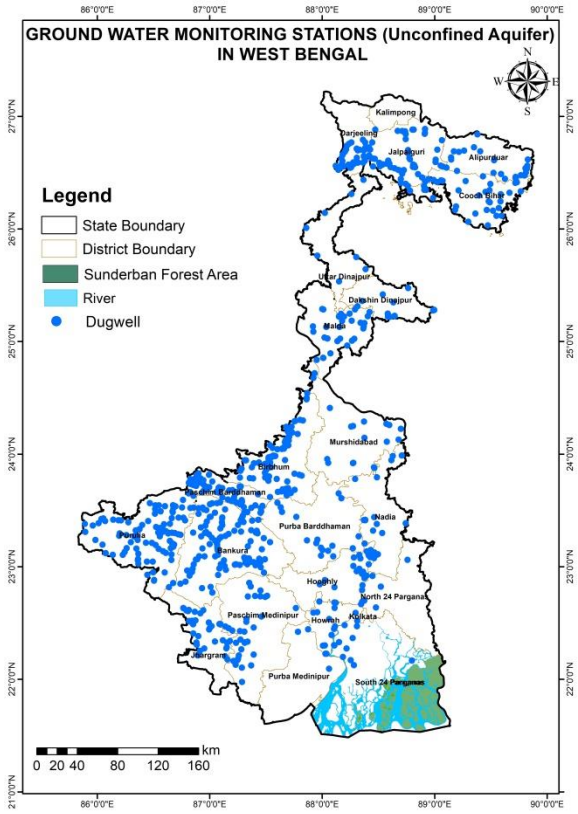

GROUND WATER LEVEL BULLETIN

April 2025

WEST BENGAL

ABSTRACT

Present Bulletin prepared on ground water scenario of West Bengal highlighting the findings, status of ground water level in Shallow /Unconfined aquifers and its seasonal, annual and decadal fluctuation during April 2025.

CGWB, Eastern Region Kolkata

1.0 INTRODUCTION

Groundwater bulletin is prepared by Central Ground Water Board (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.

In West Bengal, ground water monitoring was started since 1976 when most of the ground water structures were mainly dug wells and the development of the ground water resource was very limited. It is only after 1985; actual ground water development started in irrigational sector and took its full swing from 90s. Accordingly, Ground Water Monitoring Stations (GWMS) for monitoring of water level data were also changed in different periods. However, from late 90s, these old wells are being replaced by well-defined piezometers in phased manner with an expectation that in near future, this effort will provide better result.

Groundwater levels are being measured by CGWB, ER four times a year in West Bengal viz., in the months of April (Pre-monsoon) (20^{th} to 30^{th}), August (Mid-monsoon) (20^{th} to 30^{th}), November (Post-monsoon) (1^{st} to 10^{th}) and January (1^{st} to 10^{th}) ; 2 times in Andaman and every month in Sikkim (through Participatory monitoring since June,2024).

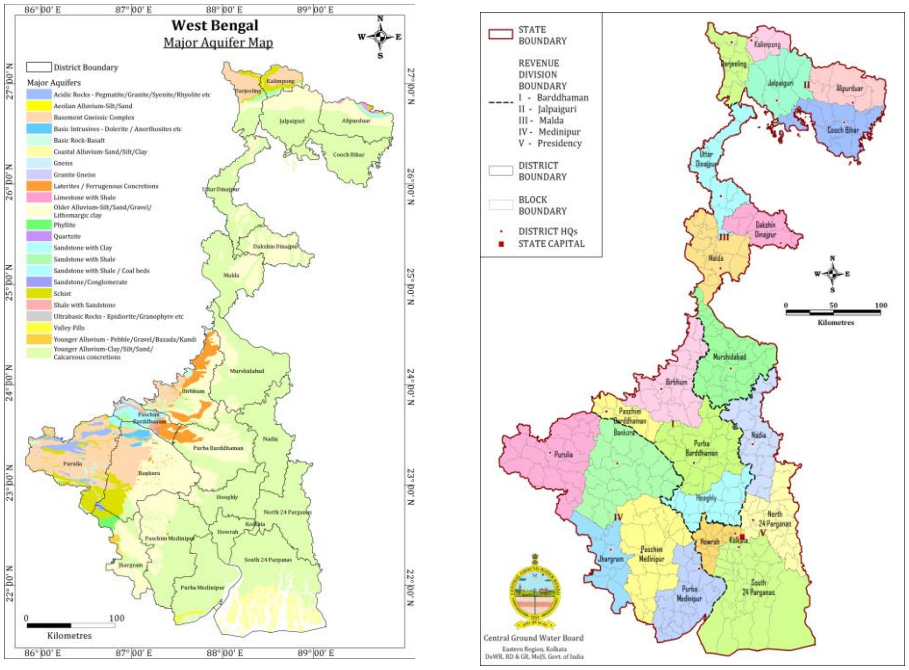

Figure-1: Map showing major aquifers and administrative divisions of West Bengal

2.0 STUDY AREA

The Eastern Region of Central Ground Water Board has jurisdiction over the State of West Bengal having an area of 88752 km^2, Andaman & Nicobar Islands (UT) having an area of 8,249 sq. km. (Andaman-6408 sq. km., Nicobar-1841 sq. km.) and Sikkim (7096 sq.km.).

The State of West Bengal is divided into 5 Divisions (Barddhaman, Jalpaiguri, Malda, Medinipur & Presidency) incorporating 23 Districts, which are further subdivided into 66 Sub-Divisions; 344 Community Development Blocks; 3,347 Gram Panchayats; 40,218 Villages (37,469 Inhabited villages with 2,03,80,118 Households); 924 Census Towns(127 Municipal & 785 Non-Municipal); 118 Municipalities and 7 Municipal Corporations. The state extends between N Latitudes, 21^0 31' 0", 27^0 33' 15" and E Longitudes, 85^0 45' 20", 89^0 33'0". Physiographically, the area incorporates extra – peninsular region of the north, peninsular mass of the south – west, and alluvial and deltaic plains of the south and south-east (figure-1).

