capita availability of water of freshwater has been observed. Additionally, due to the increasing population, high water demand has put India into water stress. To combat such a situation practice of re-use and recycle needs to be adopted. To adopt such practices strict water discharge standards at the STPs need to be enforced. In this article, the merits of the stringent standards recommended by CPCB are discussed, along with the challenges in implementing it.

Introduction:

Based on the fact of annual rainfall and the availability of total water resources, India is considerably rich at the national level. However, due to the uneven distribution of the resources often causes regional and temporal shortages. Countries population has increased rapidly since its independence in 1947. Simultaneously, with the introduction of high yielding variety crops in agriculture, dependency on water has increased tremendously since the Green [1] Revolution in 1965. During the past few decades, India has also witnessed rapid industrialization and urbanization leading to high economic growth. Although with these advancements, India has become self-reliant in many aspects of food security and economic stability but on another side, there has been a major loss to natural resources like wildlife, forest, and shortage in water supply and its quality [2].

During the past decades, it has been observed per-capita availability of fresh water has decreased with the increasing population [3]. Continuously increasing high water demand has put the country's water resources are under significant pressure. Due to the lack of stringent law and improper implementation of the already established laws and regulations, almost 80 percent of the water supply to the municipalities flows back into the ecosystem as untreated wastewater, which is a critical environmental and health hazard

Background and Discussion:

Decreasing per-capita water availability and increasing pollution in fresh-water resources are huge challenges as India continues to grow economically. In urban areas especially, water resources are under significant pressure due to high water-demand patterns. The situation is worsening with rising demand due to increasing urbanization. Central Pollution Control Board (CPCB) evaluated 152 STPs spread over 15 states in the country and has a total treatment capacity of 4716 MLD. The study revealed that the actual treatment capacity utilization is only 3126 MLD (66%). Out of the 152 STPs, 9 STPs are under construction, 30 STPs are non-operational and the performance of 28 STPs not satisfactory. Out of the 152 STPs, the treated effluent from 49 STPs exceeds the BOD standards and with respect to COD, 07 STPs are violating the general standards of Discharge. In 2017 out of 18.6% of total treatment capacity, only 13.5% of sewage was effectively treated [4][5]. The report also says that almost 80 percent of water supply to municipalities flows back into the ecosystem as untreated wastewater, which is a critical environmental and health hazard.

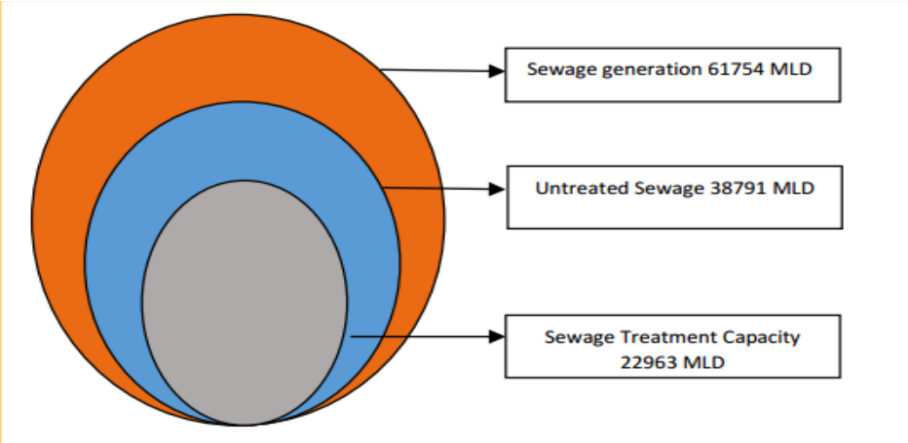

Figure 1: Status of wastewater generation and treatment capacity. (Source: 1)

Considering the seriousness of the water stress in the country, water re-use, recycle and Zero Discharge regulations have been passed. But, due to the recent changes in the national standard for the treated for wastewater, the implementation of such initiatives has become a challenge. Simultaneously, it has also ceased to distinguish between wastewater re-use for irrigation and wastewater discharge to surface or ground waters.

