

CHAPTER - VII

Monitoring of Water Quality

Chapter VII

Monitoring of Water Quality

7.1 Introduction

Monitoring of water bodies helps in identifying existing and emerging water quality problems, and in gathering information to design remedial programmes for implementing effective pollution control measures, and to ascertain extent of compliance with environmental norms.

The responsibility of monitoring water quality of surface water, including sewage and effluents, and groundwater in the State rests with following entities as shown in **Chart 7.1** below:

Chart 7.1: Responsibility of monitoring water quality in the State.

Polluted River Stretches (PRSs)	•River Rejuvenation Committee (RRC) headed by Member Secretary, WBPCB is responsible for overall monitoring of PRSs in the State.
Surface Water (Water Bodies/Lakes/Ponds/Canals/Drains)	•WBPCB: Monitors all surface water through different monitoring stations under National Water Monitoring Programme (NWMP).
Industrial effluents/ETPs/CETPs	•WBPCB: Monitors all industrial effluents through periodical inspections.
Drinking Water	•PHED: Testing of water quality and supply of drinking water in rural areas. •UD&MA: Testing and supply of drinking water in urban areas.
Ground Water	•State Water Investigation Department (SWID): Monitoring and assessment of ground water levels. •WBPCB: Monitoring of ground water quality through different monitoring stations. •PHED: Monitoring of ground water before supplying it to the beneficiaries.
Sewage Treatment Plant	•WBPCB: Monitoring of all liquid waste including STPs

Note: RRC has been constituted for the preparation of Action Plans for effective abatement of pollution, rejuvenation, protection and management of each of the identified PRS.

This chapter deals with the adequacy of the water quality monitoring system in the State with respect to surface and ground water, and achievements made with regard to SDGs therein.

7.2 Water Quality Monitoring

Under the National Water Monitoring Programme (NWMP-1978), WBPCB monitors surface and ground water quality through 140¹³³ monitoring stations of West Bengal. This monitoring is done as per the Guidelines on Water Quality Monitoring, 2017, issued by CPCB. In this context, Audit observed the following:

7.2.1 Classification of Water Quality Monitoring Stations

Guidelines on Water Quality Monitoring, 2017, delineated four different types of stations for surface water monitoring viz. (i) Baseline, (ii) Flux/Impact, (iii) Hot Spot and (iv) Trend stations.

For Ground Water, all monitoring stations were to be classified as Baseline stations and could be re-classified as Trend or Hot spot stations, wherever there is a perceived problem.

The frequency of sampling of surface and ground water and the parameters of analysis were prescribed, based on the type of monitoring stations as detailed in *Appendix-2*.

Audit observed that the monitoring stations for surface water were not differentiated by WBPCB as prescribed in the Guidelines. In absence of classification of monitoring stations, the adequacy of the tests conducted could not be ascertained by Audit. This also impacted the main objectives of water quality monitoring programmes which *inter alia* included rational planning of pollution control strategies, identification of the nature and magnitude of pollutants and evaluation of the effectiveness of pollution control efforts already in existence.

Further it was also noticed that while the Ganga River water was monitored twice a month as per the above-mentioned Guidelines, the other rivers and lakes were monitored only once in a month, though these rivers were more polluted than the Ganga.

In reply, the Department stated (March 2024) that it would select hotspots on different rivers of West Bengal.

The Guidelines on Water Quality Monitoring, were issued by CPCB in 2017, however classification of monitoring stations was not done till March 2024, impacting efficacy of the monitoring process.

7.2.2 Adequacy of Water Quality Monitoring Stations

According to CPCB’s guidelines for National Water Monitoring Programme (NWMP), 2019, monitoring stations at both upstream and downstream of a river need to be established by the State PCBs. CPCB also proposed (February 2019) that State PCBs augment the monitoring networks.

¹³³ 72 stations are Surface water monitoring stations (55 River stations, 14 Ponds/Lakes stations, two Canal stations and one marine water) and 68 are Ground water monitoring stations.

