Central Ground Water Board
Department of WR, RD & GR
Ministry of Jal Shakti
Government of India

Bhujal Samvad

JAN TO JUNE, 2025, VOL.28-29

Cover Story

JAL SANCHAY
JAN BHAGIDARI

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MESSAGE

Groundwater is often called nature's hidden treasure as it silently supports farming, industries, and our daily needs, and is the lifeline for millions of people across the country. Yet, despite its importance, it often remains overlooked until scarcity reminds us of its value. With growing demand, uncontrolled use, and the effects of climate change, the pressure on this resource is increasing rapidly. This makes careful and sustainable management of groundwater more important than ever.

The Cover Story of this edition of Bhujal Samvad (Volume 27–28) showcases the dedicated efforts of officers in the 'Jal Sanchay Jan Bhagidari' initiative, which encourages rainwater harvesting, borewell recharge, and other artificial recharge measures through the collective participation of society and government."

The In Focus section highlights key activities of the Board, including the 13th Meeting of the National Level Expert Committee (NLEC) on groundwater resource management held at our headquarters in Faridabad, and the inauguration of the Regional Chemical Laboratory at CGWB's Western Central Region, Ahmedabad.

In the Report section, readers will find a study on groundwater resource development in Nawada District, Bihar, with recommendations for conjunctive use of both surface and groundwater. The Pathshala segment continues to share useful knowledge on hydrogeology, and in this edition, it explains "RO + UV + UF: The Ultimate Trio for Safe Drinking Water."

The Shodh section highlights research papers by CGWB officers published in reputed journals, showing our commitment to scientific study and innovation in groundwater management.

I encourage readers to explore the content of this volume and share their ideas, experiences, or research with Bhujal Samvad. For any contributions or queries, you may contact us at mediacell-cgwb@nic.in.This publication aims to raise awareness and promote sustainable groundwater management practices in India.

भूजल संवाद

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CONTENTS

IN FOCUS

The Regional Directors' Meeting of CGWB was successfully held at CGWB, South Western Region, Bengaluru office. The meeting was chaired by Dr. Sunil Kumar Ambast, Chairman, CGWB.

Central Ground Water Board (CGWB), Faridabad, celebrated the 76th Republic Day with enthusiasm. Chairman, CGWB hoisted the national flag, followed by activities and prize distribution for children of officials who participated in various events.

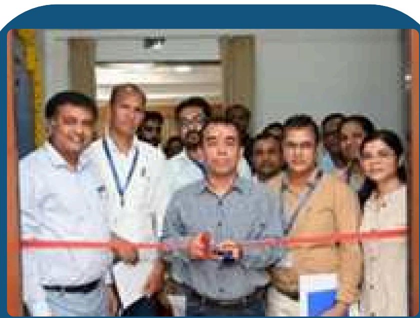
Dr. S. K. Ambast, Chairman, and Shri T. B. N. Singh, Member, CGWB, addressed the Environment Conclave 2025 organized by the Southern Gujarat Chamber of Commerce & Industry in collaboration with the Gujarat Pollution Control Board.

Shri Subodh Yadav, Additional Secretary, DoWR, RD & GR, visited the PMKSY-HKKP-GW scheme installations in Dukli Block, Tripura, and interacted with the direct beneficiaries.

Smt. Anitha Shyam, Member (South), CGWB, inspected EW/OW and piezometer sites in Lucknow, Barabanki, and Faizabad. The OIC, RPMU, briefed her on aquifer details, assembly zones, discharge, development methods, and pumping tests.

CGWB, Kerala Region, under the aegis of National Hydrology Project (NHP) has organized two-days workshop on “High Frequency Hydraulic Head Data Validation, Analytics, and Decision-Making Techniques” for Aquifer Management.

माननीय संसदीय राजभाषा समिति द्वारा शिमला में भारत सरकार के विभिन्न कार्यालयों के साथ केंद्रीय भूमिजल बोर्ड, क्षेत्रीय कार्यालय धर्मशाला का राजभाषायी निरीक्षण संपन्न हुआ। माननीय समिति ने कार्यालय में राजभाषा की प्रगति की समीक्षा की और इस दिशा में किए जा रहे प्रयासों पर संतोष प्रकट किया।



Shri Subodh Yadav, IAS, Additional Secretary, MoJS, visited CGWB, WCR, Ahmedabad, where he inaugurated the Regional Chemical Laboratory, the Exhibition-cum-Training Hall, and the Regional Office Data Centre (RODC).

Dr. S. K. Ambast chaired a technical session on "Water Neutrality & Positivity: A Deep Dive towards Net Zero Future' in Water Sustainability Conference 2025 organised by BWUE, National Water Mission.

Dr. S K Ambast, Chairman, CGWB chaired the 13th Meeting of National Level Expert Committee (NLEC) which was held at Central Headquarters, Faridabad.