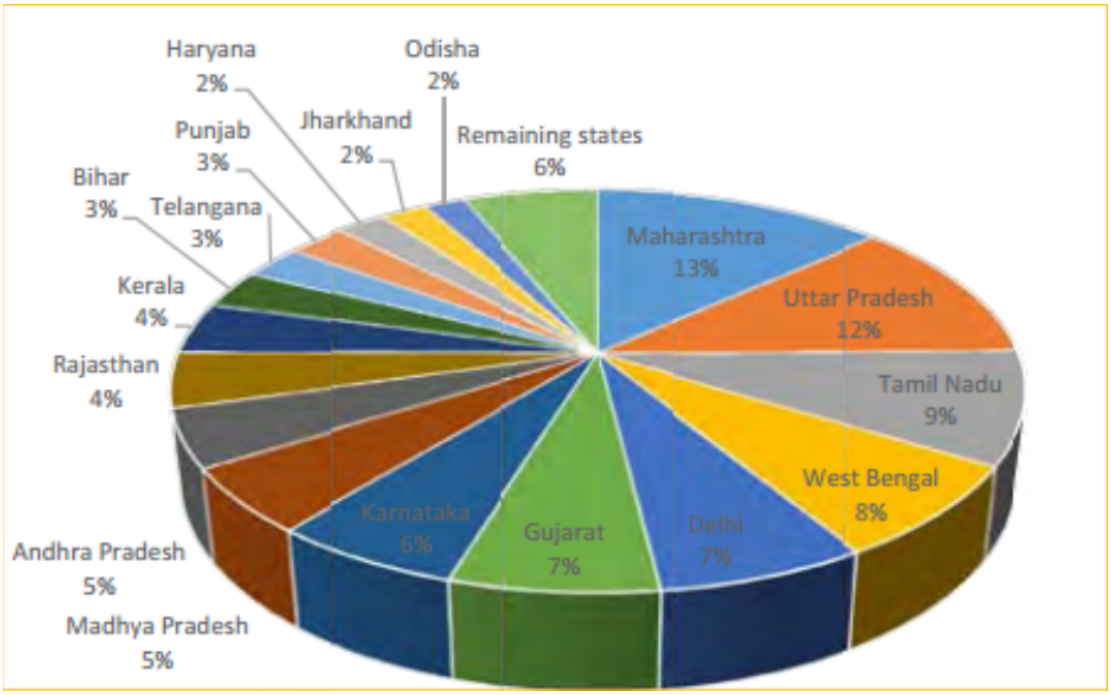

Figure 2: State-wise percentage generation of sewage. (Source:2)

Along with the challenge of wastewater management that the country is facing, rejuvenation of the polluted rivers, surface, and underground water bodies has been a subject of attention as well. Namami Gange Programme, a flagship program by the Government of India, has identified untreated discharge of wastewater by the industries located in the Ganga basin as the chief source of pollution of Ganga and Yamuna, the two major river system of North India. Under the Namami Gange Programme, Govt has allocated a budget of Rs 2000 Crore to accomplish the twin objective of abatement of pollution, conservation, and rejuvenation of the river Ganga. [6]