Broadly, West Bengal has nine major physiographic divisions – Himalayan Zone, Sub-Himalayan Zone, Barind Uplands, Degraded Plateaus, Plateau Fringe Zones, Upper Gangetic Delta, Reclaimed Lower Gangetic Delta, Non-Reclaimed Lower Gangetic Delta and Medinipur Coastal Plains.

3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board, Eastern Region, has set up a network of 1839 monitoring wells known as National Hydrographic Network Stations (NHNS) in West Bengal which includes: Dugwells- 725, Handpumps-762 and Piezometers-352 {including 199-DWLR installed PZ} (figure-2).

In the state of West Bengal during April 2025, 715 wells (Dugwells) were monitored in Shallow/Unconfined aquifer (figure-3). Few wells could not be monitored due to various reasons like inaccessibility, filled up, installation of pump units, road damaged, gate locked, etc.

The district-wise breakup of the water level monitoring stations is given in Table-1

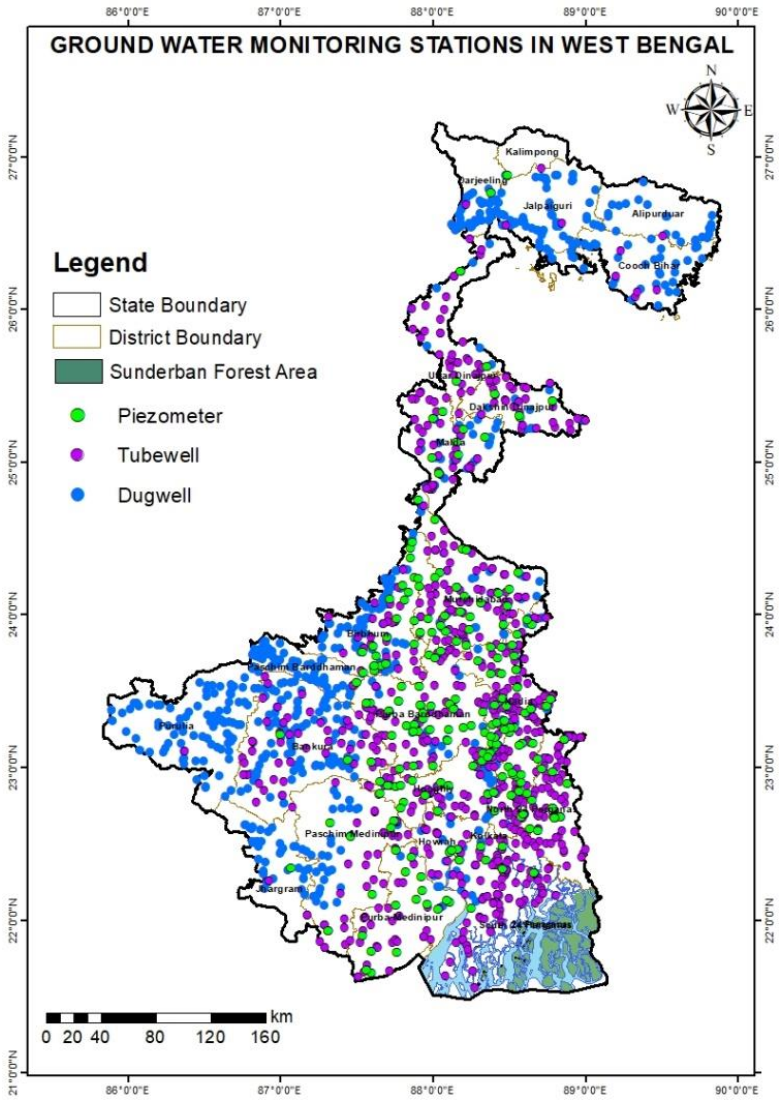

Figure- 2: Map showing locations of monitoring wells (NHNS) in West Bengal

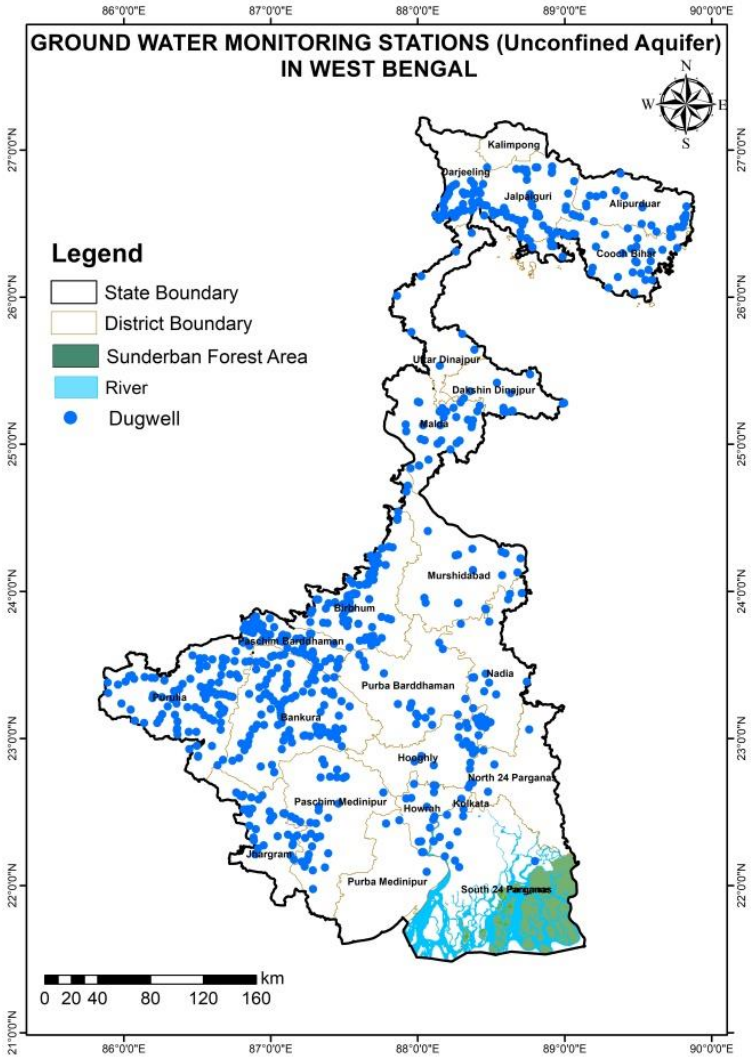

Figure- 3: Map showing locations of monitoring wells (NHNS) in Unconfined/Shallow Aquifer of West Bengal

Table-1: District-wise distribution of water level monitoring stations in West Bengal

Sl. No	Name of the District	Number of GW Monitoring Stations (as on March 2025)					
		Dug Well	Piezometer	DWLR	Handpump	Spring	Total
	West Bengal						
1	Alipurduar	25	0		1	0	26
2	Bankura	103	2	6	50	0	161
3	Birbhum	99	15	18	39	0	171
4	Dakshin Dinajpur	9	2	10	29	0	50
5	Darjeeling	40	0		2	0	42
6	Haora	18	0	1	15	0	34
7	Hugli	26	11	19	71	0	127
8	Jalpaiguri	48	0		3	0	51
9	Jhargram	30	1	4	2	0	37
10	Kochbehar	40	0		3	0	43