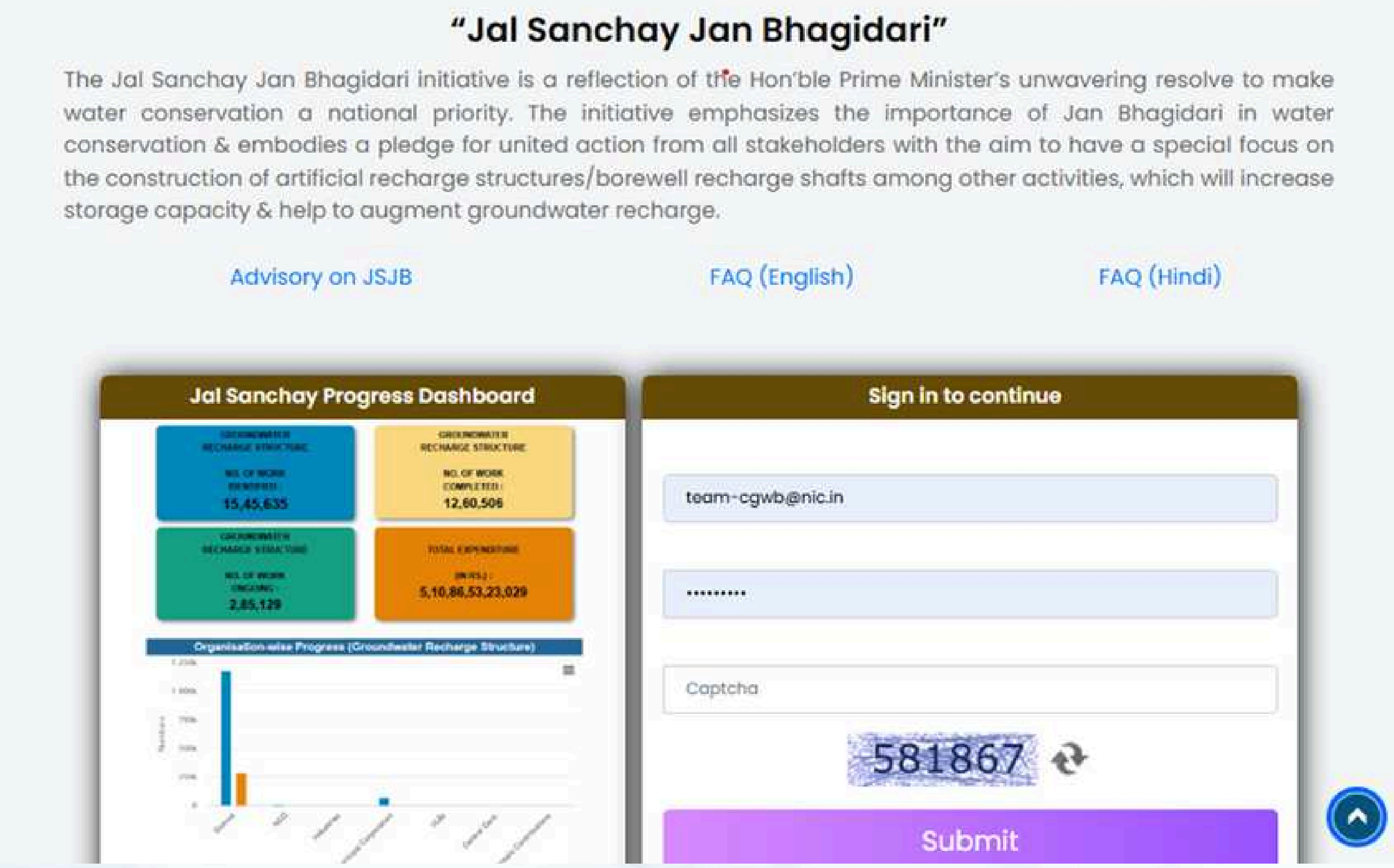
Cover Story

JAL SANCHAY JAN BHAGIDARI

Anoop Tiwari, Sc-B

Introduction

Inspired by the Hon’ble Prime Minister’s call for Jal Sanchay during his Mann ki Baat address, the Jal Shakti Abhiyan (JSA) was launched in 2019. It began by targeting 1,592 blocks in 256 of the country’s most water-stressed districts. Since then, the campaign has grown into an annual nationwide effort to conserve water. The sixth edition of Jal Shakti Abhiyan Catch the Rain was launched on 22 March 2025 with the theme Jal Sanchay Jan Bhagidari Jan Jagrukta Ki Or. The focus of this campaign is to spread awareness among people and encourage their active participation in saving water.



Gujarat has emerged as a model state of what's possible when communities, industries, and government bodies come together. By effectively using Corporate Social Responsibility (CSR) funds and engaging local communities, the state has constructed nearly 10,000 borewell recharge structures in a single year across key districts like Surat, Navsari, Valsad, Tapi, and Dang. This success showcases the strength of a collaborative, public-private approach to solving water challenges.

Building on this momentum and Gujarat's proven model, the "Jal Sanchay Jan Bhagidari"(JSJB) initiative was officially launched on 6th September 2024 in Surat. This initiative promotes a collective, grassroots movement to boost groundwater recharge through activities like rainwater harvesting, aquifer and borewell recharge, and the creation of recharge shafts. It brings together help from government departments, private companies, local organizations, CSR supporters, and people who care about saving water. Everyone is working together with one goal in mind – to make sure India has enough water in the future.

Goals and Objectives of the JSJB initiative

The JSJB initiative aims to construct a million recharge structures, including check dams, percolation tanks, and recharge wells, to enhance groundwater replenishment. The initiative will ensure:

1. **Boost in Groundwater Levels:** Capture and store rainwater and surface runoff to stabilize and increase groundwater levels, thereby preventing waste and promoting efficient water usage.
2. **Promotion of Water Conservation:** Foster a culture of water conservation by engaging communities in local water resource management and emphasizing the significance of rainwater harvesting.
3. **Enhancement of Climate Resilience:** Mitigate the impacts of climate change by developing storage solutions for heavy rainfall and providing a buffer against droughts, thereby increasing community resilience to climate variability.
4. **Improvement of Water Quality:** Utilize artificial recharge methods to naturally filter water as it percolates through soil layers, reducing salinity and contamination, and thereby enhancing water quality for both drinking and agricultural purposes.

The key objective of the JSJB initiative is to ensure that every drop of water is conserved through collective efforts, following a whole-of-society and whole-of-government approach. By promoting community ownership and responsibility, the initiative seeks to develop cost-effective, local solutions tailored to specific water challenges across different regions. The central goal is the construction of at least 1 million recharge shafts, with around 25,000 already being made, to enhance groundwater levels and support sustainable water management practices throughout the country.

Innovative Approaches to Groundwater Recharge under JSJB

Rainwater harvesting for groundwater recharge is a method used to collect and store rainwater in underground aquifers. This helps refill aquifers that have been overused due to heavy groundwater extraction. The stored rainwater is then used to meet local water needs for various purposes. To make this possible, different types of artificial recharge structures are used. These include rainwater harvesting systems in both public and private buildings, injection borewells, recharge pits, and the revival of open wells and recharge wells in lakes and heritage sites. Other techniques include catchment area treatment, building recharge shafts, stabilizing ponds, and restoring stepwells. In many areas, stormwater is also directed into water bodies, and non-working hand pumps, power pumps, borewells, and open wells are repaired to support groundwater recharge.

The initiative also promotes the use of abandoned borewells and old mines by turning them into recharge structures. This approach offers a low-cost and effective way to improve groundwater levels. It is recommended to focus on building small, community-based recharge structures that suit local needs.

