

CHAPTER-V

WATER QUALITY MONITORING AND SURVEILLANCE

5 Water Quality Monitoring and Surveillance

The Annual Groundwater Quality Report (2024) published by the Central Ground Water Board, Ministry of Jal Shakti, GoI presented findings from the data collected from several groundwater monitoring stations to establish a comprehensive baseline for groundwater quality, enabling targeted interventions to address emerging concerns. The report highlighted high concentrations of Iron, Fluoride and Nitrates above their permissible limits in several districts of Chhattisgarh State. Although not alarming, these findings necessitate regular monitoring of water quality in rural areas for protecting public health.



To ensure quality of water supply, Water Quality Monitoring & Surveillance (WQMS) is given topmost priority under JJM. Water testing is important for monitoring the operation of water supply, verification of the safety of drinking water, investigation of disease outbreaks, validation process and preventive measures. Monitoring of water quality involves laboratory and field testing of water samples collected from water sources and FHTC.

The Audit findings on Water Quality Monitoring & Surveillance issues are discussed in the following paragraphs:

5.1 Allocation of funds and their utilisation for WQMS

Recognising the importance of WQMS, up to two *per cent* of the total funds allocated to each state are earmarked specifically for WQMS activities. This financial provision reflects the mission's commitment to public health by ensuring the safe operation of water supply systems, continuous monitoring of water quality, and delivering safe drinking water. These include setting up and upgrading laboratories, procurement of equipment, chemicals and glassware, hiring resources, and covering expenses for National Accreditation Board for Testing and Calibration (NABL) accreditation. During 2019 to 2024, SWSM allocated ₹ 58.91 crore for WQMS, against the earmarked two *per cent* of total allocated funds i.e. ₹ 199.79 crore. The year-wise allocation and utilisation of funds for the WQMS component is summarised in **Table 5.1**.

Table 5.1: Year-wise allocation and utilisation of WQMS funds in Chhattisgarh*(₹ in crore)*

Year	JJM Central fund released by GoI	Mandated 2 per cent of JJM Central allocation (60%) plus matching State share (40%)	Fund allocated to DWSMs for WQMS activities		Utilised	Shortfall of utilisation against fund allocated	
			Amount	Per cent of allocation against mandated		Amount	Per cent
1	2	3	4	5	6	7 (4-6)	8
2019-20	24.27	0.81	0.00	0	0.00	0.00	0
2020-21	290.15	9.67	6.90	71	4.29	2.61	38
2021-22	556.82	18.56	20.32	109	12.85	7.47	37
2022-23	2,236.86	74.56	19.99	27	16.23	3.76	19
2023-24	2,885.56	96.19	11.70	12	7.51	4.19	36
Total	5,993.66	199.79	58.91		40.88	18.03	31

(Source: JJM sanction letter by GoI and e-Works data provided by PHED)

It can be observed from the above table that against the amount of ₹ 199.79 crore mandated for WQMS activity only ₹ 58.91 crore was allocated to DWSMs during the period 2019-20 to 2023-24. Only during 2021-22, the amount for support component was allocated as mandated by JJM guidelines. Out of total allocated amount 69.40 per cent was utilized by DWSMs.

This reflects missed opportunities in setting-up of water testing laboratories in the State and accreditation of the laboratories by NABL and shortage of staff in the laboratories due to less utilisation of funds for WQMS as discussed in subsequent paragraphs.

On this being pointed out, the Government stated (May 2025) that the PHE divisions have received allocation as per the annual work plan and accordingly fund drawl limit was issued to each division. Subsequently expenditure on WQMS work has been incurred by the PHE divisions under the WQMS during 2019-20 to 2023-24.

