



INDIA INTERNATIONAL WATER WEEK (IIWW 2026)

22 – 26 September 2026 | Bharat Mandapam, New Delhi



Ministry of Jal Shakti
Government of India



INDIA INTERNATIONAL
WATER WEEK 2026
WATER FOR A SUSTAINABLE TOMORROW

Theme: TF3 – Institutional Reforms and Strengthening

Integrated Institutional Framework for Strengthening Surface and Groundwater Quality Monitoring in India

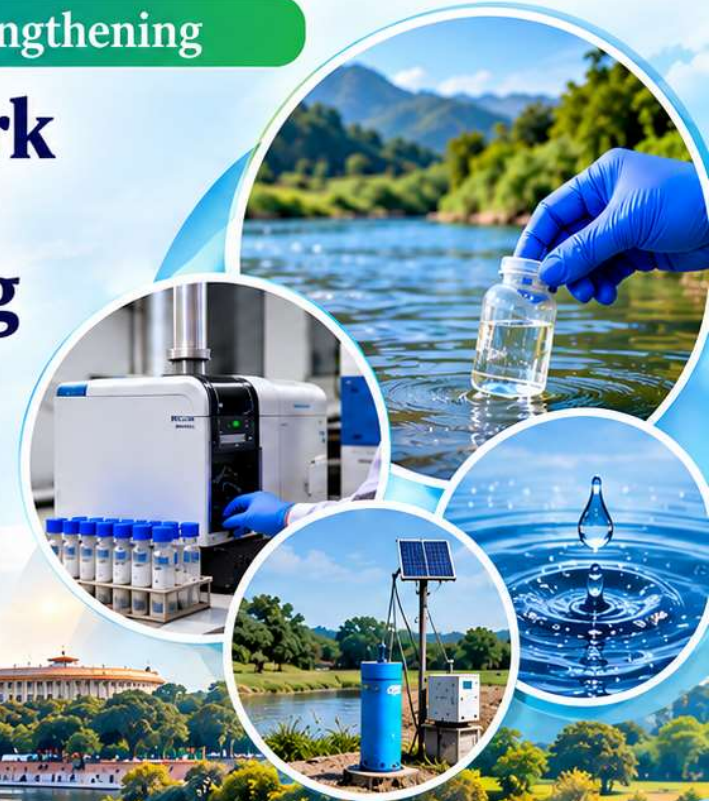
Jakir Hussain*

Middle Ganga Division,
Central Water Commission,
Ministry of Jal Shakti, Varanasi, India

Dr Sandeep Kumar Shukla

RDC-II Directorate,
Central Water Commission,
New Delhi, India

*Corresponding author: drjhsnar-cwc@nic.in; drjakirhussain@gmail.com



WATER QUALITY

“Water quality” is defined as **“those physical, chemical or biological characteristics of water by which the user evaluates the acceptability of water.”**”



KEY ASPECTS OF WATER QUALITY



PHYSICAL

Temperature, color, turbidity, odor, taste, total dissolved solids



CHEMICAL

pH, hardness, alkalinity, dissolved oxygen, heavy metals, nutrients, pesticides, etc.



BIOLOGICAL

Bacteria, viruses, protozoa, algae and other microorganisms



ACCEPTABILITY

Determines suitability of water for drinking, domestic, agricultural, industrial and ecological uses



Good water quality is essential for **human health, ecosystem sustainability** and **socio-economic development**.



Drinking Water



Agriculture



Industry



Domestic Use



Ecosystem Protection

ORGANIZATION INVOLVED IN WATER QUALITY MONITORING IN INDIA



- Central Pollution Control Boards (CPCB)



- State Pollution Control Boards (SPCBs)



- National Environmental Engineering Research Institute (NEERI), Nagpur



- Central Groundwater Board (CGWB)



- State Groundwater Departments



- Universities, Colleges and other Academic / Technical Institutes



- State Public Health Engineering Department



- State Irrigation Department



- National Institute of Hydrology (NIH), Roorkee



- Indian Council of Agriculture Research (ICAR)



- Central Inland Fisheries Research Institute (CIFRI)



- Central Water Commission (CWC)



These organizations collectively work towards monitoring, assessing and improving the quality of our water resources for a sustainable and healthy environment.