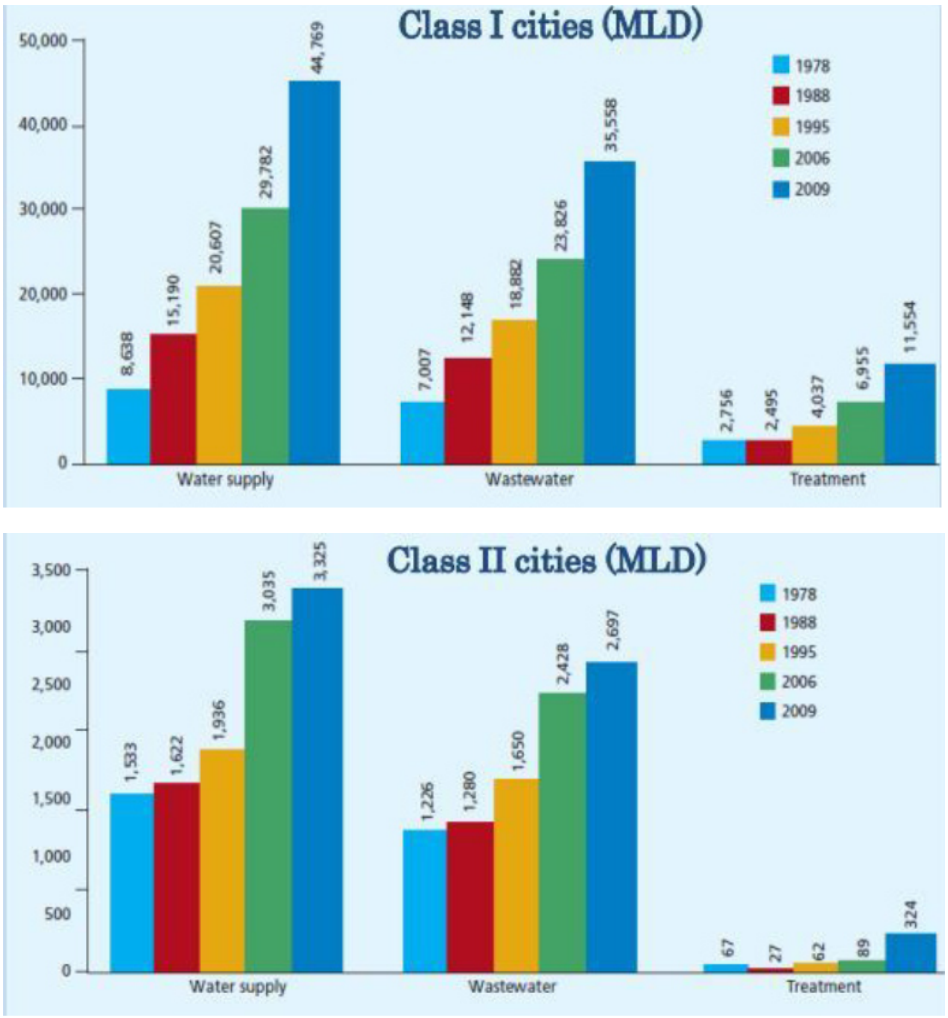

Figure 3: Status of Wastewater Treatment in India (Source: 3)

In India, The Central Pollution Control Board has been monitoring the quality of water in rivers over the past 30 years. Classification of river stretches is done five priority groups based on the BOD (Biological Oxygen Demand) data. The river stretches with a BOD value higher than 30 mg/l is termed “Priority 1”. While the stretches with BOD values between 3.1 and 6 mg/l are termed as “Priority 5”.[7]. According to the assessment by CPCB, the water quality of the river stretches has increased from 71 polluted stretches in 2005 to 375 polluted stretches in 2018, with the Mithi river having a BOD of 250 mg/l.[8]

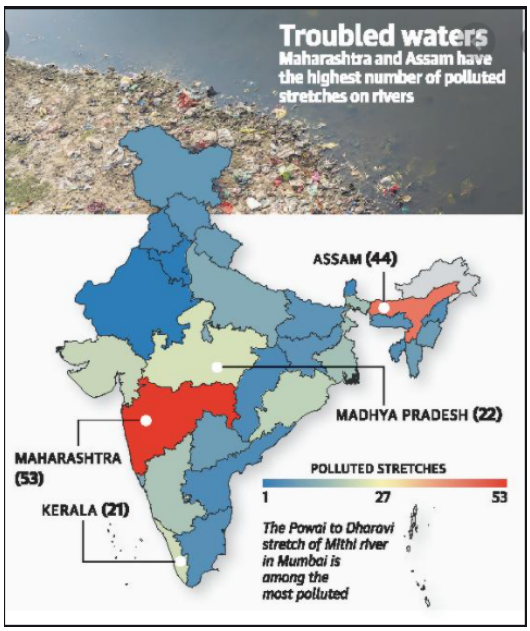

Figure 4: Polluted stretches across India (Source: 4)