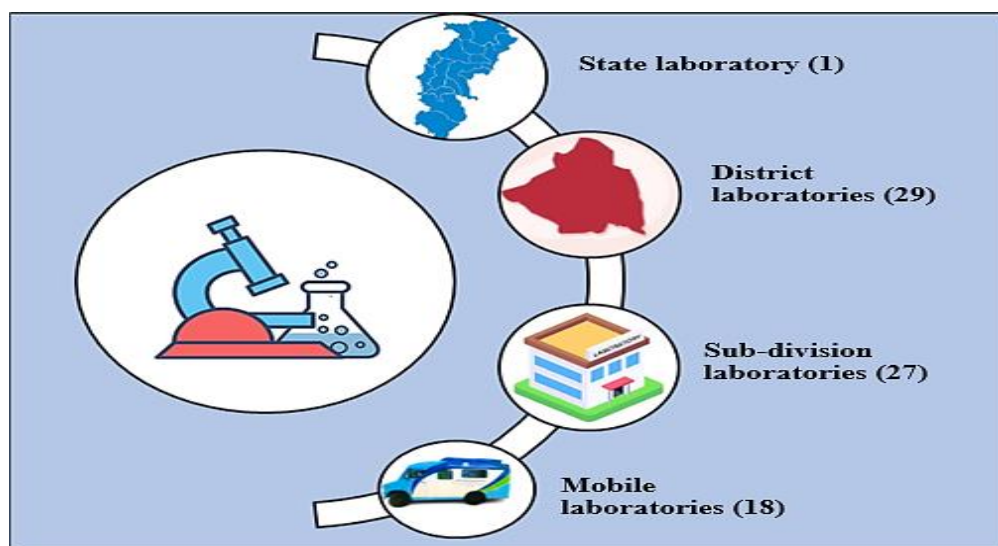
The reply furnished indicates that the activities like laboratory expansion, procurement of testing equipment under WQMS were not planned as per norms prescribed in the JJM guidelines.

5.2 Setting up of Water Quality Testing Laboratories and testing of 13 basic water quality parameters

The JJM guidelines mandate that states strengthen their water quality testing infrastructure by establishing or upgrading laboratories at the state, district, block levels, as well as mobile laboratories. This initiative is supported by regular monitoring through laboratory assessments and improvement plans. Laboratories at the state, district, and sub-division levels are required to test water samples for at least 13 basic water quality parameters in accordance with BIS:10500 (2015) standards. In Chhattisgarh, there is one state laboratory, 29 district laboratories, 27 sub-division level laboratories, and 18 mobile

laboratories. **Chart 5.1** illustrates the availability of water quality testing laboratories across the state.

Chart 5.1: Chart depicting the number of water testing laboratories at various levels in the State



Audit scrutiny revealed that the expansion of water quality testing infrastructure was not planned adequately, with the establishment of only two district level and three sub-division level laboratories to fulfill the testing requirement under JJM. As of March 2024, there was no laboratory in four¹ out of 33 districts and 27 sub-divisional laboratories covered 146 blocks in the State indicating significant shortfall in infrastructure facility for testing.

The JJM guidelines emphasise not only the creation of laboratories but also the critical need for their upgradation and regular monitoring through assessments and improvement plans. This ensures that these laboratories are fully equipped to test water samples for at least 13 essential water quality parameters², in line with BIS:10500 (2015) standards. Among these, testing for Iron, Arsenic, and Nitrate is particularly critical, as these contaminants pose serious health risks, such as stomach and skin diseases, cancer, and blue-baby syndrome. Due to the severity of these risks, no permissible relaxation is allowed for these parameters, making it crucial that all laboratories are fully capable of detecting them to protect public health.

The status of testing for all 13 basic water quality parameters prescribed by BIS:10500 (2015), along with the capability of laboratories to test the three critical parameters: Iron, Arsenic and Nitrate at various levels of laboratories (state, district, block, and mobile) is summarised in **Table 5.2**.

¹ Khairagarh-Chhuikhadan-Gandai, Manendragarh-Chirmiri-Bharatpur(MCB), Mohla-Manpur-Ambagarh Chouki, Sakti and Sarangarh-Bilaigarh.