Out of the 17 PRS, Audit observed that there was only one monitoring station each against the stipulated two (upstream and downstream) for nine PRS¹³⁴.

Further, the CPCB guidelines delineated that every district needs to have at least two groundwater locations for testing and monitoring.

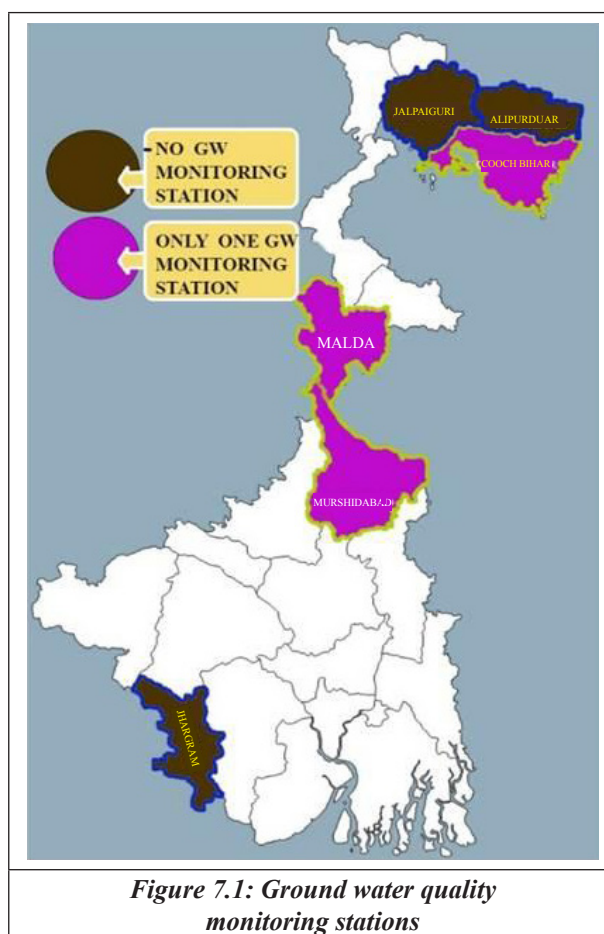


Figure 7.1: Ground water quality monitoring stations

However, Audit observed that the districts of *Jalpaiguri*, *Alipurduar*, *Jhargram*, had not identified ground water testing locations while the districts of *Malda*, *Murshidabad*, *Coochbehar* had only one location each instead of the required two.

Thus, the monitoring of ground water quality was not satisfactory as the data generated was not adequately representative, being based on a limited number of testing locations.

Further, WBPCB had not taken any initiatives to augment the existing monitoring stations. Therefore, the water quality assessment would not reflect the actual extent of pollution due to geogenic and anthropogenic activities.

In reply, the Department stated (March 2024) that it would consider establishment of more monitoring stations.

The CPCB's guidelines for augmentation of monitoring network had come into existence in 2019, however they had not been effectively implemented till March 2024 by the State.

7.2.3 Monitoring of ground water at dumping sites

According to Schedule-I of Solid Waste Management Rules, 2016 of GoI, the ground water quality within 50 meters of the periphery of a landfill site shall be periodically monitored by State PCB covering different seasons in a year to ensure that the ground water is not contaminated.

However, out of 123 landfill/dumpsites in the State, WBPCB had only one ground water monitoring station at one dumpsite (at *Dhapa*, Kolkata)

¹³⁴ Jalangi, Barakar, Dwarkeshwar, Mayurakshi, Mathabhanaga, Kaljani, Karola, Silabati and Kanshi.

In the absence of adequate number of ground water quality monitoring stations around the periphery of dumpsites, the extent of ground water contamination due to leaching could not be assessed by Audit.