Data from the JSJB dashboard shows that small recharge shafts can cost between 15,000 and 25,000 rupees, while standard rainwater harvesting structures usually range from 1 lakh to 1.5 lakh rupees. With more than 2.5 million structures already built under the initiative, these low-cost solutions are expected to significantly improve groundwater levels and contribute to long-term water security across the country.

Implementation Framework

- Each district has been given the responsibility to ensure that every village has at least five recharge structures to capture and store rainwater. Similarly, all Municipal Corporations have been asked to set a target of building a minimum of ten thousand recharge structures within their areas. Both tasks are to be carried out in a mission mode.
- Each central ministry and department is encouraged to use existing schemes and resources to support large-scale construction of recharge structures. They are advised to set self-targets based on available land, ensure maintenance of existing structures, and upload details on the JSJB portal. All offices and premises are to be equipped with rainwater harvesting systems in a mission mode.

- Public and private bodies such as Schools, Universities, Hostels, Anganwadis, FPOs, etc. are encouraged not only to prioritize the construction of recharge structures to maximize water conservation efforts within their premises but also to renovate existing recharge structures and repair of defunct structures.
- Urban and Rural local bodies are urged to take responsibility for the maintenance and monitoring of these recharge structures, ensuring their long-term effectiveness in conserving groundwater.
- Collaboration with industries, PSUs, and non-profit organizations has been encouraged to secure funding for these initiatives, with a focus on convergence of government, CSR, and private sector resources.
- Panchayats, Water Users Associations, Self-Help Groups, Resident Welfare Associations, and private citizens are being actively engaged in the construction of recharge structures, while government, CSR, and private sector funds are being leveraged to maximize the reach and impact of these water conservation efforts

Monitoring mechanism

- A comprehensive monitoring and evaluation framework has been put in place to assess the effectiveness of recharge structures. The JSJB Dashboard, a digital platform, enables stakeholders to upload details of each constructed recharge structure, including photographs, geo-tagging, and other relevant information. The information of all identified, ongoing and completed structures has to be uploaded on the JSJB dashboard as below: https://jsactr.mowr.gov.in/jsjb.aspx
- Login credentials for data uploads have been shared with all District Magistrates (DMs), Deputy Commissioners (DCs), and 254 Urban Local Bodies (ULBs)/Municipalities across States and Union Territories. Additionally, partner Ministries and Departments have been requested to nominate nodal officers for data entry on the portal.
- A user ID and password to the nodal officer has been assigned, who can then add as many users as needed. There is also an "Add User" tab for adding the new user as per requirement. Request for user Id and password can be e-mailed on jsactr-nwm@gov.in. Additionally, we are developing an Excel format that can be submitted to upload user details in bulk.
- To enhance monitoring efforts, Nodal Officers from the Central Ground Water Board (CGWB) and the Central Water Commission (CWC), in coordination with District Nodal Officers, are responsible for overseeing implementation, ensuring timely data updates and verification. They have also been entrusted with conducting test checks of 1% of the recharge structures to ensure data authenticity, as well as facilitating capacity building and training for the respective Districts, Urban Local Bodies, and Nodal Officers.
- The remaining structures are to be verified through desk-based verification, which entails validating JSJB-related data without a physical site visit. This

process involves reviewing the submitted information and examining entries on the JSJB portal. In case any discrepancies are identified, the concerned District Nodal Officers are notified for necessary corrections.

Conclusion

The "Jal Sanchay Jan Bhagidari" initiative stands as a transformative effort toward achieving long-term water security and sustainability in India. Building on the successes of the Jal Shakti Abhiyan and drawing inspiration from Gujarat's effective model of community and CSR participation, the initiative set out with the ambitious goal of constructing one million cost-effective recharge structures to enhance groundwater levels nationwide. This target was not only met but significantly surpassed, with over 2.5 million structures successfully constructed across the country under JSJB 1.0.

By adopting a "whole-of-society, whole-of-government" approach, the programme brings together all levels of government, the private sector, industries, and local communities, fostering collective ownership of water conservation efforts. In addition to improving water availability, the initiative contributes to climate resilience and water quality through natural recharge mechanisms.

The implementation is further strengthened by a robust monitoring and accountability framework, supported by a dedicated digital platform to ensure transparency and real-time tracking of progress. This comprehensive and inclusive approach underlines a shared national commitment to achieving a water-secure future for all.

REPORT

GROUNDWATER RESOURCE DEVELOPMENT IN NAWADA DISTRICT, BIHAR, INDIA: AN OVERVIEW

Dr. Aneesh Kumar V, Dr. Indranil Roy, Dr. Suresh Kumar

INTRODUCTION

Nawada district with geographical area coverage of 2487 sq.km comes in survey of India Degree Sheet No. 72 H and 72 G. The district extends between North latitude 24°31′ and 25°08′ and East longitudes 85°00′ and 86°03′ respectively. During 2019-2020 AAP, under National Aquifer Mapping programme, all the 14 blocks of Nawada district have been taken up for detailed hydrogeological survey and preparation of Aquifer maps and Management plan. Under this programme, hydrogeological study, geophysical investigations and groundwater quality studies have been undertaken and the data generated have been used in conjunction with the existing data available for the area in preparation of the aquifer maps and formulation of aquifer management plan.

Major objectives of the programme are -

- Delineation and characterization of aquifers in three dimensions
- Identification and quantification of issues
- Development of management plans to ensure sustainability of ground water resources.

Approach and Methodology

The study involved collection and compilation of aquifer system data, delineation of aquifer extents, characterization, and preparation of 1:50,000-scale aquifer maps with block-wise groundwater management plans. Artificial recharge measures were proposed based on feasibility and the existing Master Plan. Groundwater flow was conceptualized for sustainable development, using TEM geophysical data correlated with lithologs, and groundwater quality analysis to identify fluoride-affected areas. Thematic maps (land use/land cover, geomorphology, geology, hydrogeology) were prepared using GIS tools, along with hydrogeological sections, panel diagrams, geophysical sections, and hydrochemical diagrams. Data from CGWB's 2020 groundwater resources report, NHS well monitoring, and water quality sampling (May 2019) formed the basis for the final block-wise management plan.