² PH, Total Dissolved Solids (TDS), Turbidity, Chloride, Total Alkalinity, Total Hardness, Sulphate, Iron, Arsenic, Fluoride, Nitrate, Total Coliforms, and Thermotolerant Coliform or E. coli

Table 5.2: Details showing the number of water quality testing laboratories in the State and availability of parameter testing facilities

Type of Laboratory	Total No. of Laboratories	Number of basic parameters that can be tested (out of 13)	Facility for testing three parameters: Iron, Arsenic, Nitrate
State Lab	1	13 parameters	All three parameters being tested
District Labs	29	Below 5 parameters: 1 lab	0 parameters: 5 labs
		6 to 10 parameters: 11 labs	1 parameter: 6 labs
		11 to 12 parameters: 14 labs	2 parameters: 15 labs
		13 parameters: 3 labs	3 parameters: 3 labs
Sub-division Labs.	27	Below 5 parameters: 5 labs	0 parameters: 24 labs
		6 to 10 parameters: 22 labs	1 parameter: 3 labs
		11 to 12 parameters: 0 lab	2 parameters: 0 lab
		13 parameters: 0 lab	3 parameters: 0 lab
Mobile Labs	18	Below 5 parameters: 15 labs	0 parameters: 0 lab
		6 to 10 parameters: 3 labs	1 parameter: 16 labs
		11 to 12 parameters: 0 lab	2 parameters: 2 labs
		13 parameters: 0 lab	3 parameters: 0 lab
Total	75	Below 5 parameters: 21 labs	0 parameters: 29 labs
		6 to 10 parameters: 36 labs	1 parameter: 25 labs
		11 to 12 parameters: 15 labs	2 parameters: 18 labs
		13 parameters: 3 lab	3 parameters: 3 labs

(Source: Information obtained from WQMIS portal and compiled by Audit)

During scrutiny of records, the following observations on water quality testing facilities in the state were noticed:

- **Inadequate Testing Capacity:** Out of 75 water testing laboratories in the State, 51 had the capability to test only three to 10 parameters, highlighting a significant gap in testing facilities. The State laboratory did not have the facility to test Arsenic till March 2024. The equipment to test Arsenic was procured and commissioned after March 2024. Among the 29 district laboratories, only three viz. Durg, Kabirdham, and Rajnandgaon were equipped to test all 13 basic water quality parameters. In Durg and Kabirdham districts, Arsenic testing was conducted using testing kits instead of testing with laboratory equipment

viz. atomic absorption spectrophotometer, raising concerns about reliability of results.

- Additionally, five district labs and 24 sub-division labs were not conducting tests for Arsenic, Iron and Nitrates.
- **Lack of Bacteriological Testing:** The district laboratory in GPM district lacked the facility to test for bacteriological parameters. This is particularly concerning, as it may expose the rural population to the risk of bacterial contamination in drinking water.
- **Non-functional Testing Instruments:** In test-checked district-Dhamtari it was noticed that the spectrophotometer used for detecting Iron, Nitrates, Fluorides, and Sulphate in water samples had been non-functional since December 2022, further compromising the ability to accurately assess water quality in the district.
- **Non-functional Mobile Labs:** The mobile labs in two test-checked districts Kondagaon and Surguja were found to be non-functional due to a shortage of staff and lack of testing materials, undermining the flexibility and responsiveness of water quality monitoring efforts. The mobile laboratory in Kondagaon was non-functional for seven years.

There were significant gaps in the infrastructure and operational capabilities of water quality testing laboratories in the state, posing serious risks to public health.

The Government stated (May 2025) that Arsenic testing facility is available at district laboratory Rajnandgaon and State level laboratory. In other districts Arsenic testing kits are being used to test for Arsenic. Facility for testing of 13 basic parameters is available in 28 district laboratories. Further, the district laboratory has the facility for testing bacteriological parameters.

