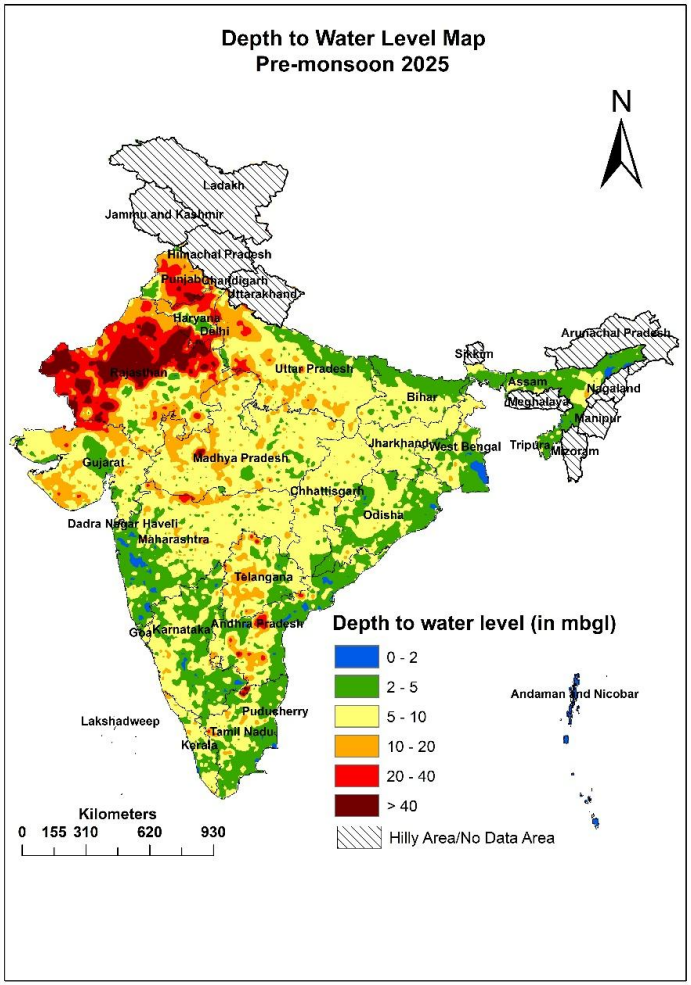

GROUND WATER LEVEL BULLETIN

Pre-monsoon 2025

ABSTRACT

Groundwater level scenario during Pre-monsoon 2025 highlighting the findings, status of ground water level in different aquifers and its seasonal, annual and decadal comparison.

National Data Centre
Central Ground Water Board, Faridabad

1.0 INTRODUCTION

Groundwater bulletin is prepared by CGWB depicting changes in groundwater regime of the country through different seasons. It is an effort to obtain information on groundwater levels through representative monitoring wells. The important attributes of groundwater regime monitoring are groundwater level.

The natural conditions affecting the groundwater regime involve climatic parameters like rainfall, evapotranspiration etc., whereas anthropogenic influences include pumpage from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc.

Groundwater levels are being measured by Central Ground Water Board four times a year during January, March/April/May, August and November. The regime monitoring started in the year 1969 by Central Groundwater Board. Currently, a network of 27163 observation wells called National Hydrograph Network Stations (NHNS) located all over the country is being monitored.

2.0 HYDROGEOLOGICAL SETUP OF THE COUNTRY

India's hydrogeological setup is characterized by diverse aquifer systems across its varied geography. The Indo-Gangetic Plain features extensive, productive alluvial aquifers, while Peninsular India has less permeable hard rock aquifers in the Deccan Plateau and sedimentary basins. Arid regions like Rajasthan and Gujarat experience scanty rainfall and feature less productive, shallow aquifers. The hydrogeological map of India is depicted in Figure 1 and the geographical distribution of hydrogeological units along with their Groundwater potential is given in Table 1.

Table1. Aquifer System in the Country

System	Coverage	Groundwater potential
Unconsolidated formations - alluvial	Indo-Gangetic, Brahmaputra plains	Highly productive system down to 600 m depth.
	Coastal Areas	Reasonably extensive aquifers, but risk of saline water intrusion
	Arid areas	Scanty rainfall. Salinity hazards. Groundwater availability at great depths.
Consolidated/semi-consolidated formations - sedimentary, basalts & crystalline rocks	Peninsular Areas	Groundwater is available in fractures and in weathered zones with varying yield at shallower depths (20-40 m) in some areas and deeper depths (100-200 m) in other areas.
Hilly	Hilly states	Low storage capacity due to quick runoff