Water Quality Monitoring



Research & Development



Data Generation & Assessment



Capacity Building & Training



Sustainable Water Resource Management

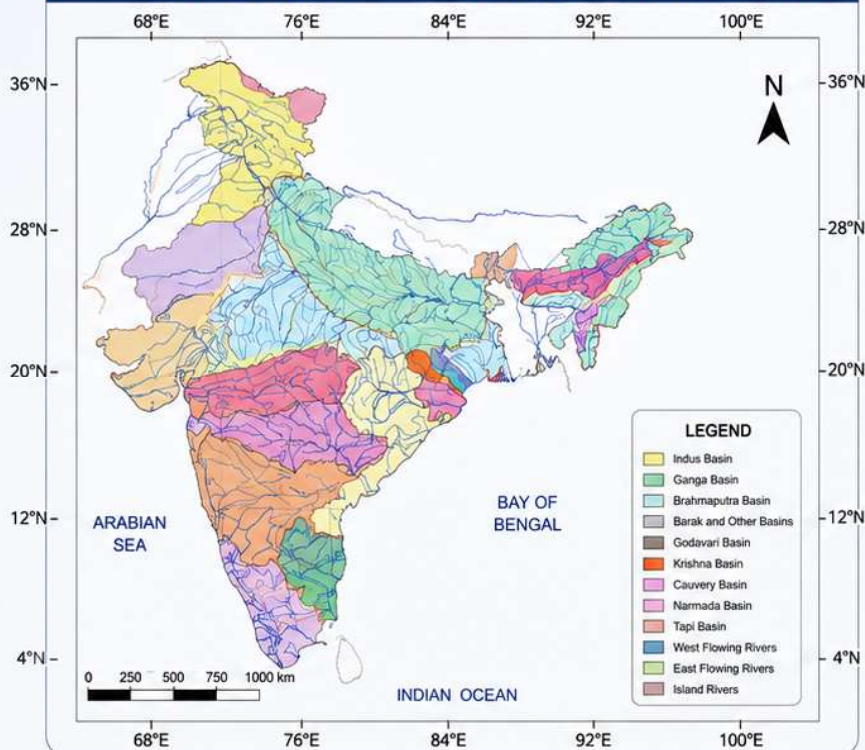


Together, we ensure **clean, safe and sustainable** water for a better tomorrow.

ORGANIZATION WISE DISTRIBUTION OF WATER QUALITY SITES OF CWC

01.01.2026

BASIN WISE DISTRIBUTION OF WATER QUALITY SITES IN CWC



S.no	Organisation	GDQ	GDSQ	GQ	WQSS	Grand Total
1	Barak and Other Basins Organisation, Shillong	7	22	8	–	37
2	Brahmaputra Basin Organisation, Guwahati	29	24	58	–	111
3	Cauvery and Southern Rivers Organisation, Coimbatore	37	53	–	–	90
4	Indus Basin Organisation, Chandigarh	2	10	–	–	12
5	Krishna & Godavari Basin Organisation, Hyderabad	19	35	6	–	60
6	Lower Ganga Basin Organisation, Patna	9	33	1	6	49
7	Monitoring Central Organisation, Nagpur	4	20	1	6	31
8	Mahanadi & Eastern Rivers Organisation, Bhubaneswar	7	43	12	28	90
9	Monitoring South Organisation, Bengaluru	9	18	–	–	27
10	Mahi & Tapi Basin Organisation, Gandhinagar	6	17	–	2	25
11	Narmada Basin Organisation, Bhopal	8	9	4	11	32
12	Teesta & Bhagirathi Damodar Basin Organisation, Kolkata	16	33	19	11	79
13	Upper Ganga Basin Organisation, Lucknow	6	32	1	33	72
14	Yamuna Basin Organisation, New Delhi	27	38	3	10	78
Grand Total		186	387	113	107	793



793
Total Water
Quality Sites



14
CWC
Organisations



186
GDO
Sites



387
GDSO
Sites



113
GQ
Sites



107
WQSS
Sites

Current Institutional Arrangement and Key Challenges

Central Water Commission (CWC)