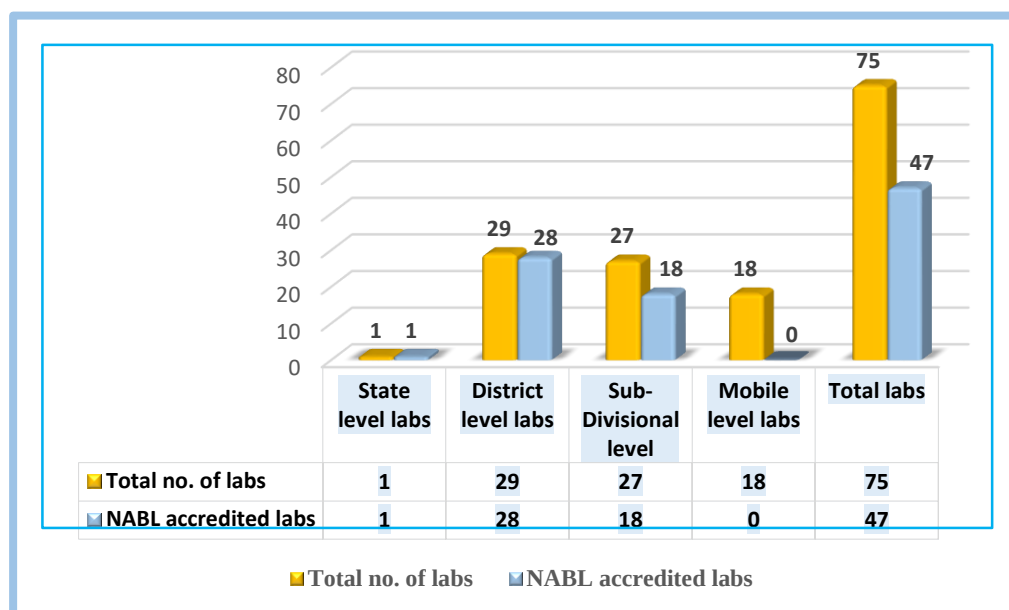
The JJM guidelines (2020) stipulates that facility for testing of 13 basic parameters including Arsenic should be available at State, district and block level laboratories. Also, the Arsenic testing facility was not available at the State level laboratory till October 2024 which is in contravention with JJM guidelines (2020). Only three district level laboratories out of 28 have the facility to test all 13 basic parameters as pointed in the paragraph, the same is also reflecting on WQMIS portal.

5.3 NABL accreditation of laboratories

According to the Uniform Drinking Water Quality Monitoring Protocol (February 2013) and Paragraph 10 (xii) of the JJM Guidelines, all water testing laboratories are required to pursue NABL accreditation as per IS/ISO/IEC:17025 for testing water quality, especially for basic water quality parameters.

Audit observed that out of 75 water quality testing laboratories in the State, only 47 laboratories had NABL accreditation as detailed in **Chart 5.2**. None of the mobile laboratories, which are crucial for testing in remote areas, in the entire State was accredited by NABL.

Chart 5.2: Details of NABL accredited laboratories in the State



Further, district water testing laboratories of all six test-checked districts were NABL accredited for only six (less than 50 per cent) basic water quality parameters out of 13 essential parameters as detailed in **Table 5.3**.

Table 5.3: Details showing number of water quality parameters being tested in the test-checked laboratories and their accreditation with NABL

Sl. No	District	District labs (6)		Sub-division labs (5)		Mobile labs (2)	
		No of basic parameters being tested	NABL accredited parameters	No of basic parameters being tested	NABL accredited parameters	No of basic parameters being tested	NABL accredited parameters
1	Dhamtari	12	6	6	Not accredited	NA	NA
2	GPM	6	6	NA	NA	NA	NA
3	Kondagaon	12	6	6	6	Not functional	0
4	Korba	12	6	6	6	NA	NA
5	Mahasamund	12	6	7	6	NA	NA
6	Surguja	10	6	3	Not accredited	Not functional	0

(Source: Information provided by the PHED and compiled by audit)

*NA: Lab not available

In the absence of NABL accreditation for water testing laboratories, the quality assurance of test results cannot be relied upon and can result in inaccurate testing of water samples.

On this being pointed out, the Government stated (May 2025) that no initiative was taken for accreditation of 18 mobile labs. Further, 11 out of 13 basic parameters were NABL accredited in Dhamtari, GPM, Mahasamund,

Kondagaon, Korba and Surguja district laboratories. Action is being taken for the accreditation of sub-division laboratories of Dhamtari and Surguja.

The NABL accreditation certificates of the six test-checked districts clearly indicate that only six out of 13 basic parameters were NABL accredited.