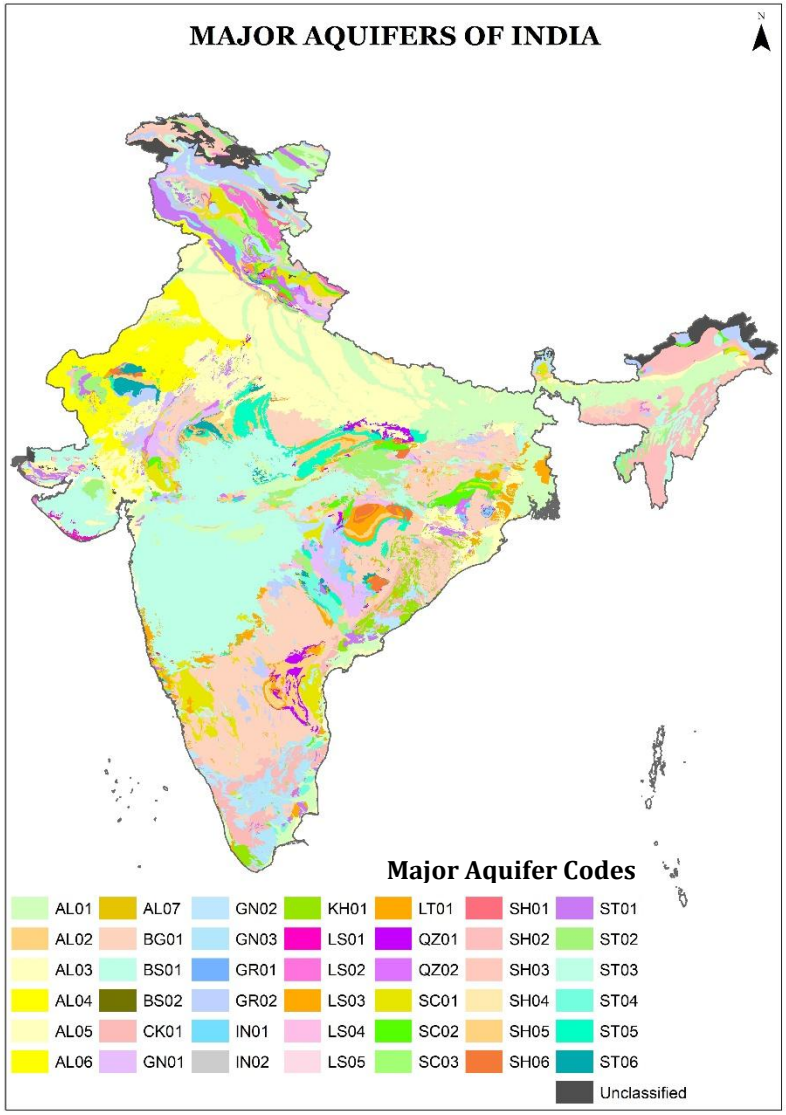

Figure 1: Map of major aquifers of India

3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board is monitoring changes in groundwater regime in the country on quarterly basis continuously. This is facilitated by a network of monitoring stations in the country located in diverse hydrogeological and geomorphic units. The number of operational wells till March 2025 was 26351 which include 16431 dug wells, 8680 piezometers, 966 Handpumps and 274 Springs. The state-wise breakup of the water level monitoring stations is given in Table 2.

Table 2. State-wise water level monitoring stations

State/ UT	DW	Piezometers	Handpump	Spring	Total
Andhra Pradesh	656	790	0	0	1446
Arunachal Pradesh	26	4	0	8	38
Assam	383	91	8	5	487
Bihar	977	117	0	0	1094
Chhattisgarh	1006	269	0	0	1275
Delhi	22	115	0	0	137
Goa	81	54	0	0	135
Gujarat	781	500	0	0	1281
Haryana	150	345	0	0	495
Himachal Pradesh	129	66	0	27	222
Jammu & Kashmir	270	87	0	26	383
Jharkhand	466	147	0	0	613
Karnataka	1316	946	0	0	2262
Kerala	1379	271	0	24	1674
Madhya Pradesh	1378	476	0	0	1854
Maharashtra	1857	318	0	0	2175
Manipur	4	0	0	2	6
Meghalaya	70	13	0	21	104
Mizoram	7	0	0	20	27
Nagaland	80	1	0	20	101
Odisha	1489	291	0	0	1780
Punjab	115	346	0	0	461
Rajasthan	647	842	0	0	1489
Sikkim	0	4	0	0	4
Tamil Nadu	766	713	0	0	1479
Telangana	270	1001	0	0	1271
Tripura	104	13	0	10	127
Uttar Pradesh	1082	453	0	0	1535
Uttarakhand	35	12	196	111	354
West Bengal	725	352	762	0	1839
Andaman & Nicobar	111	2	0	0	113
Chandigarh	1	23	0	0	24
DNH and DD	40	4	0	0	44
Puducherry	8	14	0	0	22
Total	**16431**	**8680**	**966**	**274**	**26351**

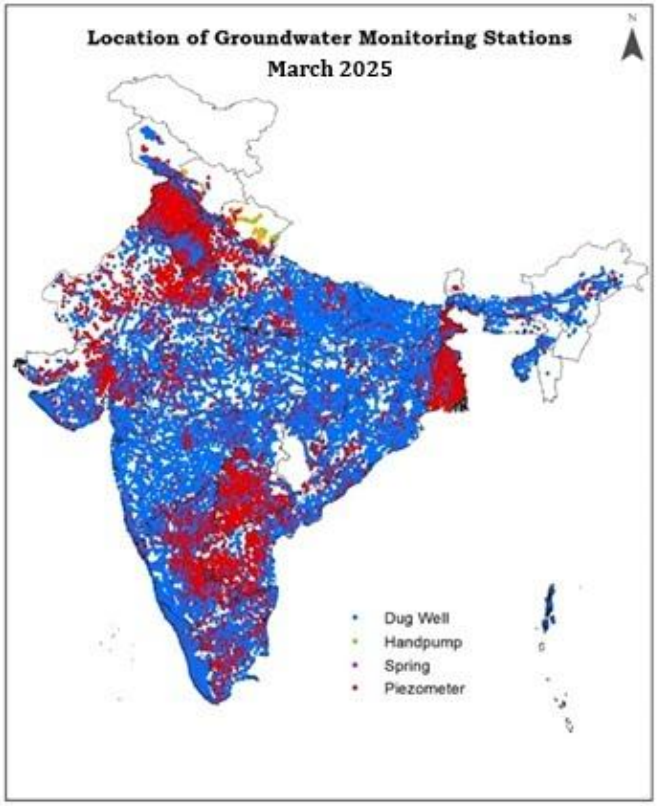

Figure 2: Location of groundwater monitoring stations

4.0 RAINFALL

The state-wise rainfall data was collected from the India Meteorological Department (IMD) to analyze the rainfall patterns during the Pre-monsoon period. Table 3 presents the normal rainfall and actual rainfall for each state during the Pre-monsoon season of 2024 and 2025, along with the departures from normal rainfall. It also indicates the percentage increase in pre-monsoon rainfall in 2025 compared to 2024.

Observations show that in 2025, the pre-monsoon rainfall had a 42.3% departure from the normal rainfall. Additionally, during the pre-monsoon of 2025, a 46.8% increase in rainfall was recorded compared to the pre-monsoon of 2024.

Table3. State-wise rainfall (mm) during the Pre-monsoon season (March-May) 2024 and 2025.