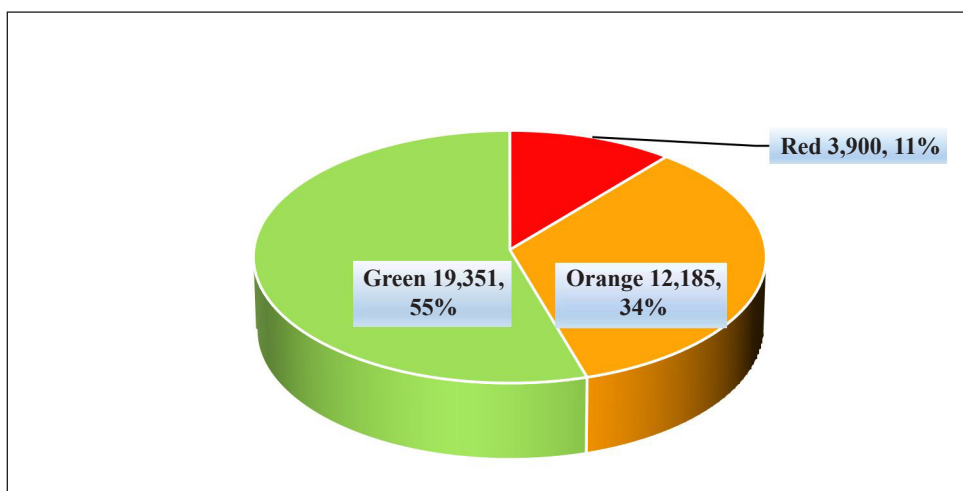
Recommendation 14:

WBPCB should establish a representative number of stations/locations for water quality monitoring, particularly in the identified hot spots.

7.3 Inspection of Industries

In compliance with the orders of NGT dated 28 August 2019, CPCB carried out a Performance Review of the WBPCB and observed (2019-20) that there were 3,900 red category industries, 12,185 orange and 19,351 green category industries as depicted in **Chart 7.2**.

Chart 7.2: Category of industries registered with WBPCB



Audit observed that WBPCB did not inspect these industries at scheduled intervals due to inadequate number of regional offices, lack of environmental laboratories as well as technical manpower during 2018-23, as discussed below:

7.3.1 Monitoring through Regional offices

WBPCB operated through 11 Regional Offices (RO) covering 23 districts of West Bengal. Audit observed that RO *Malda and Siliguri* of WBPCB, controlled four districts each while *Durgapur* and *Haldia* ROs controlled three districts each. Thus, each of the RO had to cover vast areas which impaired adequate monitoring.

WBPCB, in its 170th Board meeting highlighted (September 2019) the need for expansion of RO network and proposed the setting up of new regional offices in different districts. However, work of setting up of proposed ROs, to strengthen the monitoring infrastructure, was not taken up till date (December 2023).

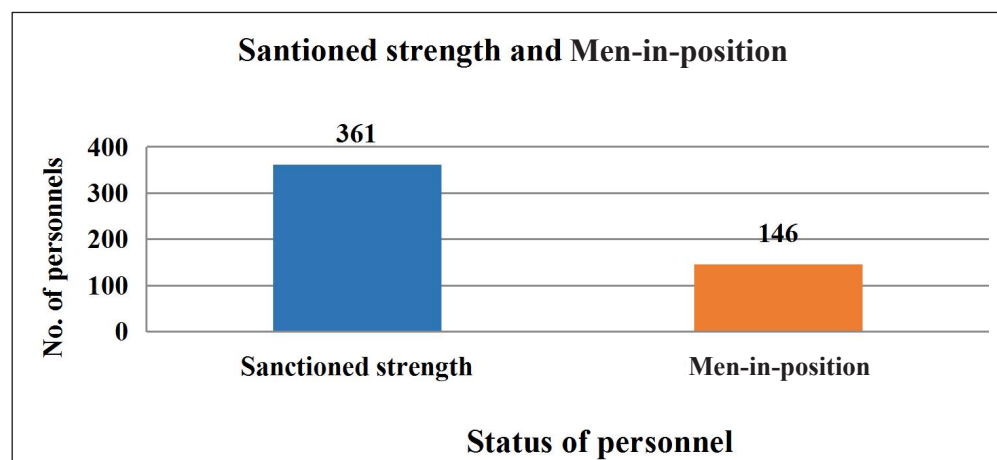
7.3.2 Availability of technical manpower

CPCB in its Report¹³⁵ recommended (September 2020) strengthening of manpower to ensure effective performance of WBPCB.