11	Kalimpong	0	0		2	0	2
12	Kolkata	13	10	3	14	0	40
13	Maldah	24	6	4	32	0	66
14	Murshidabad	18	9	32	72	0	131
15	Nadia	14	36	26	93	0	169
16	N- 24 Parganas	6	14	11	84	0	115
17	Paschim Barddhaman	59	2	9	3	0	73
18	Paschim Medinipur	32	4	9	28	0	73
19	Purba Barddhaman	17	24	12	51	0	104
20	Purba Medinipur	2	12	18	33	0	65
21	Purulia	89	0	7	0	0	96
22	S-24 Parganas	8	5	10	113	0	136
23	Uttar Dinajpur	5	0		22	0	27
	Total	**725**	**153**	**199**	**762**	**0**	**1839**

4.0 RAIN FALL

In pre-monsoon 2025, West Bengal experienced a diverse rainfall (42.8mm-527.4mm) along the coastal region to Himalayan region. The less rainfall is occurred at the middle part of the state. In North Bengal (Darjeeling, Kalimpong, Jalpaiguri, Alipurduar, Coach Behar, Uttar and Dakshin Dinajpur) total 1862.5 mm precipitation occurred during pre-monsoon season in 2025 over the region. North Bengal used to receive pre-monsoon shower, owing to the geographical location and foothills of Himalaya. However, total 814.9 mm rainfall occurred over the western part (Birbhum, Bankura, Purulia, Pachim and Purba Burdwan) of West Bengal. Southern part (Howrah, Hugly, Pachim and Purba medinipur, Jhargram, Kolkata, North and South 24 Parganas) of state received 858.9mm rainfall in pre-monsoon. This coastal region is highly influence by the seasonal cyclonic activities. The middle part (Maldah, Mursidabad and Nadia) of the state received 223.4 mm rainfall.

Coachbehar and Alipurduar districts have received the highest rainfall during pre-monsoon. While, Maldah, Uttar and Dakshin Dinajpur districts have received lowest rainfall during the pre-monsoon season (figure-4).

District-wise status of rainfall is given in table-2.