States	Normal	2024	% Dep 2024 from Normal	2025	% Dep 2025 from Normal	% Dep from 2024 to 2025
A & N Island	455.9	322.3	-29.3	606.9	33.1	88.3
Andhra Pradesh	89.4	88.8	-0.7	177.2	98.2	99.5
Arunachal Pradesh	757.3	581.5	-23.2	573.4	-24.3	-1.4
Assam	542.1	421.5	-22.2	524.8	-3.2	24.5
Bihar	85.3	84.2	-1.3	114.6	34.3	36.1
Chandigarh	54.8	61.6	12.4	85.7	56.4	39.1
Chhattisgarh	37.0	82.3	122.4	107.3	190.0	30.4
DNH And DD	10.4	0.1	-99.0	10.8	3.8	10700.0
Delhi	56.6	17.9	-68.4	104.0	83.7	481.0
Goa	71.6	112.8	57.5	681.4	851.7	504.1
Gujarat	4.1	12.5	204.9	55.9	1263.4	347.2
Haryana	44.6	25.6	-42.6	75.1	68.4	193.4
Himachal Pradesh	240.7	221.2	-8.1	180.6	-25.0	-18.4
Jammu & Kashmir	330.0	300.5	-8.9	225.0	-31.8	-25.1
Jharkhand	83.3	85.7	2.9	192.5	131.1	124.6
Karnataka	117.7	138.4	17.6	322.6	174.1	133.1
Kerala	359.1	500.4	39.3	776.4	116.2	55.2
Ladakh	8.9	17.8	100.0	39.2	340.4	120.2
Lakshadweep	197.0	357.2	81.3	319.4	62.1	-10.6
Madhya Pradesh	18.0	39.9	121.7	53.5	197.2	34.1
Maharashtra	26.2	45.2	72.5	173.0	560.3	282.7
Manipur	363.0	394.1	8.6	389.2	7.2	-1.2
Meghalaya	716.0	670.8	-6.3	982.5	37.2	46.5
Mizoram	563.0	400.7	-28.8	362.5	-35.6	-9.5
Nagaland	339.8	374.9	10.3	347.7	2.3	-7.3
Odisha	128.6	136.0	5.8	238.6	85.5	75.4
Puducherry	95.5	75.5	-20.9	183.9	92.6	143.6
Punjab	54.2	33.2	-38.7	47.9	-11.6	44.3
Rajasthan	23.2	10.8	-53.4	41.3	78.0	282.4
Sikkim	611.5	439.6	-28.1	623.9	2.0	41.9
Tamil Nādu	125.0	142.2	13.8	245.8	96.6	72.9
Telangana	63.8	81.6	27.9	171.2	168.3	109.8
Tripura	656.0	508.8	-22.4	492.9	-24.9	-3.1
Uttar Pradesh	33.2	21.0	-36.7	39.8	19.9	89.5
Uttarakhand	158.2	127.5	-19.4	208.2	31.6	63.3
West Bengal	228.9	249.4	9.0	315.5	37.8	26.5
India	**130.6**	**126.6**	**-3.1**	**185.8**	**42.3**	**46.8**