5.4 Shortfall in conducting quality testing of water sources

The JJM guidelines stipulate that the sub-divisional/block labs should test 100 *per cent* water sources under their jurisdiction once for chemical parameters and twice for bacteriological parameters (pre and post monsoon) in a year, covering all sources of a block for at least 13 basic water quality parameters. It further stipulates that the district lab should test 250 water sources per month i.e. 3,000 in a year for at least 13 basic water quality parameters. The district lab should also refer the positively tested samples to the State laboratory immediately. Moreover, five *per cent* of samples tested by the district laboratories are to be tested at State laboratories. The water source tested in six test-checked districts by the district and sub-divisional laboratories are detailed in **Table 5.4**.

Table 5.4: Details of water sources tested in the test-checked districts during 2019-24

District	Year	2021-22	2022-23	2023-24
Dhamtari	No. of water sources	1357	1446	1446
	No. of water sources tested	818	1436	1357
	Testing (in <i>per cent</i>)	60	99	94
GPM*	No. of water sources	599	599	621
	No. of water sources tested	138	150	308
	Testing (in <i>per cent</i>)	23	25	50
Kondagaon	No. of water sources	8460	8460	8460
	No. of water sources tested	704	3255	4441
	Testing (in <i>per cent</i>)	8	38	52
Korba	No. of water sources	1022	1573	2418
	No. of water sources tested	145	1177	2416
	Testing (in <i>per cent</i>)	14	75	100
Mahasamund	No. of water sources	4246	4714	4790
	No. of water sources tested	2200	2200	1851
	Testing (in <i>per cent</i>)	51.81	46.67	38.64

(Source: Information provided by the PHED and compiled by audit)

*District formed in year 2022

- **Water source testing targets were not achieved:** Audit noticed that the target of the roster to test the water sources in the districts was neither set by the PHED nor was it available on IMIS. None of the six test-checked districts achieved the target prescribed under the JJM

guidelines. Dhamtari district was at the top for testing the water sources with an average of 53 *per cent* during 2021-24.

- **Weak monitoring of water testing activities:** Korba district could not provide testing data for the year 2019-20, and Mahasamund was unable to give data for the initial two years i.e. 2019-21. Audit noticed that water source ID wise testing records were not being maintained in the laboratory, required for identification and treatment of the contaminated sources. Testing data of water sources were neither maintained on the basis of pre and post monsoon test results nor was any analysis of water sources available in the records on such decisive factors.
- **Non conducting of bacteriological testing of water sources during pre-monsoon and post-monsoon period:** The data related to the pre-monsoon and post-monsoon testing of piped water supply (PWS) sources during 2019-20 and 2020-21 was not available either with the test-checked districts or on the WQMIS portal. Details of testing during 2021-22 to 2023-24 are given in **Table 5.5**.

Table 5.5: Details of pre-monsoon and post-monsoon testing of drinking water sources in the test-checked districts

District	Year	No. of PWS source	Pre-monsoon		Post-monsoon	
			Tested	Shortfall (<i>per cent</i>)	Tested	Shortfall (<i>per cent</i>)
Dhamtari	2021-22	1,357	185	1,172 (86%)	678	679 (50%)
	2022-23	1,446	813	633 (44%)	477	969 (67%)
	2023-24	1,446	397	1,049 (73%)	608	838 (58%)
GPM	2021-22	554	0	554 (73%)	0	554 (100%)
	2022-23	554	0	554 (100%)	0	554 (100%)
	2023-24	601	0	601 (100%)	0	601 (100%)
Kondagaon	2021-22	848	0	848 (100%)	0	848 (100%)
	2022-23	848	0	848 (100%)	0	848 (100%)
	2023-24	874	265	609 (70%)	825	49 (6%)
Korba	2021-22	1,022	80	942 (92%)	22	1000 (98%)
	2022-23	1,573	528	1045 (66%)	220	1353 (86%)
	2023-24	2,418	2,100	318 (13%)	90	2328 (96%)
Mahasamund	2021-22	2,046	0	2046 (100%)	0	2046 (100%)
	2022-23	2,514	0	2514 (100%)	0	2514 (100%)
	2023-24	2,590	1	2589 (100%)	2	2588 (100%)

(Source: Information provided by the PHED and compiled by audit)

It can be observed from the above table that the shortfall in pre-monsoon testing ranged from 13 to 100 *per cent* and that during post-monsoon it was from 6 to 100 *per cent*.