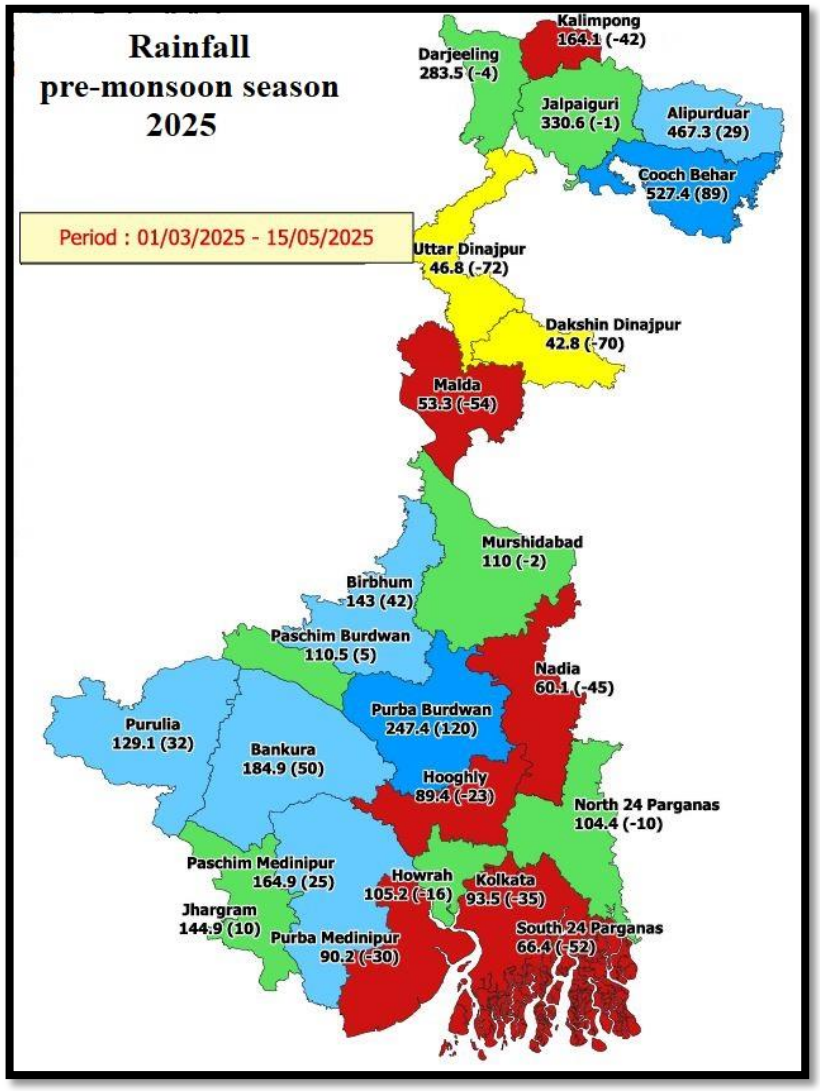

Figure-4: Rainfall distribution (in mm) and deficient rainfall (in %) over west Bengal during pre-monsoon 2025. Deficient rainfall is estimated by the comparing normal rainfall and actual rainfall. Source: IMD

Table-2: District wise rainfall data during Pre-monsoon 2025

District	Cumulative rainfall (mm) during Pre-monsoon 2025
Cooch Behar	527.4
Darjeeling	283.5
Jalpaiguri	330.6
Malda	53.3
North Dinajpur	46.8
South Dinajpur	42.8
Bankura	184.9
Birbhum	143
Paschim Burdwan	110.5
Purba Burdwan	247.4
East Midnapore	90.2
Hooghly	89.4
Howrah	105.2
Kolkata	93.5
Murshidabad	110
Nadia	60.1
North 24 Parganas	104.4
Purulia	129.1
South 24 Parganas	66.4
West Midnapore	164.9
Jhargram	144.9
Kalimpong	164.1
Alipurduar	467.3

5.0 GROUND WATER LEVEL SCENARIO (APRIL 2025) for WEST BENGAL

5.1 SHALLOW AQUIFER (UNCONFINED)

5.1.1 DEPTH TO WATER LEVEL

Depth to Water Level in Unconfined Aquifer (April 2025)

Depth to water level during April 2025 was measured from 715 numbers of GWMS in shallow aquifers. Water level of less than 2 m bgl was recorded in 16% of wells in phreatic aquifers. Similarly in 47% of wells, water level was observed between 2-5 m bgl. 5-10 m bgl was recorded in 31% of wells and 10-20 m bgl in only 6% of wells. Only 2 wells in phreatic aquifers showing water level beyond 20 m bgl *(*Figure-5 & 6).

The depth to water level map of April 2025 depicts that water level in the entire state is within the range of 2-5 and 5-10 m bgl except for few isolated patches showing water level in the range of >10 m bgl.

Deepest water level was recorded at Jaigaon, 24.92 m bgl in Kalchini block of Alipuduar district and shallowest water level 0.14 mbgl was found at Dhatrigram in Kalna-I block Purba Bardhaman district.