¹³⁵ Performance Audit of SPCBs placed before NGT in OA-95 of 2018.

The sanctioned strength and men-in position (MIP) of WBPCB for the period 2018-23, are detailed in **Chart 7.3**:

Chart 7.3: Details of sanctioned strength and MIP in respect of WBPCB



(Source: Annual Reports and website of WBPCB)

Thus, there were 60 *per cent* vacancies in manpower during 2018-23. The shortage of manpower had consequential effect on the discharge of mandatory functions especially monitoring, as discussed below:

Data related to inspections of industries revealed that during 2018-23, there was a significant shortfall in the number of WBPCB inspections as detailed in **Paragraph 5.2.1 (Chart 5.5) and Table 5.3**.

Thus, shortage of staff had an adverse effect on WBPCB's mandatory functions of conducting industrial inspections at prescribed intervals, and testing of industrial effluent/emission to ensure compliance with environmental norms.

In reply, the Department stated (March 2024) that considering the increase in responsibilities in many new emerging areas, the State Board recently reviewed the manpower requirement and accordingly sent a proposal to the State Government for effectively carrying out its mandated activities.

7.3.3 Environmental Laboratories

WBPCB had a Central Laboratory at its Head Office in Kolkata and five¹³⁶ Regional Laboratories which catered to the 23 districts of the State.

Ministry of Environment Forest & Climate Change (MoEF&CC) directed (August 2011) that all SPCB Laboratories and/Central Laboratories must acquire accreditation¹³⁷ under the Environment (Protection) Act (EPA), 1986, along with Occupational Health and Safety Management System-18001 (OHSMS) Certification before getting recognised under the Environment (Protection) Act, 1986. Further, all the existing recognised laboratories needed to acquire accreditations within a period of one year from the date of issue of the above MoEF&CC direction.

¹³⁶ Barrackpore, Hooghly, Durgapur, Haldia and Siliguri.

¹³⁷ ISO-17025 (NABL Accreditation) or ISO-9001.

Audit observed that only the Central Laboratory at Kolkata received all the three required certifications while the Regional Laboratories were yet to obtain these accreditations, as detailed in **Table 7.1**.

Table 7.1: Status of accreditation of WBPCB’s laboratory as of March 2024

Requirement	NABL Accreditation	OHSMS accreditation	EPA
Central Lab	☑	☑	☑
Hooghly Lab	☒	☒	☒
Barrackpore Lab	☒	☑	☒
Haldia Lab	☒	☒	☒
Siliguri Lab	☒	☒	☒
Durgapur Lab	☒	☒	☒

(Source: Records of WBPCB)

In reply, the Department stated (March 2024) that WBPCB was in the process of obtaining the required accreditation for all its Laboratories.

In the absence of accreditations, audit could not derive an assurance on the quality of testing by these Laboratories.

7.3.3.1 Strengthening of laboratories under Namami Gange Programme

National Mission for Clean Ganga (NMCG) granted (June 2018) administrative approval and expenditure sanction of ₹ 12.93 crore for the project on “*Strengthening of laboratories under Namami Gange Programme*”.

Under the above project, the existing laboratories at *Kolkata, Barrackpore* and *Malda/ Berhampur* were proposed to be strengthened by the West Bengal State Level Program Management Group (WBSPMG) and completed within nine months from the date of sanction of the project. All laboratories to be strengthened under this project were to perform as Ganga monitoring Centres and would further strengthen the work of NMCG. A fund of ₹ 12.93 crore was placed with WBSPMG by NMCG. The executing agency for the project was the WBPCB. Audit observed that as of March 2023, an expenditure of only ₹ 4.70 crore had been incurred by WBPCB. The reasons for non-completion of the project, even after a lapse of more than four years were not made available to Audit.