Hydrogeology

Geologically, Nawada district is characterised by the presence of Precambrian crystalline rocks in southern parts such as Rajauli, Sirdala, Govindpur and Kawakol blocks. While northern part of the district is characterised by vast alluvial planes (Older alluvium) of Quaternary age (Bhaduri and Bose, 1986). The alluvium sedimentation is considered to be the result of transport and deposition of riverine sediments by river Sakri, Nata, Tilyia, Ghaghra, Kurhi etc. This sedimentation resulted in formation of thick alluvial aquifers in northern side of the district.

The district's southern boundary is marked by ridges and spurs, with hills reaching up to 686 m amsl. The south and southeast feature massive granite outcrops, while the west has small hills of the Mungir–Rajgir rock group (NE–SW trend), extending from the Rajgir hills.

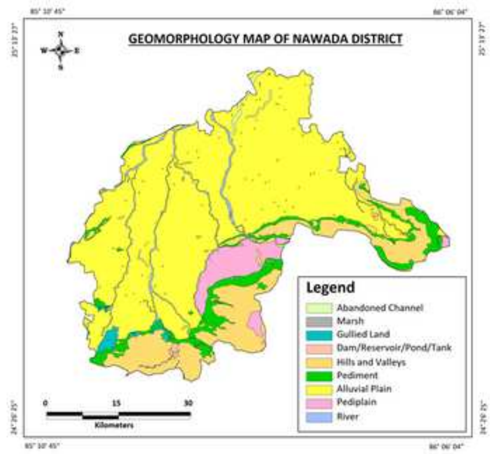


Fig: Simplified geomorphology map of Nawada District (Source: Geological Survey of India-Published maps)

Southern and southeastern areas also host waterfalls and cascades, reflecting high-energy river systems and abrupt landform changes.

Depth to Water Level and Water Table

Ground water monitoring had been carried out at 47 locations in the district during the course of study. The depth to water level contour map representing the shallow aquifer has been prepared for pre and post monsoon seasons. Depth to water level contour map of the area shows that majority of the area has water level between 5 to 10 m bgl during pre monsoon and 2 to 5 m bgl in post monsoon. In the western part of the district, water level is deep owing to the extension of Rajgir hills in that area. Similarly, towads the southern and eastern part, water level is deep both during pre and post monsoon seasons.

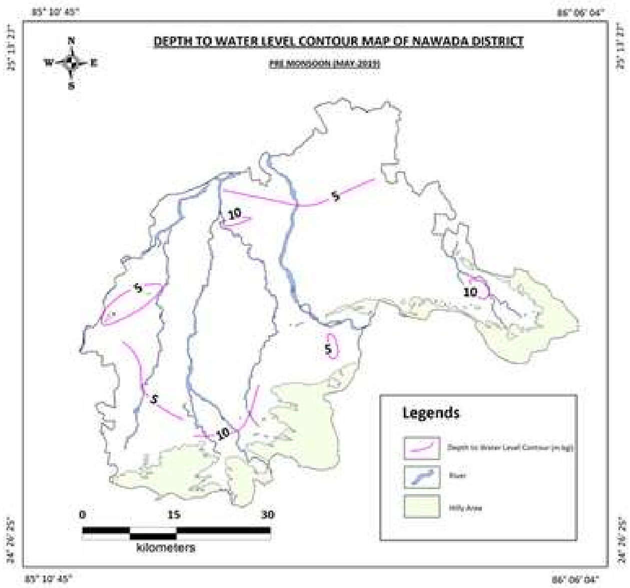


Fig.: Pre-Monsoon (May 2019)depth to water level contour map of Nawada district

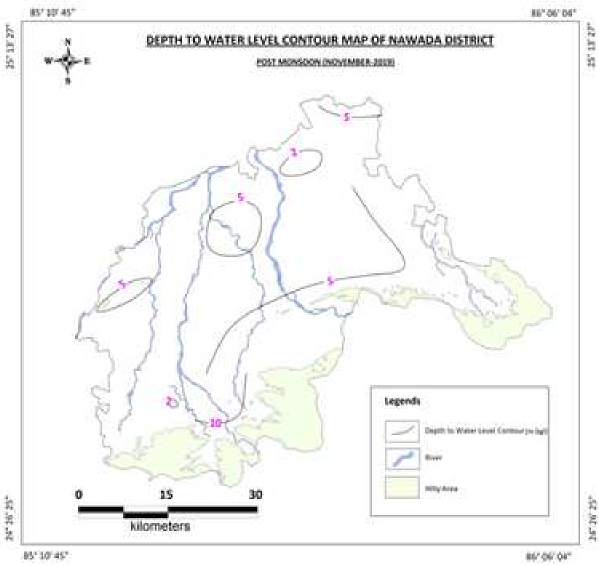


Fig: Post-monsoon (November 2019) Depth to water level contour Map of Nawada district

Aquifer disposition in the area

Aquifer disposition in the district was studied using lithologs from CGWB exploratory drilling and TEM survey data. Principal aquifers, formed mainly by fine to coarse sand zones, are laterally continuous within the alluvial sediments, whose thickness increases from south to north. Older alluvium covers 74.56% of the district, while younger alluvium occurs along rivers and palaeochannels.

High-yield tube wells are found in thick alluvium areas (e.g., Warsaliganj, Pakribarwan, Kashichak), while marginal alluvium blocks (e.g., Rajauli, Govindpur, Kawakol) have lower yields. The basin slopes northeast, with basement depth ranging from 150 m to near surface. Two main aquifer zones, separated by aquitard layers, range from 10–40 m and 10–60 m thick, respectively, with aquitards 5–20 m and 2–40 m thick. Thickness of both aquifers and aquitards increases from south to north, and the zones are hydraulically connected.

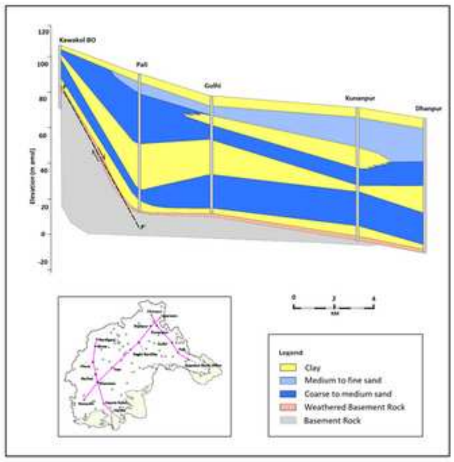


Fig.: Hydrogeological section along A-A’ from Kawakol BO to Dhanpur area.