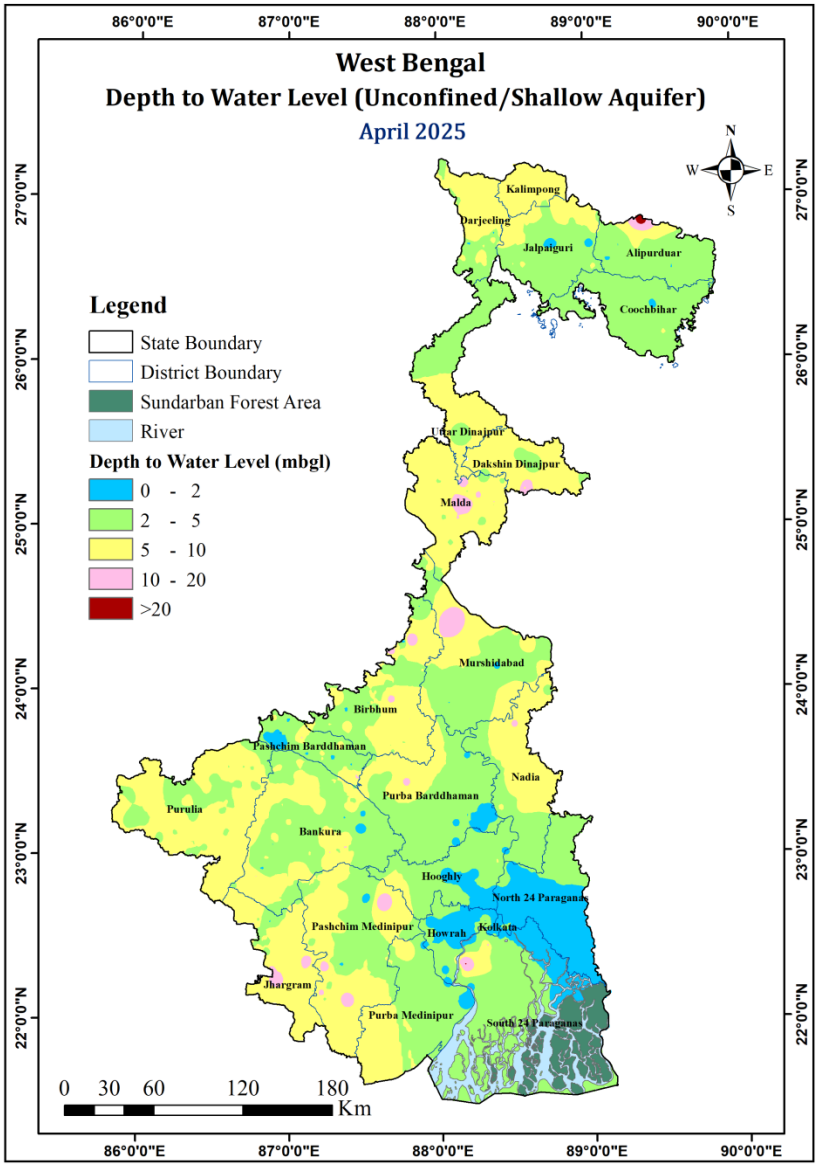

Figure-5: Depth to water level of unconfined aquifer during April 2025

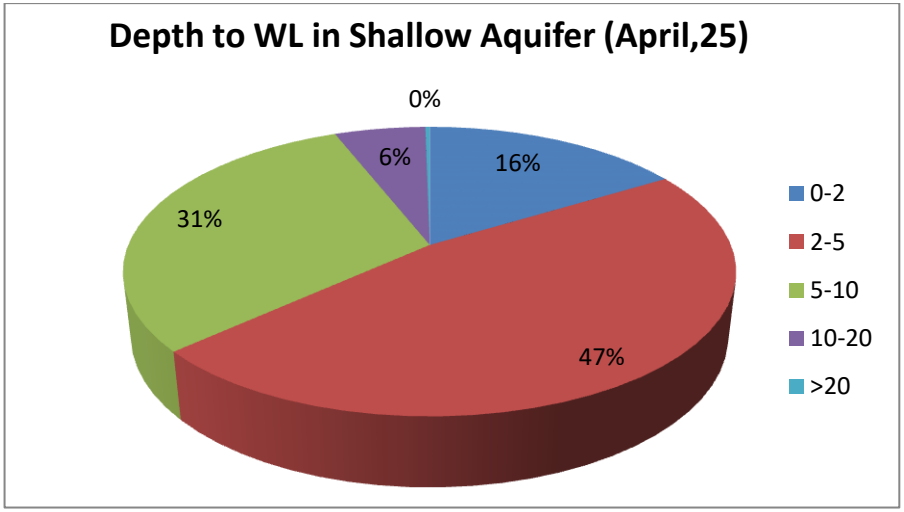

Figure-6: Percentage of wells in different water level ranges in Unconfined aquifer (April 2025)

5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer

(April 2024 to April 2025)

In shallow aquifers out of 653 wells analyzed, 474 wells showing rise and 179 wells shows falling water level (figure-7 & 8).In shallow aquifers in rising category 60% of wells are within the fluctuation of 0-2m, 10% are in 2-4m and 3% of wells are in the range of more than 4m. In the falling category 22% of wells are showing falling trend in 0-2m category, 3% of wells are in the range of 2-4m and 2% of wells are showing >4m fluctuation of water level.

The state is dominated by 0-2m fluctuation category. Rise of less than 2 m in water level is seen in all the districts of the State, significantly in Nadia, Murshidabad, N-24 Parganas Bankura, Coochbehar, Darjeeling, Alipurduar, Purba Bardhaman and parts of Paschim Medinipur, Dakshin Dinajpur district. Fall of less than 2 m in water levelis mainly observed in parts of S-24 Parganas, Purba & Paschim Medinipur, Jhargram, Purulia, Birbhum, Howrah, Hooghly, Malda and Bankura districts. Fall and rise of beyond 2 m is observed as isolated patches.

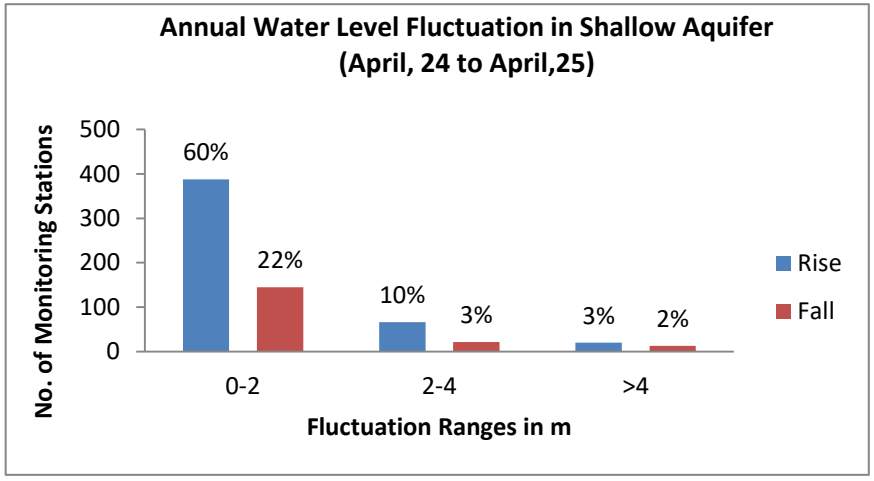

Figure-7: Percentage of wells showing rise and fall in WL in unconfined aquifer (April 2024 to April 2025)