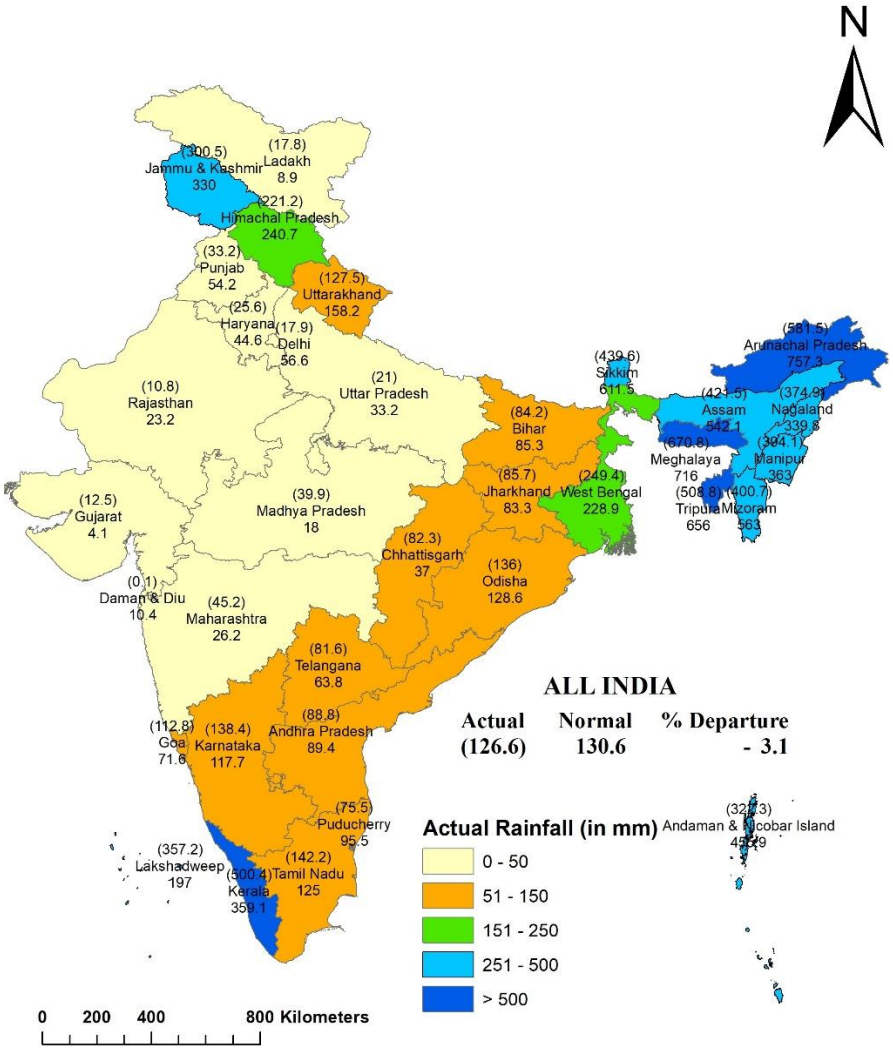

Figure 3: State-wise rainfall distribution during the pre-monsoon period 2024

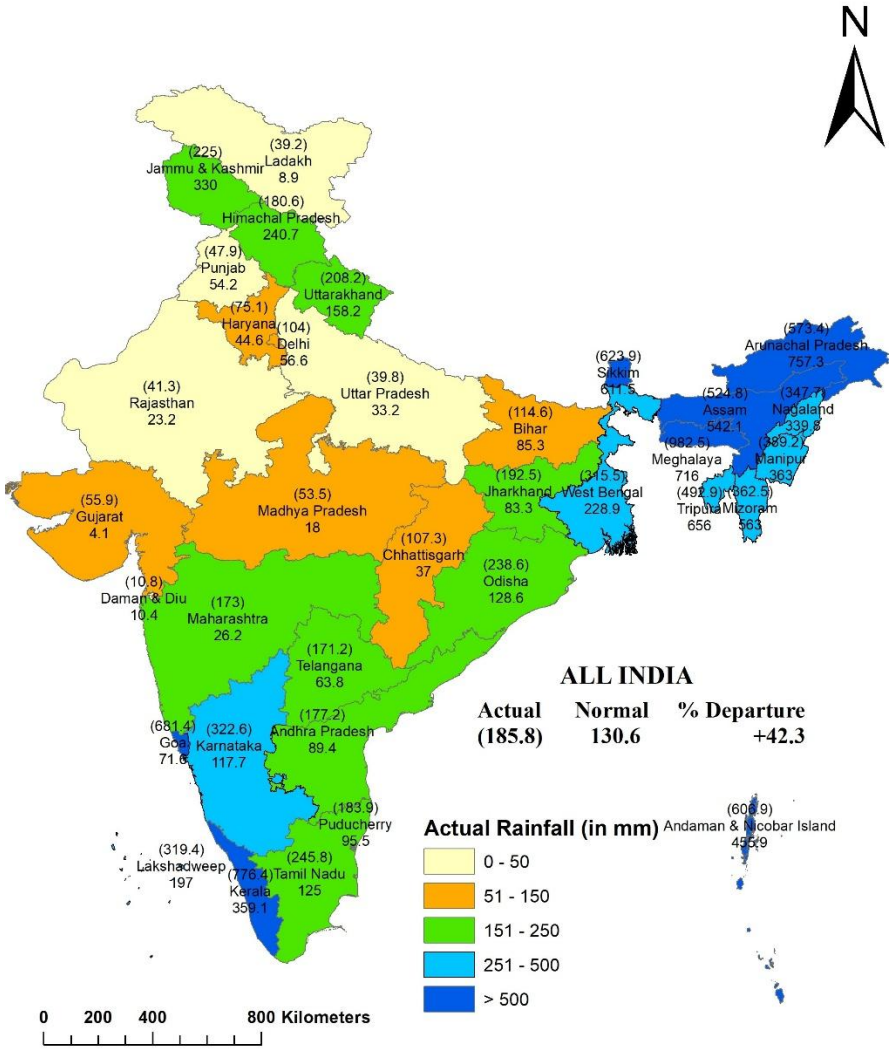

Figure 4: State-wise rainfall distribution during the pre-monsoon period 2025

5.0 GROUND WATER LEVEL SCENARIO (PRE-MONSOON 2025)

5.1 SHALLOW AQUIFER (UNCONFINED)

5.1.1 DEPTH TO WATER LEVEL

Depth To Water Level in Unconfined Aquifer (Pre-Monsoon 2025)

The groundwater level data for pre-monsoon 2025 indicates that out of the total 17307 wells analysed, 10.0% wells are showing water level less than 2 m bgl (metre below ground level), 33.1% wells are showing water level in the depth range of 2 to 5 m bgl, 37.6% wells are showing water level in the depth range of 5 to10 m bgl, 13.3% wells are showing water level in the depth range of 10 to 20 m bgl, 3.6% wells are showing water level in the depth range of 20 to 40 m bgl and the remaining 2.3% wells are showing water level more than 40 m bgl. (Fig. 5).

Groundwater level data of pre-monsoon 2025 for the country reveals that the general depth to water level of the country ranges from 2 to 10 m bgl. Very shallow water level of less than 2 m bgl is observed in few states as North Eastern states and Andaman and Nicobar Islands in small patches. Groundwater level in the range of 2 to 5 m bgl is seen in all most all states except Rajasthan and Punjab. Major part of the country shows water level in the range 5 to 10 m bgl, and small patches in Chandigarh, Punjab and Rajasthan. In major parts of north-western and western states, especially in the states of Haryana, Punjab and Rajasthan, depth to water level is generally deeper and ranges from about 20 to more than 40 m bgl. (Fig. 6).

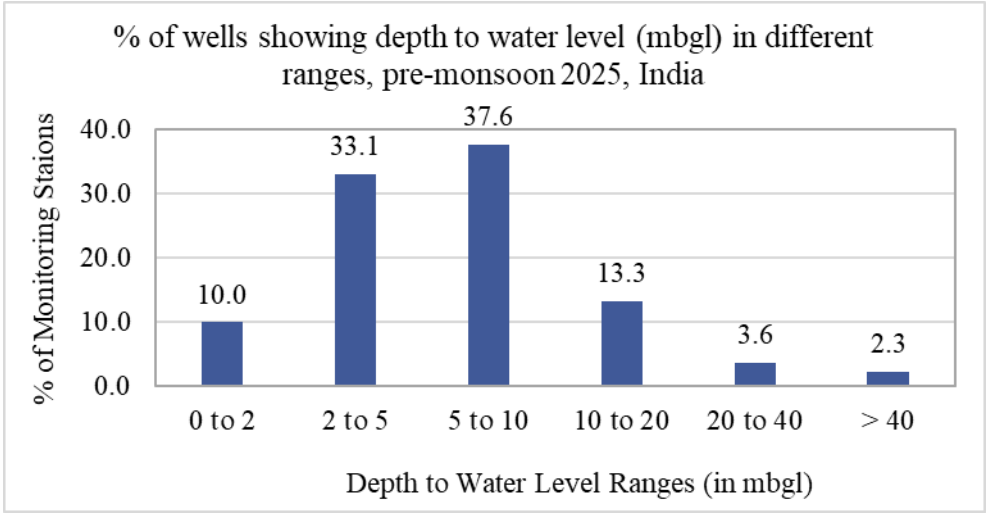

Figure 5: % of wells showing depth to water level (mbgl) in different ranges, pre-monsoon 2025 in unconfined aquifers, India