Disposition of aquifer down to 134 mbgl in the study area have been deciphered through the study of different lithological sections, fence diagrams and geophysical signatures. Hydrogeological section prepared based on borehole data are given in Fig 7 (Kawakol-Dhanpur section).

Pumping Test

Aquifer Performance Test (APT) was conducted in exploratory wells in order to determine the aquifer parameters. The time-drawdown data has been plotted by using Cooper-Jacob's Straight Line method and using Theis's Recovery Method and transmissivity values are approximated. From the data it can be observed that EW's in Nawada ITI and Kadirganj is having relatively high specific capacity owing to nominal drawdown. The deep aquifer from which pumping has been done seems to be sustainable. It is also obvious that these two EW's show higher transmissivity values.

Dynamic Ground Water Resources

Dynamic ground water resources of 14 blocks of Nawada district has been assessed, as on March 2021. Overall stage of groundwater development (SOD) in the district is 56.40 %. Out of the 14 blocks, 11 blocks comes under safe category, 01 block in critical and rest 02 blocks comes under semi-critical category on the basis of the status of ground water utilisation. It can be observed that, there is a significant variation in spatial distribution of SOD exists. The SOD in the district varies between 19.84 % (Kawakol Block) and 91.36% (Meskaur Block).

Fluoride Contamination

Fluoride in groundwater has been reported from southern blocks of the district (e.g. Singh et al, 2012; Ruhela et al, 2021; Kumar and Maurya, 2023). In the present study, fluoride contamination of ground water above the permissible limit of 1.5 mg/liter has been detected in the alluvial aquifers of Rajauli, Kawakol, Meskaur and Sirdala blocks. Both the shallow dug well zones and the deeper fractured aquifers are affected with fluoride contamination in ground water.

Conclusion

Pre-monsoon water levels range from 5–10 m bgl, and post-monsoon from 2–5 m bgl. The block, underlain by older alluvium, has two aquifer systems: the first at 10–20 m bgl (10–20 m thick) and the second at 30–40 m bgl (20–50 m thick), underlain by weathered basement rock. In Kewali and Bajithpur, the separating aquitard is absent, and in Pakribarwan and Bajithpur a major clay layer pinches out into the second aquifer. The district's drinking/domestic groundwater demand is 60.90 mcm, projected to rise to 67.79 mcm by 2026. Tube well discharge is estimated at 30–50 m^3/hr in alluvium and 20–30 m^3/hr in hard rock areas, with groundwater development proposed mainly from the second aquifer. To meet current needs, about 700 tube wells are required.

Conjunctive use of the resource and water conservation measures may be practiced in the southern parts of the district. In the district, the alluvial areas hold about 95% of the available extractable dynamic resource while the dynamic resource potential of the hard rock area is only 5%. Therefore, the southern hilly parts of the district can be treated as water-scarce area based on the availability of the dynamic resource. Due to its lithologic and geomorphic characteristics, fluoride has been mobilised and mixed with groundwater resource in aquifers mainly in marginal alluvium tract of the district. Therefore, fluoride mitigation and defluoridation measures shall be implemented at village level in those blocks affected with fluoride contamination. Groundwater from domestic hand pump shall be sampled and remedial measures shall be taken.

RO + UV + UF: The Ultimate Trio for Safe Drinking Water

Dr. Suresh Kumar

Ensuring the safety of drinking water requires a holistic approach to water purification that targets diverse contaminants found in varying water sources. While RO technology effectively reduces dissolved salts, heavy metals, and high TDS levels, it does not eliminate microbial pathogens. On the other hand, UV disinfection inactivates microorganisms but is ineffective against dissolved impurities or turbidity. UF complements both by removing suspended solids, bacteria, and cysts without requiring electricity.

The integration of RO, UV, and UF technologies in a single purification system creates a robust, multi-barrier defence mechanism, making it suitable for a wide range of water quality conditions. This article highlights the working, advantages, and considerations involved in choosing an RO + UV + UF water purifier.

When to Use RO, UV, UF – Separately or in Combination?

In the pursuit of ensuring access to safe drinking water, various water purification technologies such as Reverse Osmosis (RO), Ultraviolet (UV), and Ultrafiltration (UF) have become common household names. However, understanding when to use these technologies—either individually or in combination—is crucial for optimizing water quality while avoiding unnecessary costs or wastage. This article attempts to demystify the appropriate use of these purification systems based on the characteristics of source water.

Understanding the Technologies

- RO (Reverse Osmosis): This method uses a semipermeable membrane to remove dissolved salts (TDS), heavy metals, fluoride, and other contaminants. It is especially effective for water with high TDS (>500 mg/L). However, RO also removes essential minerals and leads to water wastage during purification.
- UV (Ultraviolet Disinfection): UV purification uses ultraviolet light to kill bacteria, viruses, and other pathogens. It does not remove chemicals, salts, or particulate matter, and hence is suitable for microbiologically contaminated but chemically safe water.
- UF(Ultrafiltration): UF uses a hollow membrane to remove bacteria, cysts, and suspended particles. It does not remove dissolved salts or chemicals. UF works well for low-TDS water with turbidity or biological contamination.

What is TDS in Drinking Water?

TDS refers to the total concentration of dissolved substances in water, including:

- Salts (calcium, magnesium, sodium, etc.)
- Minerals
- Organic matter
- Heavy metals and other contaminants

TDS is measured in milligrams per litre (mg/L) or parts per million (ppm).

According to the Bureau of Indian Standards (BIS - IS 10500:2012):

- Desirable limit of TDS in drinking water: 500 mg/L
- Permissible limit (in absence of an alternate source): up to 2000 mg/L

Effects of High and Low TDS

TDS Level (mg/L)	Water Quality	Remarks
< 150	Very low TDS	May lack essential minerals, flat taste
150–500	Good	Most desirable range for drinking
500–2000	Slightly high	May taste salty or metallic
>2000	Very high	RO treatment necessary

Things to Keep in Mind While Buying a RO Purifier

Check Your Water Source First

- Test TDS level using a TDS meter.
- If TDS < 500 mg/L, RO may not be necessary; a UV/UF purifier may suffice

Look for RO + UV + UF Combo

- RO: Removes dissolved solids
- UV: Kills bacteria/viruses
- UF: Filters residual particles and pathogens

Mineral Retention/Enhancer Technology

- Choose models with TDS controller or mineralizer to retain essential minerals like calcium and magnesium.