To highlight the status of river stretches fit for bathing purposes, the Honorable National Green Tribunal (NGT) in September 2018, ordered the construction of the River Rejuvenation Committee for the preparation of the action plan and its implementation [8]. Additionally, due to the deteriorating water quality and depletion of water resources, central and state governments have shown their interest in centralizing the use of water resources [9]. In another recent order, the Honorable NGT has directed states to submit the action plans for the utilization of treated wastewater by June 2019. Honorable NGT has also directed states to include monitoring plans for the wastewater that is being discharged into surface water bodies. In addition to it, States are also directed to include the infrastructure augmentation [9]. States including Gujarat and Karnataka have already implemented the reuse policies for some years, but this recent NGT order aims to promote the focused implementation of reuse wastewater throughout the whole country.

In India, the Ministry of Environment Forest and Climate Change (MoEF&CC), Ministry of Housing and Urban Affairs, and Ministry of Jal Shakti hold the responsibility of controlling water pollution. While on the other side, MoEF&CC along with the CPCB are the bodies that regulate the pollution by laying policies, law, and the standards. In 1974, for the prevention and control of water pollution. Water Prevention and Control of Pollution Act was released, that established responsible bodies to address the issue of water pollution at central and state level. After three decades with the rapid urbanization in the country, the National Sanitation Policy was established in 2008 to mandate the

total coverage of sanitization in all Indian cities and towns. Later on, in 2012, the draft was the National Water Policy (NWP) focused on the attention towards the looming crisis in the water sector [10]. As a result, NWP proposed the recycling and reuse of the water and emphasized the efficient use of water. [10]

During the past five years, wastewater discharge standards for STPs have changed considerably. In 2015, comparatively stringent standards were formulated which proposed a fixed set of standards. But, in 2017 it went underwent a second change with a relaxation of limits and the inclusions of different criteria for metro cities. Frequent changes, along with the difficulties in accessing the relevant information on central online platforms led to confusion and misunderstanding among the upcoming projects. To address the issue, a time of 7 years was proposed by the expert committee for old STPs in complying with the updated stringent standard but it was rejected by the NGT [11]. Dilution of stringent standards were considered as retrograde step, as it would deteriorate the water quality and also degrade the environment.

In the report sent by CBCP to NGT in 2019[11] mentions that 351 river stretches of 323 rivers are polluted. It has also mentioned the need for the revised standards for BOD and COD to protect the water quality of rivers/stretches. In addition to it, there is also a need for the revised standard for TSS, Nitrogen (Total and Ammonical), Phosphorus, and Faecal Coliform. Table shown below summarizes the old standards with the proposed standard, along with the relaxed standards proposed by MoEF&CC [11]. In the report CPCB also proposed the inclusion of COD monitoring of discharge water from the STPs for the early diagnosis of the health of the STPs. Moreover, the report also mentions, if Government wishes to regulate STPs across the country through online monitoring, inclusion of COD in Discharge Standard will prove to be beneficial, as COD sensors available in the Indian market are more reliable as compared with BOD sensors.