Surface Water Quality Monitoring



793
monitoring stations



Sampling
three times annually



Covers all major
river basins



Key Challenges



Fragmented
water quality
management



Duplication of
infrastructure
and resources



Shortage of
scientific manpower
and limited career
progression



Absence of a
unified framework
for advanced
monitoring and
research



Integration of Scientific and Technical Capabilities



Optimal utilization
of human resources



Strengthened capacity
for comprehensive
water quality assessment



Improved water
quality management



Enhanced support for
sustainable development

Central Ground Water Board (CGWB)

Groundwater Quality Monitoring



> 15,200
monitoring locations



Detailed assessments at
4,982 trend stations



Covers aquifers
across the country



CWC – CGWB LOCATIONS

CGWB Lab Locations

S.no	Location
1	Nagpur
2	Lucknow
3	Kolkata
4	Guwahati
5	Chandigarh
6	Jaipur
7	Jammu
8	Hyderabad
9	Ahmedabad
10	Patna
11	Bangalore
12	Chennai
13	Thiruvananthapuram
14	Bhopal
15	Raipur
16	Bhubaneswar

CWC Lab Locations

S.no	Location
1	Nagpur
2	Lucknow
3	Guwahati
4	Jammu
5	Hyderabad
6	Patna
7	Bangalore
8	Chennai
9	Bhopal
10	Raipur
11	Bhubaneswar
12	Naharlagun
13	Coimbatore
14	Kochi
15	Pune
16	Gandhinagar
17	Surat
18	Jalpaiguri
19	Berhampore
20	Haridwar
21	Agra
22	New Delhi
23	Varanasi
24	Kota
25	Silchar

Exclusive CWC Locations

S.no	Location
1	Naharlagun
2	Coimbatore
3	Kochi
4	Pune
5	Surat
6	Jalpaiguri
7	Berhampur
8	Haridwar
9	Agra
10	New Delhi
11	Varanasi
12	Kota
13	Silchar

Exclusive CGWB Locations

S.no	Location
1	Kolkata
2	Chandigarh
3	Jaipur
4	Thiruvananthapuram

Common Locations

S.no	Location
1	Nagpur
2	Lucknow
3	Guwahati
4	Jammu
5	Hyderabad
6	Patna
7	Bangalore
8	Chennai
9	Bhopal
10	Raipur
11	Bhubaneswar
12	Ahmedabad/Gandhinagar

- ▲ CWC Laboratory (25)
- CGWB Laboratory (16)
- Common Location (12)



CWC
Laboratory Locations
25



CGWB
Laboratory Locations
16



Common
Locations
12



Total
Unique Locations
41

Scientific Man-Power Comparison – CGWB & CWC

Strengthening Human Resources for Integrated Water Quality Management



Scientific Man-Power – CGWB

Post	Sanctioned Post	Filled Post	Vacant Post
Scientist B, C, D (Chemical)	32	28	4
Assistant Chemist	23	17	6
STA (Chemical)	24	17	7
Total	79	62	17



Scientific Man-Power – CWC

Post	Sanctioned Post	Filled Post	Vacant Post
Research Officer	8	6	2
Assistant Research Officer	28	26	2
Senior Research Assistant	70	44	26
Total	106	76	30



**Key
Takeaways**



CGWB
Total Posts

79



CGWB
Filled Posts

62



CWC
Total Posts

106



CWC
Filled Posts

76



People | Science | Water Security
for a Sustainable India

Proposed Institutional Reform

Towards an Integrated Framework for Surface and Groundwater Quality Monitoring in India

Current Arrangement

CWC

Surface Water Quality Monitoring



793 monitoring stations

Sampling three times annually

Laboratories (with comparable expertise and facilities)



Fragmented management



Duplication of infrastructure and resources



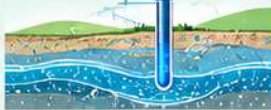
Shortage of scientific manpower and limited career progression



Lack of unified framework for advanced monitoring and research

CGWB

Groundwater Quality Monitoring



> 15,200 monitoring locations

4,982 trend stations

Laboratories (with comparable expertise and facilities)