Water Wastage and Recovery Rate

- RO purifiers can waste 3–4 Liters for every 1 Liter purified.
- opt for systems with high recovery rate or built-in water-saving features.

Storage Capacity

- Ensure the storage tank meets your household needs (typically 7–10 Liters for a family of 4).

Annual Maintenance Cost

- Regular filter and membrane replacement is necessary.
- Clarify AMC (Annual Maintenance Contract) terms with the supplier.

ISI/NSF Certification

- Look for BIS/ISI/NSF certified purifiers for verified safety and quality.

UV Chamber: Vertical vs Horizontal Orientation

Vertical UV chambers allow for better water flow, more uniform UV exposure, fewer air pockets, and easier maintenance. Most modern domestic RO+UV water purifiers are designed with vertical UV chambers for these reasons.

Feature	Vertical UV Chamber	Horizontal UV Chamber
Water Flow	Uses gravity-assisted flow, consistent exposure	Relies on pump-driven flow, may have flow irregularities
UV Exposure Efficiency	Uniform UV exposure over the length of the tube	May have slight stagnation zones if poorly designed
Drainage & Air Release	Better drainage, less air locking	May trap air bubbles, reducing disinfection efficiency
Maintenance & Access	Easier access and lamp replacement	Slightly difficult to access if mounted under sink
Common Usage	Preferred in domestic & compact units	Often used in built-in or commercial units

Combined Benefits of RO + UV + UF:

- **Removes Almost All Contaminants**
  - RO handles dissolved impurities (salts, metals, chemicals)
  - UV kills disease-causing germs
  - UF removes physical and microbial particles (even in turbid water)
- **Suitable for All Water Sources**
  - Groundwater (high TDS and hardness)
  - Municipal water (may contain chlorine, bacteria)
  - Surface water (turbid, prone to contamination)
- **Multiple Safeguards**
  - If one system fails (e.g., UV lamp), UF still filters bacteria
  - RO reduces TDS even if UV is not active
  - Enhanced reliability for consistent water safety
- **Improved Taste and Odor**
  - RO removes taste-altering minerals
  - UV and UF eliminate foul smells from microbial presence
- **Protects Health**
  - Prevents diseases like diarrhoea, cholera, and heavy metal toxicity
  - Especially important for children, elderly, and immune-compromised individuals
- **Points to Keep in Mind**
  - If TDS is below 300 mg/L, RO may not be needed (only UV+UF is sufficient).
  - Choose a purifier with TDS controller or mineralizer to retain essential minerals.
  - Regular maintenance (filter & UV lamp replacement) is necessary for optimal performance

Combined Benefits of RO + UV + UF:

- Households with uncertain or varying water sources
- Areas with high TDS or contamination risk
- People looking for complete protection and peace of mind.

Safe drinking water is not just about purification—it's about appropriate purification. In a country like India where water quality varies greatly by region and source, the use of RO, UV, and UF should be guided by scientific water testing and awareness. Overuse of RO in low TDS areas leads to water wastage and loss of essential minerals, while underuse in high-risk zones can pose health hazards.

Through responsible technology selection and periodic testing, we can ensure both health and sustainability in drinking water management.

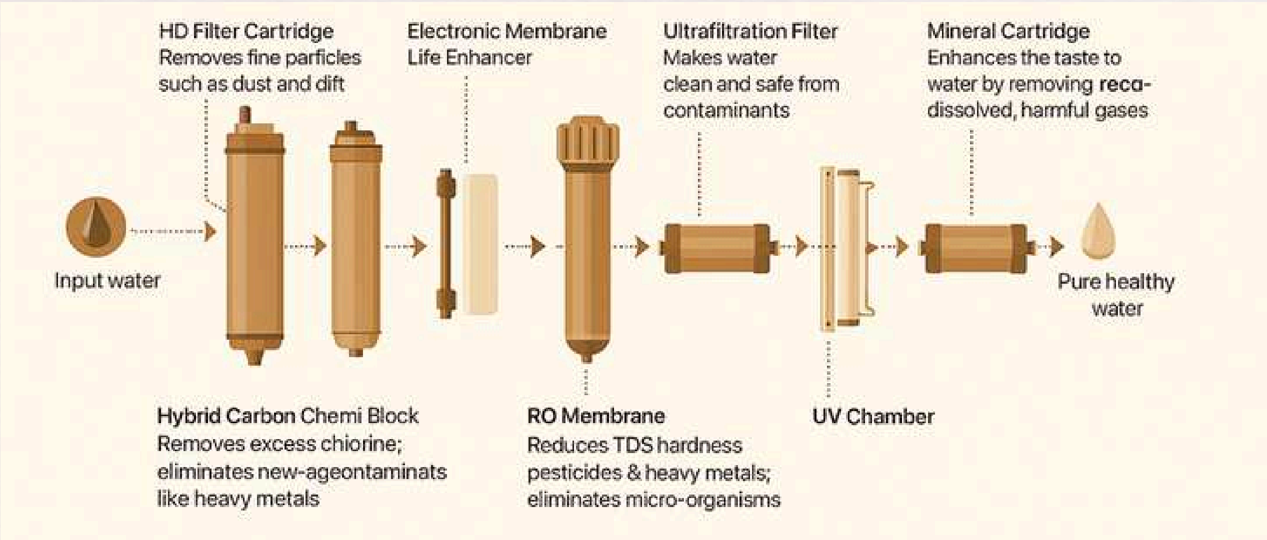


Fig.: Water Purification process, Source: https://www.iliv.co.in/about_water_purification/

Research Publications by CGWB Officers in Reputed International Journals

Title: Water resources sustainability through evaluation of hydrogeological conditions using D–Z parameters in Saraswati Nagar block of district Yamuna Nagar, Haryana, India

Environmental Earth Sciences

Singh S.; Chaudhary B.S.; Kumar S.; Bhatnagar S.; Singh P.; Khanna A.