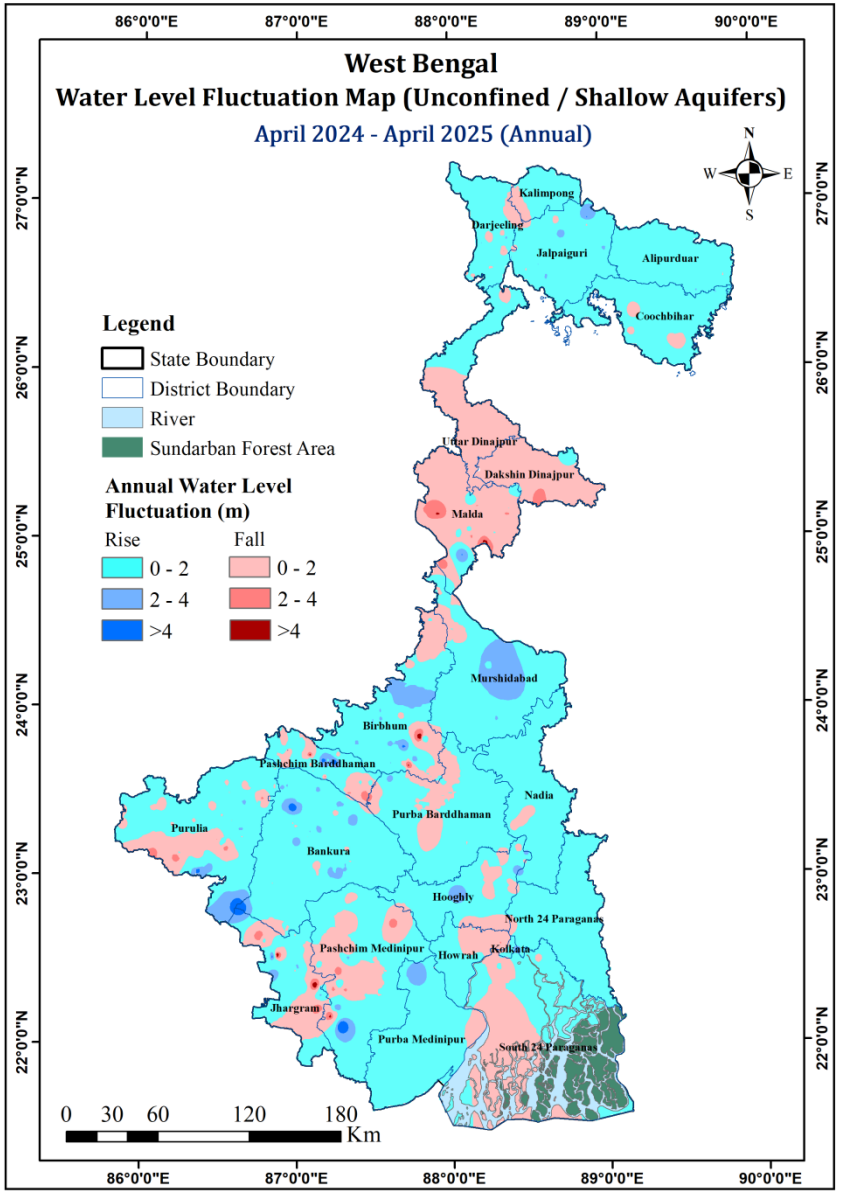

Figure-8: Annual water level fluctuation in unconfined aquifer (April 2024 to April 2025)

5.1.3 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer

(April 2023 to April 2025)

In shallow aquifers out of 597 wells analyzed, 442 wells showing rise and 155 wells shows falling water level (figure-9 & 10).

In shallow aquifers in rising category 60% of wells are within the fluctuation of 0-2m, 11% are in 2-4m and 4% of wells are in the range of more than 4m. In the falling category 21% of wells are showing falling trend in 0-2m category, 2% of wells are in the range of 2-4m and 2% of wells are showing >4m fluctuation of water level.

The state is dominated by 0-2m fluctuation category. Rise of less than 2 m in water level is seen in all the districts of the State, significantly in Nadia, N-24 Parganas, Birbhum, Paschim Bardhaman, and parts of Purba Bardhaman, Malda, Murshidabad, Purba & Paschim Medinipur, Jhargram district. Fall of less than 2 m in water level is mainly observed in Uttar & Dakshin Dinajpur Coochbehar, Darjeeling, Alipurduar, parts of N24 & S-24 Parganas, Purba & Paschim Medinipur, Nadia, Jhargram, Purulia, Birbhum, Howrah, Hooghly and Malda districts. Fall and rise of beyond 2 m is observed as isolated patches.

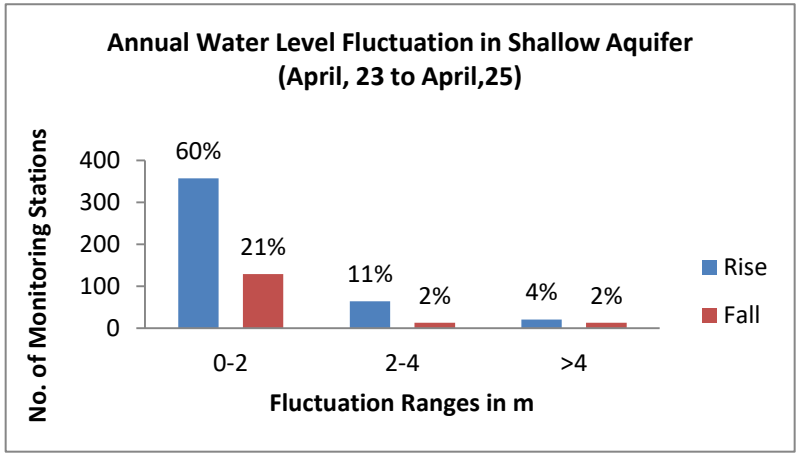

Figure-9: Percentage of wells showing rise and fall in WL in unconfined aquifer (April 2023 to April 2025)