- **Poor water quality checks in Schools and Anganwadi Centers:** In test-checked districts, it was noticed that the DWSM was not serious about water quality checks of Schools and Anganwadi Centers. Testing of water quality during the first three years of the JJM period i.e. 2019-20 to 2021-22 was negligible. Information on testing of the drinking water in the Schools and Anganwadi Centers in test-checked districts is summarised in **Table 5.6**.

Table 5.6: Details of water quality check in Schools and Anganwadi Centers in the test-checked districts during 2019-24

District	Year	Schools			Anganwadi centres		
		Total no.	Tested	Test percentage	Total no.	Tested	Test percentage
Dhamtari	2019-20	1,165	5	0.43	758	12	1.58
	2020-21	1,165	6	0.52	758	5	0.66
	2021-22	1,165	0	0.00	758	0	0.00
	2022-23	1,165	26	2.23	758	18	2.37
	2023-24	1,165	15	1.29	758	0	0.00
GPM	2019-20	NA	NA	NA	NA	NA	NA
	2020-21	NA	NA	NA	NA	NA	NA
	2021-22	197	4	2.03	160	7	4.38
	2022-23	197	10	5.08	160	7	4.38
	2023-24	197	128	64.97	160	106	66.25
Kondagaon	2019-20	884	27	3.05	320	14	4.38
	2020-21	884	39	4.41	320	25	7.81
	2021-22	884	159	17.99	320	62	19.38
	2022-23	884	116	13.12	320	53	16.56
	2023-24	883	883	100.00	322	322	100.00
Korba	2019-20	NA	NA	NA	NA	NA	NA
	2020-21	NA	NA	NA	NA	NA	NA
	2021-22	356	332	93.26	202	189	93.56
	2022-23	356	353	99.16	202	197	97.52
	2023-24	356	294	82.58	202	192	95.05
Mahasamund	2019-20	NA	NA	NA	NA	NA	NA
	2020-21	NA	NA	NA	NA	NA	NA
	2021-22	902	160	17.74	329	80	24.32
	2022-23	902	471	52.22	329	237	72.04
	2023-24	899	462	51.39	329	91	27.66

(Source: Information provided by the PHED and compiled by audit)

It can be observed from the table that the quality of water supplied in Schools and Anganwadi Centers of the district was not tested completely except in Kondagaon in the year 2023-24. The performance of district Dhamtari was very poor in testing of water quality of Schools and Anganwadi.

On this being pointed out, the Government replied (May 2025) that pre-monsoon and post-monsoon tests of source of PWSS were being conducted. Further, the water sources in Schools and *Anganwadi* Centres were being conducted through Field Test kits (FTK).

The reply furnished by the Government is not acceptable as there was huge shortfall in pre-monsoon and post-monsoon testing in the test-checked districts as found during audit. Moreover, as per JJM guidelines (2019) all block level laboratories are to test all drinking water sources in their jurisdiction which includes the drinking water sources in Schools and *Anganwadi* Centres also.

5.5 Tests conducted through Field Test Kits (FTK) and Bacteriological Detection Kits (BDK)

Chapter 10 of the JJM guidelines states that every VWSC is to identify and train five women (Surveillance group) in every village to undertake surveillance activities involving use of FTK for testing and conducting sanitary inspection.

Further, paragraph 4.3 (v) and 6.3.6 of JJM-WQMS Framework stipulates that surveillance groups must ensure to test 100 *per cent* drinking water sources, including private sources, and water supply at schools, *Anganwadi* centers under their jurisdiction using FTK/BDK along with sanitary inspection as well as two sample delivery points in each habitation which are at the tail-end at least once in a month. The monthly test results are to be uploaded on WQMIS portal. The Surveillance Groups were formed with the name '*Jal Bahini*' in Chhattisgarh State.