Abstract : Groundwater is vital for meeting water demands in India, especially for agriculture, but faces stress from industrialization, urbanization, and climate change. Sustainable management, including understanding aquifers and recharge zones like palaeochannels, is essential to ensure long-term groundwater availability. The present research explored the applications of surface geophysical Dar-Zarrouk (D-Z) parameters, estimated from Vertical Electrical Sounding (VES) surveys conducted at seventeen locations, to assess hydrogeological conditions and correlate the findings with the identified palaeochannels within the alluvial area of Saraswati Nagar block of district Yamuna Nagar, Haryana, India. Further, as the study area is occupied with fresh groundwater, the estimated D-Z parameters including Transverse Resistance (T) and Longitudinal Conductance (S) values should be relatively on the higher side in comparison to the saline groundwater-occupied areas. In the study area, S values vary between 0.2025 (Sahabpur) and 2.49 (Talakaur) mho with an average value of 0.9364 mho, and T values vary between 922.96 (Bhamboli) and 5505 (Kabulpur) Ωm2 with an average value of 3000.75 Ωm2 respectively. The results of the electrical resistivity survey have been used for estimating the hydraulic conductivity (K) and transmissivity (t). Hydraulic parameters such as hydraulic conductivity and transmissivity are pivotal in evaluating and controlling groundwater resources. The findings highlight the valuable insights gained for groundwater resource management. This type of study has not been attempted before by any researcher in this regions hence, it will greatly help in understanding the groundwater regime in the area.

Title: Water Conservation and Artificial Recharge Efforts in India

Water Resources Development and Management

Suresh S.; Senthilkumar M.; Dwivedi S.N.

Abstract : Groundwater resource in India has immensely contributed in achieving food and drinking water security of the country. Groundwater development has been the backbone of green revolution in India, and exponential growth in well construction has led to about 21.7 million wells presently in India. The easy access and extraction of groundwater to meet the demand has resulted in unplanned and skewed groundwater development in India and it has created pockets of over-exploitationOver-exploitation, where recharge exceeds the annual replenishment. In order to combat the lopsided development, efforts have been made in India to augment the natural recharge through man made interventions under "Rain Water HarvestingRain water harvesting and Artificial RechargeArtificial recharge (RWH & AR)". In India, the various subjects of governance are vested with either the Union or the State Government as per the constitution of India. Water is primarily a State subject and only in cases of disputes between State Governments, the Union Government intervenes to resolve the issues. However, initiatives on RWH and AR are being taken up by both Central and State Governments through different schemes. The efforts made in India towards water conservationWater conservation and groundwater resourceGroundwater resource augmentation have been compiled as a chapter to highlight the steps taken to meet the challenges in such a diverse hydrogeological environment.

TITLE: **ASSESSMENT OF HYDROCHEMICAL FACIES AND DRINKING WATER QUALITY OF NORTH-EASTERN STATE OF INDIA, TRIPURA**

JOURNAL OF THE GEOLOGICAL SOCIETY OF INDIA

SAHOO G.; BARMAN R.; DUTTA S.; DATTA S.; RAY B.; RADHAPYARI K.

Abstract : Groundwater is the most precious natural resource on this planet, and at the same time, it is also vulnerable to contamination with each passing day. The present study attempts to comprehensively understand groundwater quality in the Tripura state of India using the water quality and heavy metal evaluation indexes. The study also attempts to forecast the Water Quality Index (WQI) for the next two years from the study period. In this study, twelve key parameters viz., pH turbidity, total dissolved solids, bicarbonate, chloride, sulfate, nitrate, fluoride, calcium, magnesium, total hardness, and iron were considered for calculating the WQI and six heavy metals viz., iron, arsenic, uranium, manganese, zinc and copper for HEI. A total of 970 groundwater samples were collected from all the districts of Tripura over a decade, from 2013–14 to 2022–23. The findings reveal that high iron concentration in Tripura consistently surpasses the recommended limits set by both the Bureau of Indian Standards (BIS) and the World Health Organisation (WHO) standards, with some areas also experiencing elevated total dissolved solid concentrations. The South Tripura District reported the highest concentration of 28 ppm of iron. The output from WQI confirms that in most districts, water quality falls in the excellent to good category. However, a few locations from the West Tripura District exhibit poor to very poor water quality for drinking. Almost 80% of the water samples from the study area have been marked as excellent to good for drinking purposes, and none fall under the unsuitable category. Iron and WQI distribution graphs, along with the Piper diagram, were studied to explain the results of the study. The evaluation of the Heavy Metal Evaluation Index (HEI) shows that more than 97% of groundwater samples are at low risk for drinking. Piper diagram infers that the Groundwater in Tripura is mostly enriched with calcium cation and bicarbonate anion. Considering all the points, it may be assumed that the water quality in Tripura is good enough, and no significant major concern has been noted regarding groundwater quality for the last ten years. Predicted WQI considering all the same parameters for the next two years indicates that all the districts will fall within the "Excellent" category, highlighting overall enhancement in water quality. © 2025 Geologial Society of India, Bengaluru, India.

TITLE: **ASSESSING AQUIFER VULNERABILITY TOWARDS CONTAMINATION OF GROUNDWATER USING A NEW MODEL (DRASTIC-LU) IN PARTS OF RAMGANGA BASIN, INDIA**

WATER CONSERVATION SCIENCE AND ENGINEERING

ALAM F.; SWAROOP S.K.; BHARTARIYA S.G.

Abstract : The groundwater at the foothills is pristine and functions as the recharge source for the rest of the basins. Any pollution at this juncture is carried to the rest of the basin, making it particularly sensitive from an environmental point of view. To ensure the supply of safe drinking water locally and to evaluate the characteristics for basin recharge, the present study is conducted to estimate groundwater vulnerability to pollution using the modified DRASTIC–LU model in parts of Ramganga Basin, covering the Bareilly district of approximately 4120 km2. It utilizes land use land cover (LULC) as an additional parameter in the DRASTIC model consisting of depth to water level (D), net recharge (R), aquifer media (A), soil media (S), topography (T), impact of vadose zone (I), and hydraulic conductivity (C). From the modified DRASTIC–LU model developed, a groundwater vulnerability potential map is generated classifying the study area into zones from low to high vulnerability. It was found that around 40% of the area is of low vulnerability, 56% falls in the moderate, and 4% of the area is in the high vulnerability zone. The sensitivity analysis revealed that the highest contribution to the vulnerability index is made by land use land cover, depth to water level, and net recharge, and the lowest contribution is made by the impact of the vadose zone in contamination of groundwater. In the study area, it was observed that areas with high iron concentrations correlated with areas of high vulnerability to contamination. The present study concludes that the DRASTIC–LU model is an effective preliminary tool, which can be used for policy planning and management execution levels during the decision-making process for groundwater management and protection from urban, industrial, and agricultural pollution sources. Therefore, it is recommended to draft and implement stricter land use policies alongside regular and fine resolution water quality monitoring in the area. © The Author(s), under exclusive licence to Springer Nature Singapore Pte Ltd. 2025.