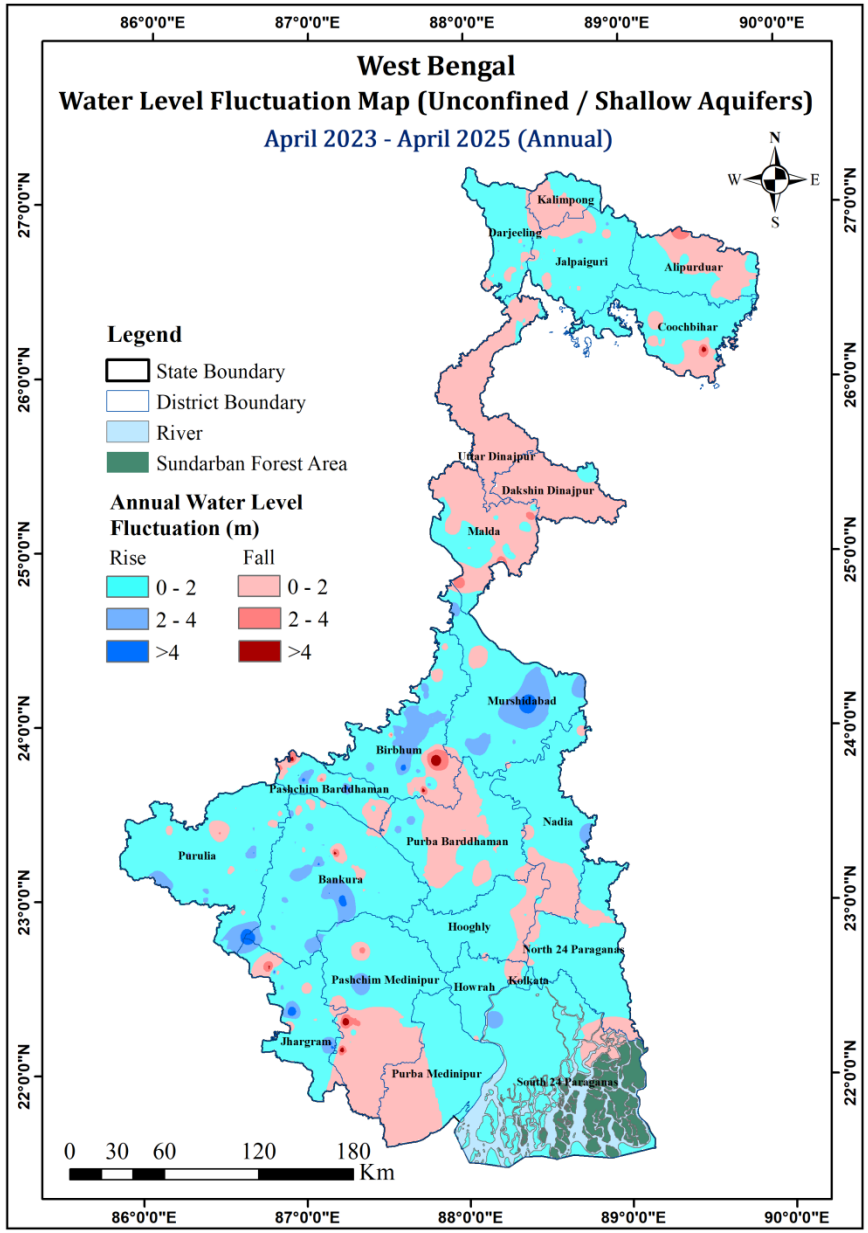

Figure-10: Annual water level fluctuation in unconfined aquifer (April 2023 to April 2025)

5.1.4 DECADAL FLUCTUATION IN WATER LEVEL

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

In shallow aquifers out of 655 wells analyzed, 383 wells showing rise and 272 wells shows falling water level (figure-11 & 12).

For shallow aquifers, in rising category 49% of wells are within the fluctuation of 0-2m, 8% are in 2-4m and 1% of wells are in the range of more than 4m. In the falling category 35% of wells are showing falling trend in 0-2m category, 4% of wells are in the range of 2-4m and 3% of wells are showing >4m fluctuation of water level.

From the water level fluctuation map it can be observed that water level fluctuation is mainly in the range of 0-2 m and can be observed in most of the district of the State. 2-4 m fluctuation is observed in isolated pockets.

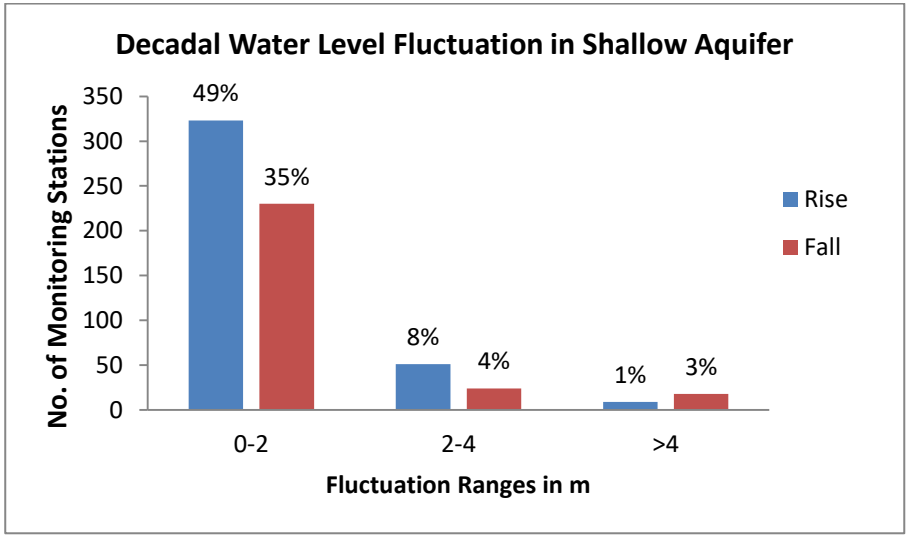

Figure-11: Percentage of wells showing rise and fall in WL in unconfined aquifer (Decadal Mean April (2015-2024) to April 2025)