From Fragmentation to Integration

Proposed Institutional Framework



Water Quality Wing / Department

Department of Water Resources,
River Development and Ganga Rejuvenation
(DoWR, RD & GR)
Ministry of Jal Shakti



Monitoring & Assessment



Research & Development



Laboratory Infrastructure



Capacity Building

Integrated Management of
Surface and Groundwater Quality

Key Functions



Rationalization and strengthening of laboratory infrastructure



Sharing of scientific expertise



Addressing shortages of specialized manpower



Unified framework for monitoring, assessment and research

Advanced Monitoring and Analytical Capabilities



Automatic and real-time monitoring systems



ICP-MS/MS
(for trace and toxic metals and emerging contaminants)



GC-MS/MS
(for organic contaminants, pharmaceuticals, pesticides, PFAS, etc.)

Expanded Scope of Contaminants



Pharmaceuticals



Pesticides



PFAS



Microplastics



Other contaminants of emerging concern



Optimal utilization of human resources



Strengthened capacity for comprehensive water quality assessment



Improved water quality and ecosystem health



Sustainable water resources for future generations

Clean Water
Stronger India

Envisioned Water Quality Wing

A National Centre of Excellence for Water Quality Science and Innovation

Integrated Science
for a Cleaner, Safer
and More Resilient India

Integrated Water Quality Database

- Surface and groundwater quality
- National-level data integration
- Open and accessible for planning and research



Basin and Aquifer Management

- Support basin-scale and aquifer-based strategies
- Scientific inputs for sustainable water resources management



High-End Analytical Laboratory Network

- Advanced instruments (ICP-MS/MS, GC-MS/MS, etc.)
- Support to States and agencies
- Testing of emerging contaminants (pharmaceuticals, pesticides, PFAS, microplastics, etc.)



Support to Key National Goals

- River rejuvenation
- Drinking water safety
- Groundwater protection
- Pollution control
- Climate resilience



Harmonization and Standardization

- Harmonized standards and methods
- Consistent monitoring and assessment protocols
- Inter-agency and inter-state comparability



Predictive Tools and Forecasting

- Development of predictive models
- Water quality forecasting systems
- Early warning and risk assessment



Evidence-based Policy Support

- Scientific inputs for policy formulation
- Guidance for regulatory and management decisions
- Capacity building and technical support

Water Quality Wing

Knowledge | Innovation | Collaboration
for Water Security

Outcomes



Improved
Water Quality



Public Health
Protection



Healthy
Ecosystems



Efficient Use
of Resources



Strengthened
Governance



Climate
Resilience



Support to
States and Stakeholders



Healthy Waters
Secure Tomorrow



Collaborative Institutions



Advanced Science



Sustainable Management



Cleaner Water
Healthier People
Stronger India

Towards Integrated Water Resources Management

A Transformative Institutional Reform through a Dedicated Water Quality Department