Further, all the sanctioned posts for the project were not filled even after six years of the project being sanctioned. The details of sanctioned strength *vis-a-vis* person in position of the Laboratories under the project is shown in **Table 7.2**.

Table 7.2: Men in Position *vis a vis* Sanctioned Strength at Kolkata, Barrackpore and Malda/ Berhampur Laboratories

Sl No.	Designation	Sanctioned Strength (SS)	Person in Position (PIP) as on March 2023	Vacancies
1.	Junior/Senior Research Fellow	12	08	04
2.	Jr. Lab Asstt.	09	09	00

Sl No.	Designation	Sanctioned Strength (SS)	Person in Position (PIP) as on March 2023	Vacancies
3.	Attendant	09	05	04
5.	Field Attendant	06	04	02
6.	MTS	03	02	01
Total		39	28	11

(Source: Records of WBPCB)

Thus, WBPCB failed to achieve the NMCG objective of putting in place a strengthened water quality monitoring mechanism for the river Ganga as envisaged.

Recommendations:

15. Government should implement the proposal of the State Board on engagement of manpower and strengthen the water quality monitoring mechanism for effectively carrying out its mandate.

16. WBPCB should develop and upgrade its laboratories and obtain NABL Accreditation, OH&SMS certification and EPA recognition by MoEF&CC to enhance assurance level.

7.4 Monitoring of STPs

CPCB issued directions, under section 18(1) (b) of the Water (Prevention and Control of Pollution) Act, 1974 to WBPCB in March 2017 to take up monitoring of STPs discharging into the river Ganga on a monthly basis and forward the reports to CPCB.

Audit observed that WBPCB, however, monitors STPs discharging into Ganga once in three months as per its internal orders dated 14 January 2020. The status of WBPCB's monitoring of STPs on the Ganga during the period 2018-23 is as detailed in **Table 7.3**.

Table 7.3: Monitoring of STPs by WBPCB

Year	No. of commissioned STPs in the State	Frequency of Monitoring required (Quarterly)	Frequency of monitoring actually done (Quarterly)	Percentage of monitoring
2018-19	33	396	12	3
2019-20	40	480	46	10
2020-21	41	164	41	25
2021-22	41	164	66	40
2022-23	41	164	76	46

(Source: Inspections and water quality Monitoring reports of WBPCB)

From the above table, it can be seen that during 2018-23, the monitoring frequency of STPs by WBPCB ranged between 03 *per cent* and 46 *per cent* only. Further, from the test reports of WBPCB it was noticed through test check of records that STPs were non-compliant with discharge standards for FC and BOD ranging between 83 *per cent* to 100 *per cent* and 52 *per cent* to 71 *per cent* respectively. Audit, however, observed that the WBPCB did not act against the non-compliant STPs as discussed in Chapter III.

7.4.1 Non-operational STPs

CPCB issued directions (June 2019), under Section 18(1)(b) of the Water (Prevention and Control of Pollution) Act, 1974, to WBPCB regarding non-operational STPs in West Bengal and stated that:

- (a) WBPCB shall impose environmental compensation on the operators for not operating STPs.
- (b) WBPCB shall direct the concerned authorities to prepare and submit time bound action plans for up-gradation and rehabilitation of non-operational STPs.

According to CPCB’s status report for West Bengal STPs as of March 2023, there were 11 non-operational STPs out of a total of 41 on the river Ganga.

Audit observed that due to the non-operation of STPs, the management of municipal sewage, as conceived in related action plans, could not be effectively undertaken, and the river Ganga continued to receive untreated sewage.