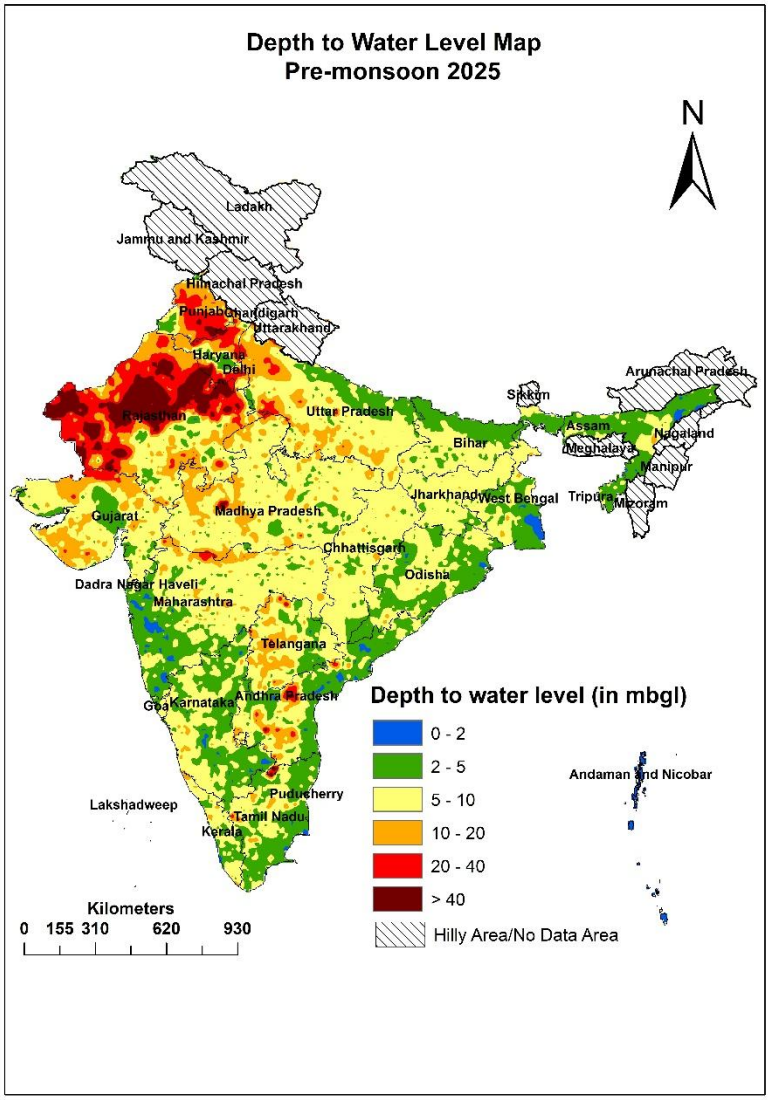

Figure 6: Depth to water level of unconfined aquifer during Pre-Monsoon 2025

5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer (Pre-Monsoon 2023 to Pre-Monsoon 2025)

The groundwater level fluctuation analysis done in 13750 wells. The water level fluctuation of pre-monsoon 2023 compared to pre-monsoon 2025 shows that about 58% stations are showing rising and 41% stations are showing falling in water level. About 1% stations analysed do not show any change in water level. (Fig. 7).

Rise in Water Levels

About 41.5% wells are showing rise in the water level in the range of less than 2 m. About 9.7% wells are showing rise in water level in 2 to 4 m range and 6.7% wells showing rise in water level more than 4 m range. A comparison of depth to water level of pre-monsoon 2023 to pre-monsoon 2025 also reveals that in general there is rise in water level in most part of the country. Rise in water level is prominently observed in parts of states such as Goa, Jharkhand, Karnataka, Tamil Nadu, West Bengal and Andaman and Nicobar Island.

Fall in Water Levels

About, 31.3% wells are showing decline in water level in less than 2 m range. About 5.9% wells are showing decline in water level in 2 to 4 m range and 4.1% wells are showing decline in water level more than 4 m range. Fluctuation is mainly in the range of 0 to 2 m. Fall is mostly in the range of 0 to 2 m observed in all states of the country. Fall in water level is prominently observed in isolated pockets, in the states of Andhra Pradesh, Haryana, Himachal Pradesh, Punjab, Telangana and Uttar Pradesh. (Fig. 8).

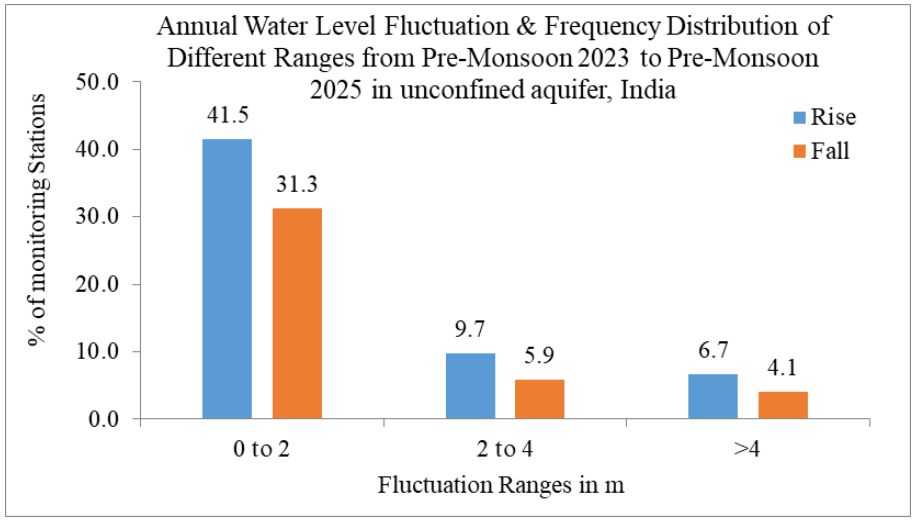

Figure 7: Annual Water Level Fluctuation & Frequency Distribution of Different Ranges from Pre-Monsoon 2023 to Pre-Monsoon 2025 in unconfined aquifer, India