Table 1: Summary of Effluents discharge limits as per Old standards, CPCB Proposed standards and Relaxed standards proposed by MoEF&CC [Source:11]

S. No.	Parameter	Old Standards	CPCB Proposed Standards	MoEF&CC Proposed (Relaxed) Standards
1	**BOD (mg/l)**	<30	<10	<30 and < 20

				(metro cities)
2	**TSS (mg/l)**	100	20	< 100 and < 50
3	**COD (mg/l)**	250	50	No Limit
4	**Nitrogen Total (mg/l)**	100	10	No Limit
5	**Ammonical Nitrogen (mg/l)**	< 50	< 5	No Limit
6	**Total Phosphorus (mg/l)**	No Limit	No Limit	No limit
7	**Faecal Coliform (MPN/100 ml)**	No Limit	<100	< 1000

The committee also mentions the revised standards for Fecal Coliform (FC) as any relaxing FC pose risk to downstream cities/towns/villages that rely on drinking water sources on the same water body in case of rivers.

The immense pollution arising from improper or inexistent sanitation requests for the allocation of adequate funding schemes to achieve set targets. However, it was observed stated that strict standards were not applicable at the current time in India due to the lack of economic and technical feasibility. It is stated that the economic feasibility for implementation of the MoEF&CC norms at all levels has not been fully explored, and the efforts of the wastewater sector to provide sanitation has stalled due to a lack of clarity on goals and a lack of applicable technologies.

Unless the total governmental budget for wastewater infrastructure development increases drastically, infrastructural development and coverage are likely to slow down even as the population continues to grow. This trend can result in higher pollution and health burden and enforce higher risk inequalities as only certain areas could be served while others would be exposed to an unsafe and dangerous environment. Overall, it is observed that there is a wide gap in institutional capacity at all levels, highlighting a pressing need for more holistic management processes.

In the report, because of the above and severity of depletion of aquatic resources vis-a-vis the financial aspects related to conveyance and treatment of water/sewage, the committee recommended that the effluent discharge for STPs to be as follows:[11]

Table 2: Recommended effluent discharge for STPs [Source: 11]

Industry	**Parameter**	**Standards (Applicable to all mode of disposal)**			
		Mega and Metropolitan Cities	**Class I cities**	**Others**	**Deep marine outfalls**
Sewage Treatment Plants	**pH**	5.5-9.0	5.5-9.0	5.5-9.0	5.5-9.0
	BOD (mg/l)	10	20	30	30
	TSS (mg/l)	20	30	50	50
	COD	50	100	150	150
	Nitrogen - Total (mg/l)	10	15	-	-
	Phosphorus- Total (For discharge into ponds and lakes)	1	1	1	
	Faecal Coliform (MPN/100 ml)	Desirable 100 Permissible- 230	Desirable- 230 Permissible - 1000	Desirable- 1000 Permissible - 1000	Desirable- 1000 Permissible - 10,000

Summary and conclusion:

Considering the status of sewage treatment as mentioned above in the article and to tackle the issue of water stress, proper management water resources, and treatment of discharged wastewater are the best solution. The expert committee supported the need for revised and stringent standards for discharged water from the STPs, as mentioned in the NGT Report 2019, by stating the following benefits:

- "If stringent quality standards are not implemented then in the coming future with more population burden on rivers, the situation will further deteriorate.
- The greatest benefit of these standards is to achieve all-purpose non-portable reuse quality effluent. Each STP is to be treated as a source of water for reuse and recycling, helping in mitigating drought/climate change in the country. It will also reduce the exploitation of groundwater reserves and dependency on rainfall which has become quite unpredictable in the past few years. Climate change is a reality that should be addressed and adopted in the coming future. It will go a long way in reducing agricultural dependency on bore well water.
- If the treatment of wastewater is not carried out with intention of reuse and recycle expenditure on conveyance/long-distance transport of water/sewage will be much higher. Even as on today in many cities the cost of conveyance of water is much higher than the treatment of sewage to make it fit for most uses including domestic uses. For example, the cost of transporting water from Narmada to fulfill the water supply needs of Indore city (approximately @ Rs. 20/cum) is much higher than the cost of treating sewage to the tertiary level."

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Source 3: http://www.sulabhenvis.nic.in/database/stst_wastewater_2090.aspx

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