7.5 Online Continuous Effluent Monitoring System (OCEMS)

Central Pollution Control Board in February 2014 issued instructions to State Pollution Control Boards and Pollution Control Committees to direct industries, Common Effluent Treatment Plants (CETPs) and STPs *etc.*, to install Online Continuous Emission Monitoring System (OCEMS), developed by CPCB, to help track the discharges of pollutants units.

Audit observed that only 16 industrial units had OCEMS out of 65 sampled industries.

CPCB, further, instructed (June 2019) WBPCB to direct all concerned local bodies/authorities operating STPs to install OCEMS at the outlet of STPs to monitor performance against established parameters and provide connectivity to CPCB and WBPCB servers for continuous monitoring within three months.

Audit observed that out of the sampled 34 STPs being operated by local bodies/authorities, none had installed the OCEMS till December 2023.

Thus, the real time tracking of discharge of pollutants could not be effectively implemented even after more than four years of CPCB’s instruction.

Recommendation 17:

WBPCB should monitor all the STPs regularly and take action to ensure that the STPs were working and were complying with the discharge standards. It should also ensure installation of OCEMS for STPs/ETPs and use the data for effective surveillance and monitoring.

7.6 Utilisation of funds under Water Quality Monitoring & Surveillance

Para 10.2 of the Operational Guidelines (December 2019) of National Jal Jeevan Mission (JJM), Government of India, stipulated that up to two *per cent* of the allocation under JJM to States could be utilized for carrying out Water Quality Monitoring and Surveillance (WQM&S) activities. The Guidelines also provided that the fund could be utilized for activities like setting up of laboratories,

upgrading of existing laboratories which *inter alia* included procurement of equipment, instruments, chemicals/ reagents, glassware, consumables, etc.

Audit observed that PHE Department, Government of West Bengal, during the period 2019-20 to 2022-23, could utilise only 26 *per cent* of the fund earmarked for WQM&S activities, and an aggregate fund of ₹ 389.85 crore remained unutilised, as shown in the **Table 7.4**.

Table.7.4: Allotment and utilisation of funds for WQM&S under JJM

(₹ in Crore)

Year	Total allotted fund under JJM (Centre & State)	Earmarked WQM&S fund (2 <i>per cent</i> of the total allotted fund)	Total expenditure incurred in WQM&S activities (Centre & State)	Un-utilised fund under WQM&S activities
2019-20	1,658.88	33.18	11.25	21.93
2020-21	2,690.30	53.80	37.00	16.80
2021-22	11,664.95	233.30	29.20	204.10
2022-23	10,300.42	206.00	58.98	147.02
Total	26,314.55	526.28	136.43	389.85

In reply, the Department stated (March 2024) that Water Quality Monitoring activities, within the fund ceiling of two *per cent* of the allotted fund under Jal Jeevan Mission, were carried out as per approved Annual Action Plan (AAP) for WQMS, and there was no scope to take up WQMS activity beyond the approved AAP. However only 26 *per cent* of earmarked fund for Water Quality Monitoring could be utilised.

7.7 Monitoring of Drains

Due to rapid urbanisation, industrialisation and increase in anthropogenic activities in the past few decades, most of the canals have been converted to drains and are treated as mode of disposal of pollutants. Most of these drains are man-made and carry municipal, industrial and mixed waste in addition to natural storm water. To address this surface water pollution issue, it is a must to have accurate information available about the sources of pollution.

CPCB carried out the monitoring of 104 drains discharging into the River Ganga in West Bengal on a half yearly basis (Pre and Post Monsoon). In comparison, WBPCB monitors only 56 drains along the river Ganga on a quarterly basis. It was further seen that WBPCB and UD&MA in the matter of NGT case (OA No. 600/2018) mentioned (February 2022) that 402 drains had been identified as discharging into the Ganga in the State.

Thus, WBPCB should have prepared an Action Plan to monitor all the identified drains instead of monitoring a limited number of discharge points.