Healthy Water
Prosperous People
Viksit Bharat 2047



*Clean Water Today
A Better Tomorrow*



Water Security



Healthy Ecosystems



Thriving Communities



Sustainable Development



**Viksit Bharat
2047**

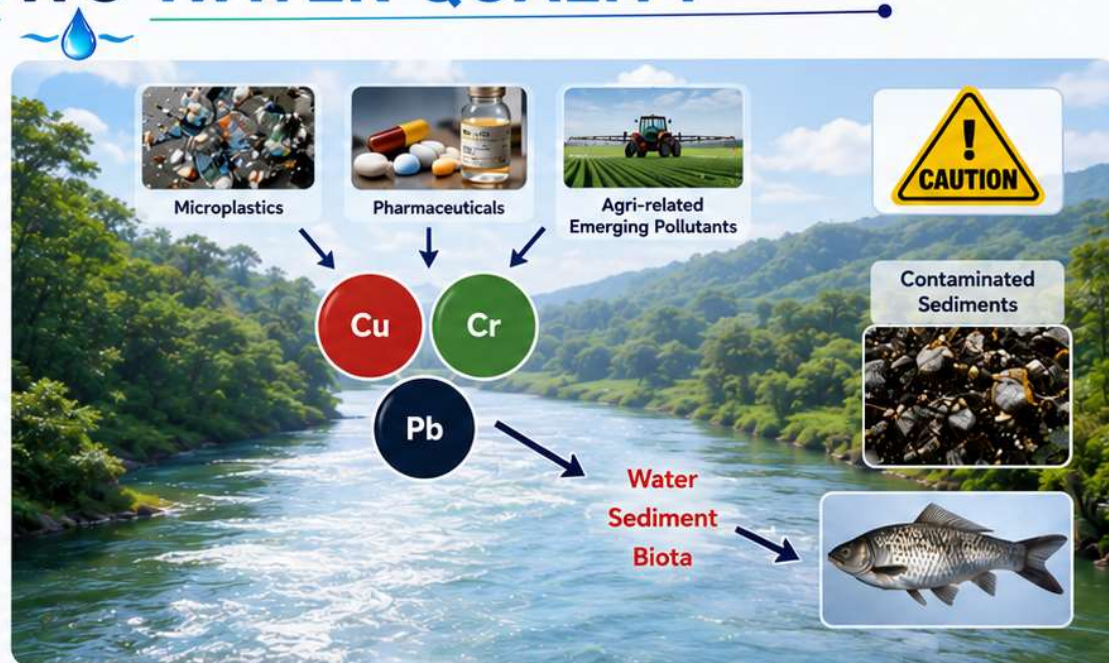
FUTURE RESEARCH AND EXPANSION RELATED TO CWC WATER QUALITY

RESEARCH PRIORITIES

- Monitoring of Microplastics, Pharmaceuticals, and Emerging Organic Pollutants
- Metal Speciation and Toxicity Assessment
- Trace Metals and Contaminants in River Sediments
- Development of a National River Water Quality Index (RWQI)
- Real-Time Water Quality Monitoring and Public Information Display Systems
- Application of Non-Target Screening (NTS) and Contaminant Fingerprinting
- Assessment of Climate Change Impacts on River Water Quality

PROGRAMME EXPANSION

- Expansion of Monitoring Network (Stations, Parameters, and Frequency)
- Inclusion of Emerging Pollutants, Trace Metals, and Organic Contaminants
- Modernization of Water Quality Laboratories with Advanced Instrumentation
- Provision of Analytical Services to Government and External Agencies
- Capacity Building and Training for State Water Resources Departments
- Strengthening Data Analytics, AI, and Decision Support Systems
- Development of Integrated Water Quality and Sediment Monitoring Programmes



Real-Time
Monitoring



Data Analytics
& AI



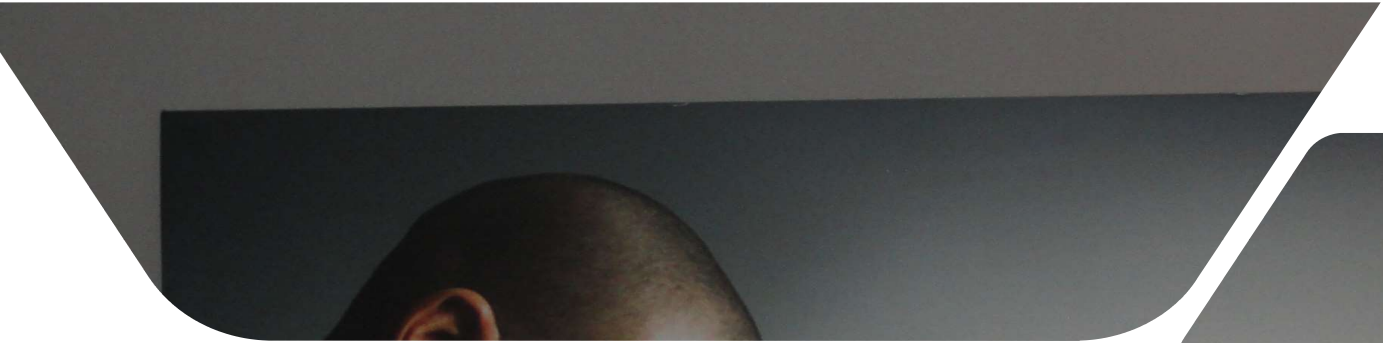
Advanced
Laboratories



Capacity Building
& Training



Public Information
Display Systems



SAVE WATER
YOU SAVE YOURSELF