SOCIAL MEDIA HIGHLIGHTS

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 9 April ·

Dr. A. Asokan and Sh. P. K. Tripathi assumed the charge of regular Member (Scientific), CGWB.

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 10 February ·

श्री शैलेन्द्र नाथ द्विवेदी, वैज्ञानिक डी एवं निदेशक (प्रशासन) ने मध्य पूर्वी क्षेत्र, पटना की क्षेत्रीय रासायनिक प्रयोगशाला का भ्रमण कर कार्यों की सराहना की। उन्होंने ... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 31 January ·

Ms Rumi Mukherjee, Scientist D, CGWB, Faridabad delivered a lecture on Ground Water and related investigations & Recharge of GW in the training programme for State Govt... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 24 January ·

A lecture on "Central Groundwater Authority: Functions & Activities" was held at MOIL, Mansar, Nagpur on 22.01.2025. Speakers Ms. Pournima Barahate & Ms. Shubhangi Loha... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 20 January ·

Dr. Sunil Kumar Ambast, Chairman, CGWB, visited SER Bhubaneswar on 18.01.2025 to review AAP progress, discuss NHP assignments, and inspect the DWLR monitoring station a... See more

Instagram

centralgroundwaterboard

SOCIAL MEDIA HIGHLIGHTS

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 4 March

Additional Secretary, DoWRs, RD & GR visited PMKSY-HKKP-GW scheme installations in the Dukli Block of Tripura and engaged with the direct beneficiaries. They compared d... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 16 June

Smt. T.S. Anitha Shyam, Member (South), visited SECR Chennai, where she inspected the DWLR installed at the PIB site and reviewed the progress of the Annual Action Plan... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 13 June

Shri Subodh Yadav, IAS, AS, MoJS, visited CGWB, WCR, Ahmedabad. During the visit, he inaugurated the Regional Chemical Laboratory, exhibition-cum-Training Hall, and Reg... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 13 March

The First meeting of the State Level Committee (SLC) on Ground Water Resource Estimation (GWRE)-2025 of Chandigarh UT held under the Chairmanship of Sh. Mandip Singh Br... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 23 May

26 newly inducted Trainee Officers from Central Ground Water Board, Ministry of Jal Shakti, Government of India, are undertaking a one-week study tour (from May 19 to M... See more

Central Ground Water Board
Published by केंद्रीय भूमि जल बोर्ड · 29 May

Smt. Debashree Mukherjee IAS, Secretary and Shri Subodh Yadav IAS, Additional Secretary, Do WR, RD&GR , Ministry of Jal Shakti visited Rajiv Gandhi National Ground Wate... See more

COLLECTABLE

1. Chairman, CGWB chaired a Meeting held between Officers of CGWB, CHQ & Prof Basant Maheshwari, Distinguished Prof, Western Sydney University to discuss the possibilities of extension of the MoU with MARVI Partners
2. Dr. Pandith Madhnure, HOO, CR, Nagpur participated and delivered keynote speech in Kisan Samruddhi Mahotsav at Bangalore organized by THE ART OF LIVING.
3. CGWB, NWR, Chandigarh organized a Tier-II Training on "Aquifer Management Through Participatory Approach" at CCSHAU, Hisar highlighting groundwater importance.
4. Dr R S Chatterjee, Scientist G, Indian Institute of Remote Sensing (IIRS), Dehradun delievered a talk as part of Bhujal samvad talk Series on "Satellite Gravity Observation and Interferometric SAR for Ground Water Storage Change and Aquifer-system Compaction Studies".
5. CGWB, Eastern Region, Kolkata organized a PIP at Jalpaiguri, under Dr. Anadi Gayen's supervision. Students participated in a painting and quiz competition, raising awareness on groundwater sustainability and environmental protection.
6. As part of NPMU visit, physical verification of Piezometers constructed under PIB Package-2 was undertaken by Sh. Sunil Toppo, Scientist-C, CGWB, CHQ, Faridabad along with RD, RPMU members from CGWB, CR & Division-VI, Nagpur.
7. As per the MoA between CGWB, BWSSB, and IISc, a meeting was held to assess Bangalore's groundwater in summer. IISc presented a GW outlook, and Sh. Shende highlighted vulnerable wards and mitigation measures based on CGWB data.

COLLECTABLE

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1. Sh. Subodh Yadav, IAS, AS, MoJS and Shri Pratul Saxena, Member & PD, Atal Jal, visited CGWB, NR office in Lucknow and conducted a detailed review of regional activities .
2. CGWB SECR Chennai held the 4th Quarterly Dialogue and 1st SLC meeting, chaired by Tamil Nadu's Secretary of WRD.
3. As part of the Swachhata Pakhwada, 2025 celebrations, all the officers/officials of CGWB, SER, Bhubaneswar actively participated in the cleanliness drive in the office premises.
4. Sri Pabitra Ram Khaund, IAS, Secretary released three key reports from the CGWB, NER, namely the "Aquifer Management Plan for parts of Kamrup (M) district, Assam," the "Aquifer Management Plan for Bamunimaidan Industrial Estates and Guwahati Oil Refinery, Kamrup Metro, Assam," and the "GWRA Report of Assam 2024".
5. Officers from SUO, Ranchi have conducted pre-monsoon microplastics sampling for Urban Ranchi as part of the NAQUIM 2.0 initiative.
6. Smt. T.S. Anitha Shyam, Member (South), visited SECR Chennai, where she inspected the DWLR installed at the PIB site and reviewed the progress of the Annual Action Plan (AAP) 2025–26.
7. 1st SLC meeting for GWRA 2025 held under the chairmanship of Principal Secretary Sh Sanjay Khandare, IAS, WSSD, Govt of Maharashtra. Reports on GWRA 2024, NAQUIM 2.0 (2023-24), GW Quality Maharashtra state 2023-2024, Groundwater Year Book 23-24 were also released by Principal Secretary Sh. Sanjay Khandare, IAS.

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