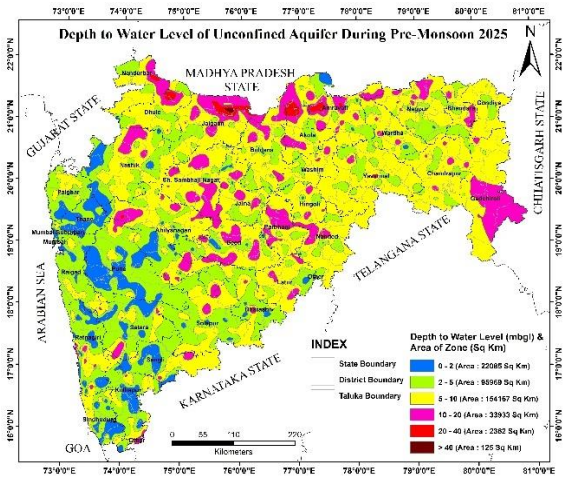
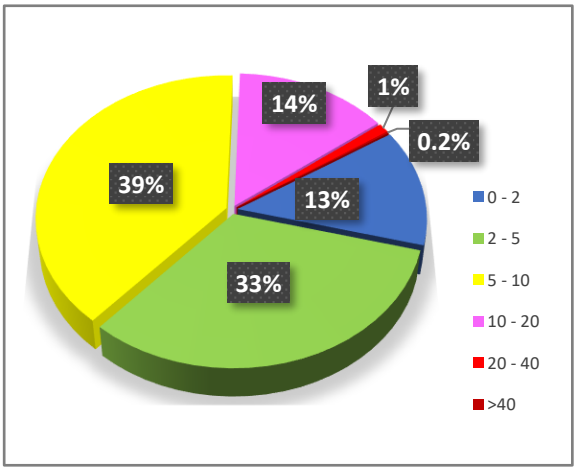
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION





GROUND WATER LEVEL BULLETIN

May-2025

Maharashtra

ABSTRACT

Groundwater Level Scenario – May 2025 (Pre-Monsoon)

The May 2025 pre-monsoon monitoring highlights key findings regarding groundwater levels in the state of Maharashtra. It presents a detailed status of the groundwater regime and includes both annual and decadal comparisons to assess temporal changes and trends.

CENTRAL GROUND WATER BOARD
CENTRAL REGION
NAGPUR

1. INTRODUCTION

Since 1969, the Central Ground Water Board (CGWB) has been monitoring groundwater levels across India four times a year in January, May, August, and November. Based on this data, CGWB prepares a Groundwater Bulletin that highlights seasonal, Annual and long-term changes in the groundwater regime throughout the country. This monitoring is conducted through representative observation wells, offering valuable insights into the dynamics of groundwater.

Natural factors such as rainfall, evapotranspiration, and other climatic variables influence groundwater levels, while human activities like groundwater extraction, artificial recharge through irrigation, and waste disposal also play a significant role. Continuous monitoring enables a scientific assessment of these factors and supports effective groundwater resource management across different regions.

2. STUDY AREA

The State of Maharashtra occupies the west-central part of India. It lies between latitudes 15°45' to 22°00' N and longitudes 73°00' to 80°59' E **(Fig.1).** Maharashtra, the third largest state in India has a total geographical area of 3, 07,713 sq km with 9.4 % of the country area. It is bound on the north by Madhya Pradesh, north-west by Gujrat State, east by Chhattisgarh State, south-east by Telangana state, south by Karnataka and Goa and in the west by the Arabian Sea. Administratively, the state is governed by 36 districts which are grouped into six divisions namely Konkan, Pune, Nashik, Chatrapati Sambhaji Nagar (Aurangabad), Amravati and Nagpur. The State is further divided into five regions namely Konkan, Western Maharashtra, Khandesh, Marathwada and Vidarbha. Total population of the State is 112.37 million (as per census 2011) out of which 50.81 million (45.21%) is urban and 61.56 million (54.78%) is rural. The average density of population is 365 persons/km^2. The overall growth in total population during the decade is ~15.99 % (2001 to 2011 census).

Central Ground Water Board, Central Region, Nagpur has set up a network of 2175 observation wells known as the Ground Water Monitoring Wells (GWMW's) located all over Maharashtra which comprises of 1857 dug wells and 318 piezometers. The average density of Monitoring stations is 141 Km^2/well.