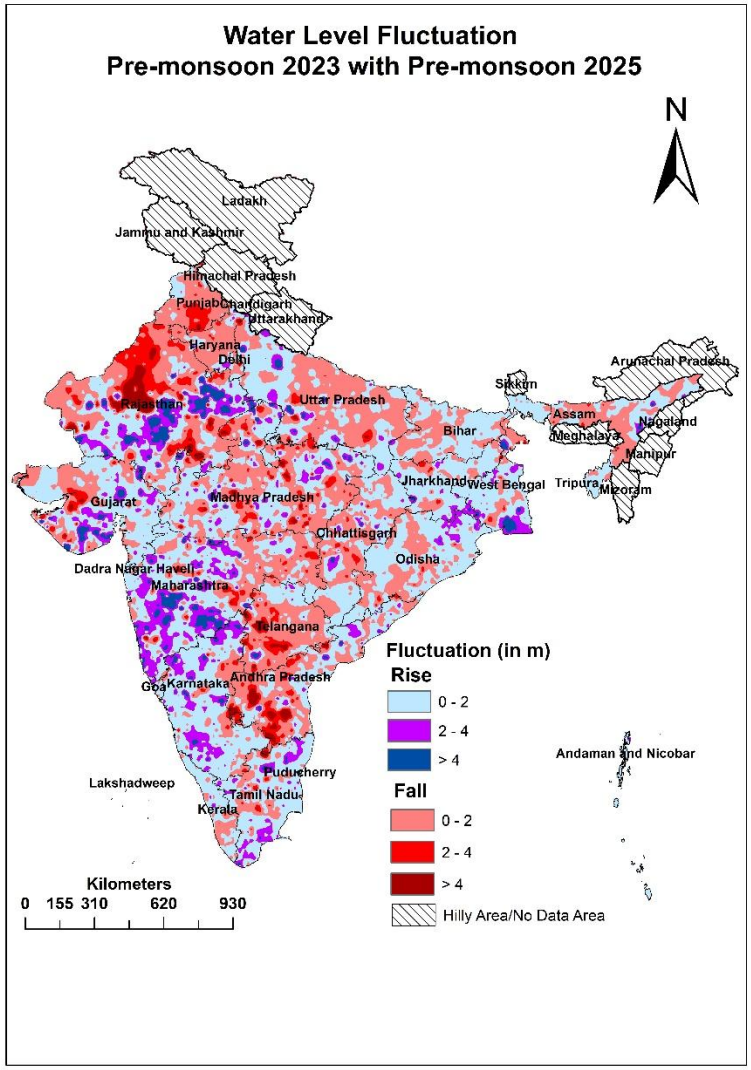

Figure 8: Annual water level fluctuation in unconfined aquifer (Pre-Monsoon 2023 to Pre-Monsoon 2025)

Annual Fluctuation of Water Level in Unconfined Aquifer (Pre-Monsoon 2024 to Pre-Monsoon 2025)

The groundwater level fluctuation analysis done in 14924 wells. The water level fluctuation of pre-monsoon 2024 compared to pre-monsoon 2025 shows that about 64.6% stations are showing rising in water level and 34.7% stations are showing fall in water level. About 0.7% of stations analysed do not show any change in water level. (Fig. 9).

Rise in Water Levels

About 44.5% wells are showing rise in the water level in the range of less than 2 m. About 11.5% wells are showing rise in water level in 2 to 4 m range and 8.6% wells showing rise in water level more than 4 m range. Rise in water level is prominently observed in all parts of the country except Haryana, Himachal Pradesh, Nagaland, Punjab, Chandigarh and Jammu Kashmir.

Fall in Water Levels

About, 34.7% of total analysed wells are showing declining water level, out of which, 27.5% wells are showing decline in water level in less than 2 m range. About 4.3% wells are showing decline in water level in 2 to 4 m range and 2.9% wells are showing decline in water level more than 4 m range. Fluctuation is mainly in the range of 0 to 2 m. A comparison of depth to water level of pre-monsoon 2024 to pre-monsoon 2025 also reveals that fall in water level is prominently observed in the states Haryana, Himachal Pradesh, Nagaland, Punjab, Chandigarh and Jammu Kashmir. (Fig. 10).

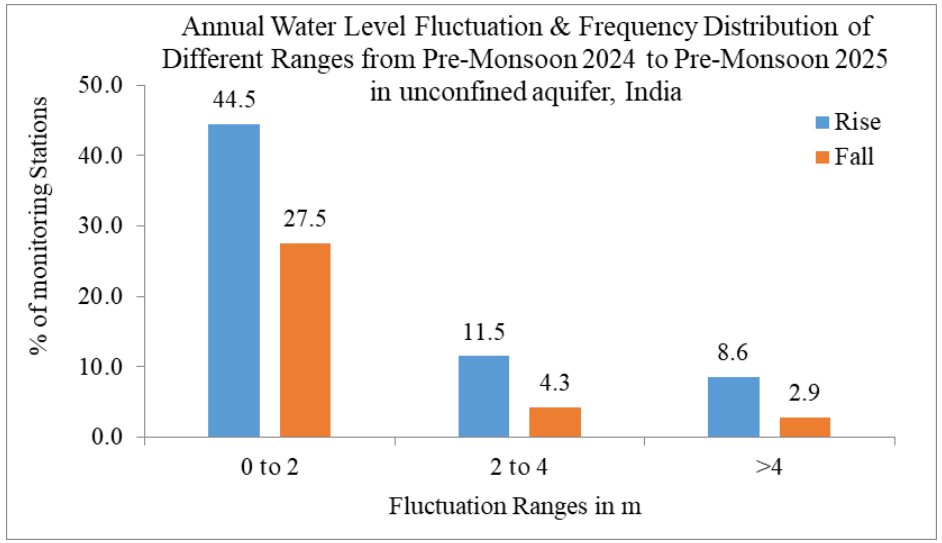

Figure 9: Annual Water Level Fluctuation & Frequency Distribution of Different Ranges from Pre-Monsoon 2024 to Pre-Monsoon 2025 in unconfined aquifer, India