During audit, it was seen that the Surveillance Groups were not formed in three out of 24 test-checked villages³. Testing results were not maintained in any of the test-checked villages, nor were they available at the WQMIS portal of the JJM.

The annual requisite testing frequency at all levels i.e. water sources, schools, *Anganwadi* centers and households and the number of samples tested during 2023-24 in the entire state as per WQMS Framework are depicted in **Table 5.7**.



Photo 5.1: A surveillance group member using FTK for water quality

³ Pandripani (Mahasamund), Bundeli (Korba) and Chhindlibeda (Kondagaon)

Table 5.7: Details of FTK/BDK sampling target and number of tests conducted during 2023-24

Water testing levels	Sampling frequency as per JJM-WQMS guideline	Total number	Annual testing target	No. of samples tested
1	2	3	4 (2*3)	5
Water sources (PWSS + non-PWSS*)	Once for chemical parameters and twice for bacteriological parameters (pre-monsoon and post-monsoon)	60,211	1,80,633	-
Schools	Once every month	46,280	5,55,360	
Anganwadi	Once every month	45,731	5,48,772	
Sample Household (no. of habitation=75,207)	Two households in each habitation every month	75,207*2 = 1,50,414	18,04,968	
Total			30,89,733	7,10,584 (23%)

(Source: IMIS and WQMIS reports and compiled by audit)

(* Non-PWSS source includes handpump, borewell, tubewell etc.)

The audit noticed that:

- Only 23 per cent of samples (7,10,584) were tested by using FTK/BDK against the target of 30,89,733 samples.
- As per the WQMIS, 3,060 samples were found contaminated out of 7,10,584 samples tested through FTK/BDK, of which only four were retested at the district laboratories and the test results of those four were not uploaded on the WQMIS. Health of rural people is at risk as contaminated samples are not retested at district labs.
- Data analysis of water testing done in test-checked districts using FTK/BDK revealed that achievement was meagre with only two to 28 per cent of the target during 2021-22 to 2023-24 as detailed in **Table 5.8**.

Table 5.8: Details of FTK/BDK sampling target and number of tests conducted in test-checked districts

District	2021-22			2022-23			2023-24		
	Target	No. of tests conducted	Per cent	Target	No. of tests conducted	Per cent	Target	No. of tests conducted	Per cent
Dhamtari	1,05,507	23,526	22	1,05,774	4097	4	1,05,774	7,602	7
GPM	32,097	1467	5	32,121	1,469	5	32,187	4,279	13
Kondagaon	1,37,748	28,998	26	1,38,564	28,992	21	1,38,408	27,533	20
Korba	71,634	1,104	2	73,287	2,382	3	75,822	5,153	7
Mahasamund	88,086	23,001	26	89,490	25,358	28	89,658	22,036	25

(Source: Information provided by the PHED and compiled by audit)

It can be seen from the above table that against the target, actual tests conducted ranged between 7 to 25 *per cent* during 2023-24.

On this being pointed out, the Government intimated (May 2025) that information was being collected from the concerned districts.

5.6 Monitoring of the utilisation of FTK/ H₂S vials

As per Chapter 10 of the JJM guidelines, one of the activities under WQMS is to enable communities to undertake presumptive testing of water quality using FTK and set up a system to procure/ refill FTK/bacteriological vials and monitor their utilisation.

Audit observed that FTK and H₂S vial were procured during 2019-20 to 2022-23 by DWSM.

Further, MD, JJM issued instruction (May 2023) to all DWSM for not procuring FTK, FTK refill and H₂S vials for BDK due to purchase of low standard of quality of kit at higher rates. The SWSM issued (September 2023) for empanelment of manufacturers and suppliers of FTK/BDK for centralised procurement of kits.

However, no FTK and H₂S vials were procured and distributed to the surveillance groups in the villages from 2023-24 to till date of audit (September 2024) in all six test-checked districts which hampered the water testing in the villages. The above-mentioned districts had reported conducting tests using earlier procured FTK and H₂S vials during 2023-24 and 2024-25, which indicates ineffective testing.