Physiographically, the state can be divided into 3 units namely Sahyadri Range (Western Ghats), the Western Coastal Tract (Konkan), and the Eastern Plateau (Deccan Plateau). Godavari, Krishna, Tapi, Mahanadi,

Narmada and Coastal Basins are the Major River basins in the State. About 75% area of Maharashtra is drained by eastward flowing rivers, viz., the Godavari and Krishna draining into the Bay of Bengal, the remaining 25% of the area is drained by westward flowing rivers, viz., Tapi and Konkan coastal rivers, draining into the Arabian Sea. 45% of state's water resources are from West Flowing Rivers which are mainly monsoon specific rivers emanating from the Ghats and draining into the Arabian Sea. ~53 % of network stations fall in Godavari basin, 16 % fall in Tapi, 16% fall in Krishna, and 15 % network stations fall in the Coastal basins.

Approximately 82% area of the State (2,49,934 sq km) is covered by Deccan trap basalts, whereas rest of area is covered by Quaternary alluvium (14,526 sq km; 4.7 %), Gondwanas (4800 sq km; 1.6 %), Precambrian (Vindhyans, Cuddapahs, and Kaladgi group of rocks - 6,217 sq km; 2%) and Archaean's (32,235 sq km; 10.5%). The aquifers are grouped under three major hydrogeological groups namely unconsolidated, semi-consolidated and consolidated and nine different types of hydrogeological sub-groups based on geological age and hydrogeological characters. These hydrogeological units are further divided into 11 Principal aquifers system.

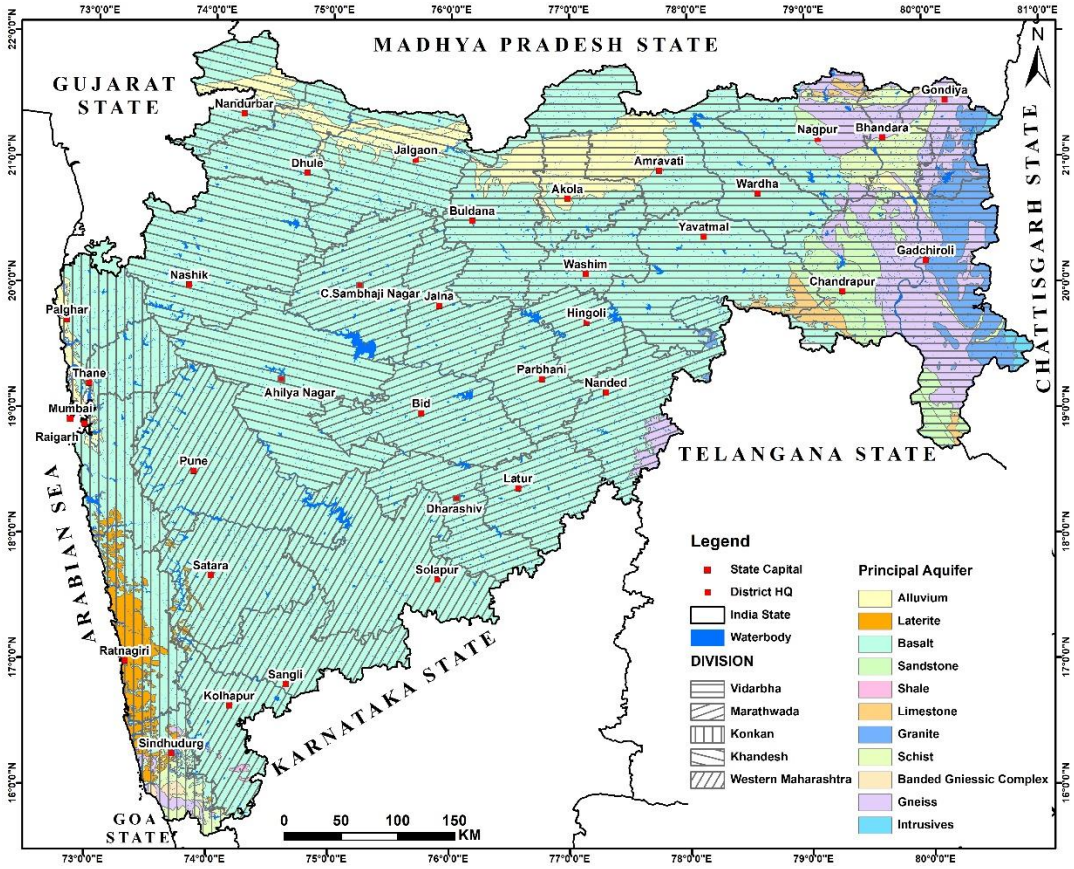


Fig.1: Major Aquifers & Administrative Divisions of Maharashtra state.