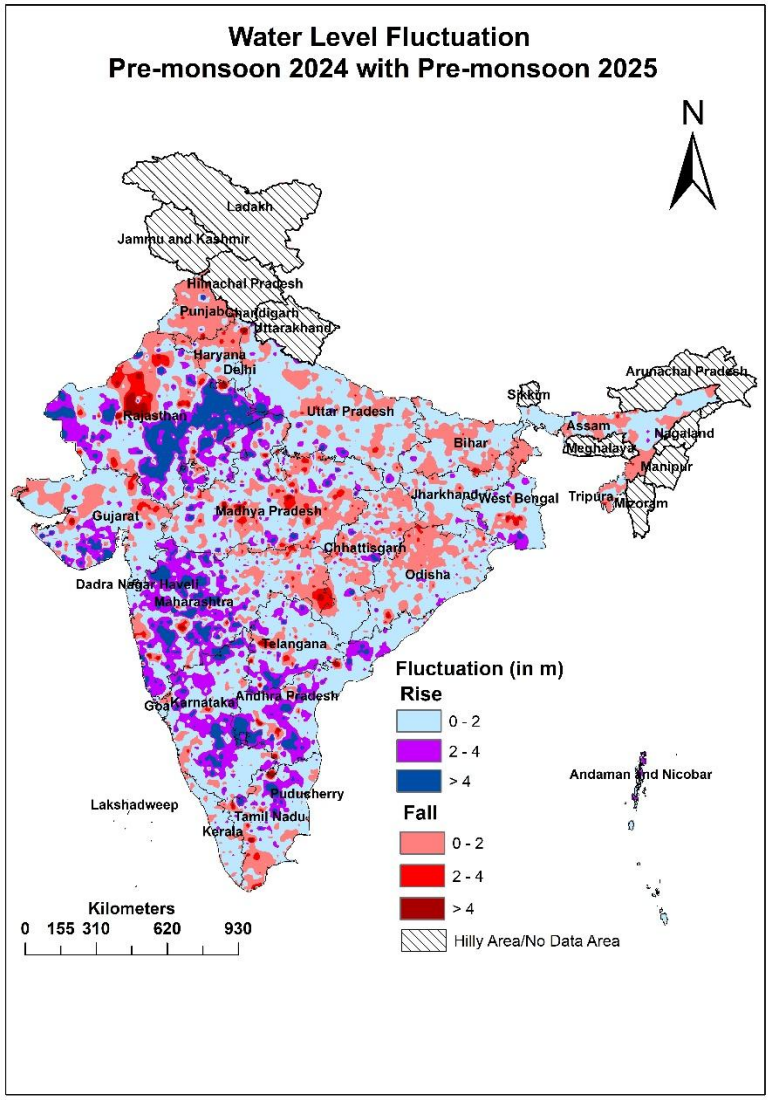

Figure 10: Annual water level fluctuation in unconfined aquifer (Pre-Monsoon 2024 to Pre-Monsoon 2025)

5.1.3 DECADAL FLUCTUATION IN WATER LEVEL

Decadal Fluctuation of Water Level in Unconfined Aquifer (Decadal Mean Pre-Monsoon (2015-2024) to Pre-Monsoon 2025)

The groundwater level fluctuation analysis done in 12710 wells. A comparison of depth to water level of pre-monsoon 2025 with decadal mean of pre-monsoon (2015-2024) indicate that, 67.7% of stations analysed are showing rise and 32.0% of stations analysed are showing fall in water level. About 0.3% of stations analysed do not show any change in water level. (Fig. 11).

Rise in Water Levels

About 44.8% wells are showing rise of water level less than 2 m. About 13.9% wells are showing rise in water level in the range of 2 to 4 m and about 9.0% wells are showing rise in water level in the range of more than 4 m. Rise in water level is prominently observed in the states of Andhra Pradesh, Arunachal Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, Telangana and Andaman and Nicobar Islands.

Fall in Water Levels

About 25.4% wells are showing decline in water in the range of 0 to 2 m. 4.1% wells are showing decline in water level in 2 to 4 m range and remaining 2.5% are in the range of more than 4 m. Fall is mostly in the range of 0 to 2 m observed in all states of the country in scattered pockets. Fall in water level is prominently observed in parts of the states such as Bihar, Chhattisgarh, Himachal Pradesh, Punjab and Uttar Pradesh. (Fig. 12).

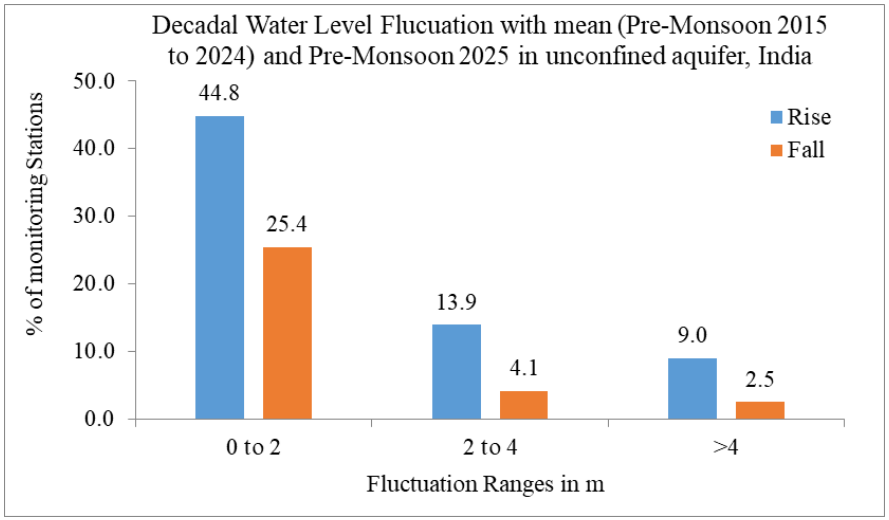

Figure 11: Decadal Water Level Fluctuation with mean (Pre-Monsoon 2015 to 2025) and Pre-Monsoon 2025 in unconfined aquifer, India