Since the FTK and H₂S vials have only two years of best life, it must be procured and issued to all surveillance groups (SGs) in a timely manner and their proper utilisation must be ensured. It was seen that no system has been evolved by the DWSMs for monitoring the utilisation of FTK/H₂S vials by the surveillance groups.

On this being pointed out, the Government stated (May 2025) that the FTK and H₂S vials are being procured and provided for testing of water quality.

The reply is not consistent with the findings during audit.



Photo 5.2: FTK for water

5.7 Water quality 'Hot spots'

Paragraph 10.3 of the JJM guidelines states that the water sources where the concentration of chemical contaminants is found to be borderline i.e. a little lower than the permissible limit as prescribed in BIS:10500, should be termed as 'Hot spot'. The list of such 'Hot spots' is to be shared by the PHED with SWSM, DWSM and GPs. Regular monitoring of water quality of such water sources was also the responsibility of the PHED and water quality surveillance should be done by the GP to take corrective measures as required.

Audit noticed that 'Hot spots' were neither identified nor the criteria to define the 'Hot spots' were fixed by the SWSM or DWSM.

On this being pointed out, the Government stated (May 2025) that the samples with borderline results are being retested and rechecked at the State level laboratory.

The reply is not acceptable as no such records were found at the test-checked districts regarding referring of samples to State level laboratory.

5.8 Shortage of manpower in water quality testing laboratories

Paragraph 4.3 of the WQMS framework (October 2021) issued by GoI stipulates the states to plan for adequate human resources (HR) to operate the water quality testing laboratories, facilitate water quality surveillance activities. The availability of staff against the prescribed staffing pattern for laboratories at all levels as shown in **Table 5.9**.

Table 5.9: Details of manpower position in various water quality laboratories

Type of Laboratory	Prescribed staff		No. of laboratories	Required Staff	Person in position	Shortfall
	Position	Numbers				
State lab	Chief Chemist/ Chief Water Analyst	1	1	1*1=1	1	0
	Senior Chemist/ Senior Water Analyst/ Senior Microbiologist	1		1*1=1	0	1
	Chemist/ Water Analyst	2		2*1=2	1	1
	Microbiologist/ bacteriologist	1		1*1=1	0	1
	Laboratory Assistant	3		3*1=3	0	3
	Data Entry Operator	2		2*1=2	0	2
	Lab Attendant	2		2*1=2	0	2
	Field Assistant	2		2*1=2	0	2
Total		14		14	2	12
District labs	Chemist/ Water Analyst	1	29	1*29=29	17	12
	Microbiologist/ Bacteriologist	1		1*29=29	0	29
	Laboratory Assistant	2		2*29=58	11	47
	Data Entry Operator	1		1*29=29	0	29
	Lab Attendant	1		1*29=29	0	29
	Field Assistant	2		2*29=58	0	58
Total		8		232	28	204

Block level labs	Junior Chemist	1	27	1*27=27	0	27
	Junior Microbiologist	1		1*27=27	0	27
	Laboratory Assistant	1		1*27=27	0	27
	Data Entry Operator	1		1*27=27	0	27
	Lab Attendant	1		1*27=27	0	27
	Field Assistant	1		1*27=27	0	27
Total		6		162	0	162
Mobile labs	Junior Chemist/ Microbiologist	1	18	1*18=18	0	18
	Field Assistant	1		1*18=18	0	18
	Driver	1		1*18=18	0	18
Total		3		54	0	54
Grand Total			75	462	30	432 (94%)

(Source: Information provided by the PHED and compiled by audit)

As can be seen from the above table, there is a shortfall of 432 i.e. 94 per cent of staff in laboratories at all levels. Further, it was seen that there was no provision for sanction strength for sub-division and mobile labs in the State. Thus, the shortage of prescribed laboratory staff not only hampered the number of water quality tests to be conducted but also the quality of tests conducted at laboratories.

On this being pointed out, the Government stated (May 2025) that temporary staffs were engaged through collectorate rate after providing due training to the employees for conducting water testing in the laboratory.

The reply furnished by the Government is not acceptable because, in the six test-checked districts, the sanction strength was itself less than the prescribed norms suggested under JJM.