Further, analysis of water quality test reports of WBPCB from January to March 2023 of these 56 drains being monitored by WBPCB showed that:

- 18 drains had Faecal Coliform in the range of 78,000 and 7,90,00,000 (MPN/100ml) and rest of the 37 drains were not monitored for FC (*Appendix-3*).

- 50 drains had BOD between 10.11 mg/l and 366.67 mg/l, and 45 drains had COD between 50.35 mg/l and 995.32 mg/l which was much higher than the permissible limit¹³⁸ (*Appendix-4*).

7.8 Sustainable Development Goals

The 2030 Agenda for Sustainable Development set at the Sustainable Development Summit held at United Nations Headquarters in September 2015, contained 17 Goals and 169 targets. The action for achievement of Sustainable Development Goals (SDGs) started on 01 January 2016 and these were expected to be achieved by 31 December 2030.

Of the 17 SDG goals, Goal 6- ‘Ensure availability and sustainable management of water and sanitation for all’ is relevant for the extant audit.

According to the SDG index-2020 of NITI Aayog, as regards the performance of West Bengal against SDG 6 (Clean water and sanitation), it was observed that the score of the State declined to 81 from 83 in 2019¹³⁹. The achievement of West Bengal against target specified under SDG 6-Clean Water and Sanitation is detailed in **Table 7.5**.



Figure 7.2: SDG 6

Table 7.5: Achievement of following targets under SDG 6

Targets	Indicator	Audit observations
6.1	6.1.1	Only 48.12 <i>per cent</i> of households in the State of West Bengal were provided with tap connected drinking water against the national average of 76.59 <i>per cent</i> as per data of Jal Jeevan Mission.
To achieve universal and equitable access to safe and affordable drinking water for all by 2030.	Proportion of population using safely managed drinking water services.	
6.3	6.3.1	The gap in sewage treatment of about 84 <i>per cent</i> indicated that the State’s wastewater management, planning, and monitoring had not been effectively converged with the vision set in SDG 6. (<i>Chart 4.1 under para no. 4.2</i>) <i>Issues on treatment of industrial effluent were pointed out in paras 5.2.2, 5.2.3, 5.2.4 and 5.2.6.</i>
To improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally, by 2030.	Tracks the proportion of wastewater flows from households, services and industrial economic activities that are safely treated before it is discharged into the environment.	
	6.3.2	As discussed in Chapter IV and Chapter V of this Report, the sewage/effluent flowing into water bodies had pollution loads in excess of prescribed limits.
	Track proportion of bodies of water with good ambient water quality.	

¹³⁸ Permissible limit for STP as per order of NGT dt 30.04.2019, pH-(5.5-9.0), BOD-10 mg/l, COD-50 mg/l, FC-100(MPN/100 ml).

¹³⁹ No report of NITI Aayog since 2020 was available on records to assess the subsequent performance of the State against this SDG for the period covered under Audit.

Targets	Indicator	Audit observations
		Further as pointed out in Chapter VI there was contamination of the ground water due to leaching and of the surface water due to unscientific waste dumping and faecal disposal. Chapter VII highlights inadequate infrastructure and manpower to carry out monitoring as per prescribed schedule, which in turn impaired assessment of water quality and achievement of targeted goal of reducing water pollution.
6.4	6.4.1	The extent of re-use of treated wastewater (municipal and industrial) and abstraction of groundwater without authorization were pointed out in Para 3.3.4 and 3.3.5 of Chapter III of this Report.
To substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of fresh water to address water scarcity and substantially reduce the number of people suffering from water scarcity.	6.4.2	
	Level of Water Stress: fresh water withdrawals as a proportion of available fresh water resources.	The control and monitoring mechanism for ensuring regulated ground water extraction and its use was not effectively invoked, as detailed in para 6.2 of Chapter VI.

KOLKATA

The 05 MAY 2025



(MANISH KUMAR)

Principal Accountant General
(Audit-II) West Bengal

Countersigned



(K. SANJAY MURTHY)

NEW DELHI

The 07 MAY 2025

Comptroller and Auditor General of India