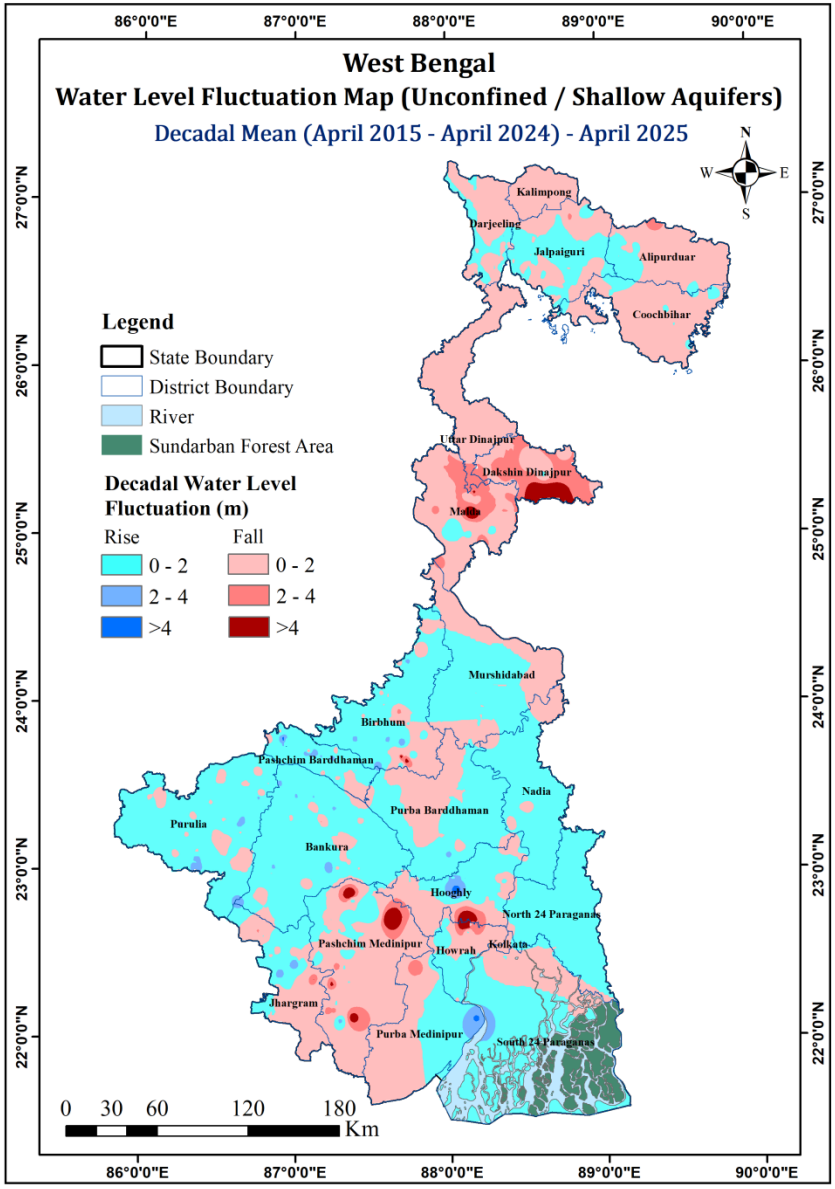

Figure-12: Decadal water level fluctuation in unconfined Aquifer (Decadal Mean April (2015-2024) to April 2025)

6.0 SUMMARY

As a component of the National Ground Water Monitoring Programme, CGWB, ER, Kolkata conducts ground water monitoring on quarterly basis in West Bengal: during April (pre-monsoon), August, November (post-monsoon) and January. As on March 2025, the Eastern Region, Kolkata has 1839 GWMS in the State of West Bengal.

During April 2025, 715 number of wells been monitored tapping tapping Unconfined/shallow aquifer, of which around 94% of the monitoring wells of the State exhibit depth to water level within 20 meters below ground level.

The ground water level in West Bengal during April 2025 has been significantly influenced by rainfall. This period witnessed have heavy pre-monsoon rainfall in West Bengal during 2025 significantly raised the groundwater levels across most regions. In North Bengal and the coastal south, where rainfall exceeded 800 mm and reached nearly 1,900 mm has replenished aquifers. However, Central areas with much lower rainfall (~223 mm), experienced modest water level increases. Overall, the excess precipitation helped in recharging the groundwater in the aquifer system.

Annual water level fluctuation April 2024 to April 2025 shows that 73% rise and 27% fall in annual water level fluctuation which when compared to the year Annual fluctuation (April 2023 to April 2025) having 74% rise and 26% fall in water level, suggests a consistent stable trend in groundwater levels may be due to heavy pre-monsoon showers during 2025.

Similarly, Decadal fluctuation in water level of mean (2015-2024) with respect to April -2025 shows 58% of the area experienced rise and 42% fall in water level, which when compared to the previous year Decadal mean (2014-2023) to April-2024 having 36% rise and 64% fall in water level reveals a positive trend towards replenishment of groundwater, as more areas are showing a rise in water levels compared to the previous period (2014-2023).

7.0 RECOMMENDATIONS

The observed decadal fluctuations in groundwater levels in West Bengal indicate a notable improvement in aquifer system compared to the previous period (2014-2023) wrt April 2024. This shift suggests a significant enhancement in groundwater recharge during (2015-2024) with respect to April -2025.

Based on the observed trends in water level fluctuations, here are some recommendations to maintain or enhance the positive impact on aquifer recharge and water management:

1. **Rainwater Harvesting:** Implementing Roof-top rainwater harvesting structures especially in areas that have seen a fall in water levels.
2. **Artificial Recharge Structures:** Construction of check-dams, contour bunds, and percolation tanks across small streams to slow runoff, support infiltration, and ease groundwater replenishment in western and foothill areas of the State.
3. **Strengthen Watershed Management:** Development of integrated watershed management plans to protect natural recharge zones and prevent soil erosion.
4. **Sustainable Water Usage:** Encouragement for the adoption of water-efficient agricultural practices, including drip irrigation, rain-fed farming, and drought-resistant crop varieties in areas with declining trend.

By following these recommendations, it is possible to sustain and improve the aquifer recharge process, ultimately ensuring better water availability for the future use.

आज़ादी का अमृत महोत्सव

CONSERVE WATER FOR FUTURE

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