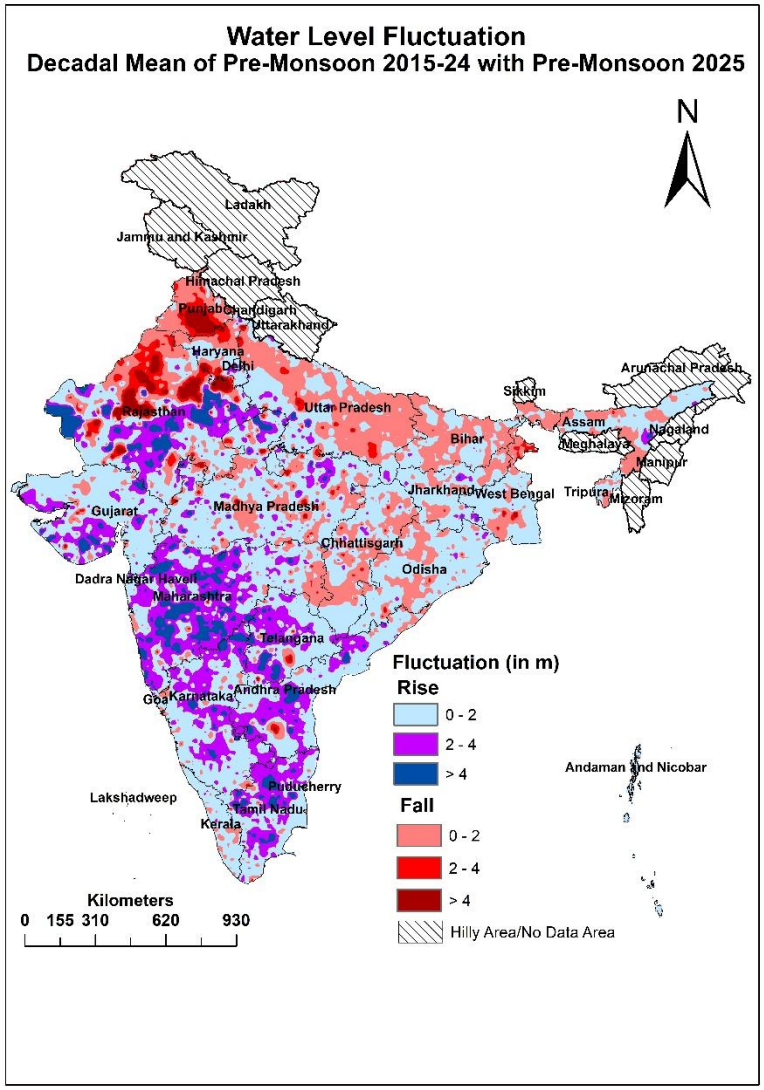

Figure 12: Decadal Water Level Fluctuation with mean (Pre-Monsoon 2014 to 2023) and Pre-Monsoon 2024 in unconfined aquifer, India

6.0 SUMMARY

As a component of the National Ground Water Monitoring Programme, the CGWB conducts monitoring of the groundwater conditions on a quarterly basis: in January, pre-monsoon May, post-monsoon August, and November. As of March 2025, the Central Ground Water Board supervises total 26351 monitoring stations. This comprehensive effort aims to portray the variations in the country's ground water conditions across different aquifers.

In Pre-Monsoon 2025, around 80% of the country's monitoring stations exhibited a depth to water level within 10 meters below ground level. Deeper water levels of more than 20 m is observed in around 6% of stations of the country covering mainly the western states especially Rajasthan, Punjab, Haryana and Chandigarh.

The deeper ground water level in the states like Rajasthan, Punjab, Haryana and Chandigarh during Pre-Monsoon 2025 has been significantly influenced by the deficient rainfall from March 2025 to May 2025.

Annual water level comparison with the previous year Pre-Monsoon 2024 to Pre-Monsoon 2025 has shown that about 65% of total analyzed stations of the country experienced rise in annual water level fluctuation due to excess rainfall in 2025 Pre-monsoon.

The decadal water level fluctuation with mean of Pre-monsoon 2015 to 2024 of Pre-monsoon 2025 also rising water level in most part of the country.

Rain water is the primary source for recharging the aquifers. The pre-monsoon period in 2025 witnessed significant fluctuations in rainfall patterns across the country. The evident rise in annual groundwater level during Pre-monsoon 2025 in the country can be attributed to a substantial 46% excess rainfall when comparing pre-monsoon 2025 to pre-monsoon 2025.

7.0 RECOMMENDATIONS

1. **Shallow Ground Water Level during Pre-Monsoon 2025 (Water Logged Areas)**

   The areas where the pre-monsoon water level in the phreatic aquifer is less than 3 mbgl for consecutively 2 or more years may be classified as water logging prone areas. The water-logged areas occur as isolated patches and local in extent. Hence for demarcation of water-logged areas block level analysis of pre-monsoon depth to water levels for two consecutive years is required.

   To address the water logging issues the following measures are recommended to adopt.

   - **Consumptive/ Conjunctive Use:** If shallow water level is due to poor ground water utilization, then consumptive use of ground water must be encouraged. In the agricultural command areas, if water logging happens due to excessive application of irrigation water without utilizing the ground water, Conjunctive use of ground and surface water may be promoted.
   - **Promotion of Industries/SEZ:** extraction of ground area must be promoted for industrial uses in the shallow water level areas.

2. **Recommendations on Management of depletion in Ground Water Levels**

   Based on the nature of aquifer, ground water levels and recharge/discharge characteristics and demand/ supply scenario the ground water management aspects are to be planned. The following practices can be taken into consideration for ground water management planning.

   - **Focus on Western States with Deeper Water levels:** In Rajasthan, Punjab, Haryana, and Chandigarh, it is essential to harvest monsoon rainwater and utilize it for artificial recharge. Regular maintenance of recharge structures is recommended to maintain efficiency.
   - **Master Plan for Site Selection:** The MASTER PLAN FOR ARTIFICIAL RECHARGE TO GROUND WATER IN INDIA-2020 should be referenced to identify optimal sites for artificial recharge structures.
   - **Urban Recharge:** In urban areas with reduced natural recharge, rooftop rainwater harvesting structures would be effective for groundwater recharge and storage.
   - **Point Recharge Structures:** These are recommended for recharging deeper aquifers effectively through recharge tubewell/borewells.

2. **Efficient Water Use Practices**
   - **Micro-Irrigation:** Promote efficient micro-irrigation practices, especially for water-intensive crops such as paddy and sugarcane.
   - **Crop Diversification:** Encourage farmers to shift from water-intensive crops to less water-demanding varieties suitable for local climatic conditions.
   - **Water-Efficient Fixtures:** Advocate for the adoption of water-efficient fixtures and low-flow plumbing systems in residential and commercial buildings. Technologies include low-flow faucets, aerators, showerheads, and toilets.

3. **Community-Based Water Management**
   - **Water Budgeting:** Implement water budgeting by Village Panchayats to promote responsible water usage.
   - **Participatory Groundwater Management:** Foster community involvement in groundwater management at the grassroots level to create a sense of ownership and accountability.

4. **Re-Use of Treated Water**
   - **Treated Sewage Water:** Encourage the reuse of treated sewage water after secondary or tertiary treatment for groundwater recharge, ensuring compliance with water quality standards.

5. **Reviving Traditional Water Bodies**
   - **Restoration Projects:** Restore traditional water bodies such as ponds, lakes, and historical water harvesting structures to support natural recharge processes.

6. **Policy and Incentives**
   - **Incentives for Conservation:** Provide financial incentives to industries and farmers adopting water-saving technologies and sustainable water management practices.
   - **Regulatory Measures:** Enforce groundwater extraction regulations, especially in over-exploited regions, to prevent unsustainable depletion.

Central Ground Water Board
Ministry of Jal Shakti
Department of Water Resources,
River Development and Ganga Rejuvenation
Government of India