3.0 GROUND WATER MONITOIRNG

Central Ground Water Board, Central Region, monitors ground water levels four times (i.e. May, August, November and January) in a hydrological year through a network of 2175 Ground Water Monitoring Wells (GWMW) (DW: 1857 & Pz: 318) spread all over the State**.** The long-term data generated during monitoring is essential for computation, evaluation and analysis of ground water utilization and its availability.

During the month of May-2025, 1960 GWMWs (DW: 1687; Pzs:273) were monitored over entire Maharashtra, However, 95 wells could not be monitored due to various unavoidable reasons like inaccessibility, lock jam, outside added, well filled up, well fitted with pump etc. and 120 wells are dried. The district wise status of GWMWs for the month of May 2025 is presented in **Table 1** and location of GWMWs is shown in **Fig. 2**.

Table-1: District wise status of GWMWs May-2025.

S. No.	District	Active		Dry		Wells Not Monitored		Total wells		
		DW	BW	DW	BW	DW	BW	DW	BW	Total
1	Ahilyanagar (Ahmednagar)	77	11	2	1	1	0	80	12	92
2	Akola	23	6	2	0	1	1	26	7	33
3	Amravati	81	12	4	0	6	4	91	16	107
4	C. Sambhaji Nagar (Aurangabad)	45	4	5	0	0	1	50	5	55
5	Beed	63	1	2	0	0	0	65	1	66
6	Bhandara	27	2	3	0	1	2	31	4	35
7	Buldhana	60	47	5	3	6	3	71	53	124
8	Chandrapur	57	06	5	4	2	2	64	12	76
9	Dhule	35	6	2	0	0	0	37	6	43
10	Gadchiroli	37	3	6	1	0	0	43	4	47
11	Gondia	18	8	0	0	1	0	19	8	27
12	Hingoli	28	0	0	0	1	0	29	0	29
13	Jalgaon	59	4	3	1	0	0	62	5	67
14	Jalna	46	6	3	0	0	0	49	6	55
15	Kolhapur	39	4	2	0	0	0	41	4	45
16	Latur	36	6	5	0	0	1	41	7	48
17	Mumbai City	6	0	0	0	0	0	6	0	6
18	Mumbai Suburban	19	0	0	0	0	0	19	0	19
19	Nagpur	145	29	14	2	1	1	159	33	192
20	Nanded	54	1	0	0	2	1	56	2	58
21	Nandurbar	22	4	0	0	0	0	22	4	26
22	Nashik	62	7	6	0	3	0	71	7	78
23	Dharashiv (Osmanabad)	32	2	4	0	3	1	39	3	42
24	Palghar	41	2	0	0	0	0	41	2	43
25	Parbhani	44	2	0	0	3	0	47	2	49
26	Pune	62	5	3	0	2	0	67	5	72

S. No.	District	Active		Dry		Wells Not Monitored		Total wells		
		DW	BW	DW	BW	DW	BW	DW	BW	Total
27	Raigad	48	1	1	0	0	0	49	1	50
28	Ratnagiri	63	18	0	0	2	0	65	18	83
29	Sangli	25	14	5	2	10	4	40	20	60
30	Satara	30	2	10	1	14	1	54	4	58
31	Sindhudurg	50	15	7	1	0	1	58	16	74
32	Solapur	52	7	0	0	3	1	55	8	63
33	Thane	25	0	0	0	0	0	25	0	25
34	Wardha	59	8	0	0	2	2	61	10	71
35	Washim	47	5	0	0	0	1	47	6	53
36	Yavatmal	70	25	5	0	2	2	77	27	104
Grand Total		**1687**	**273**	**104**	**16**	**66**	**29**	**1857**	**318**	**2175**

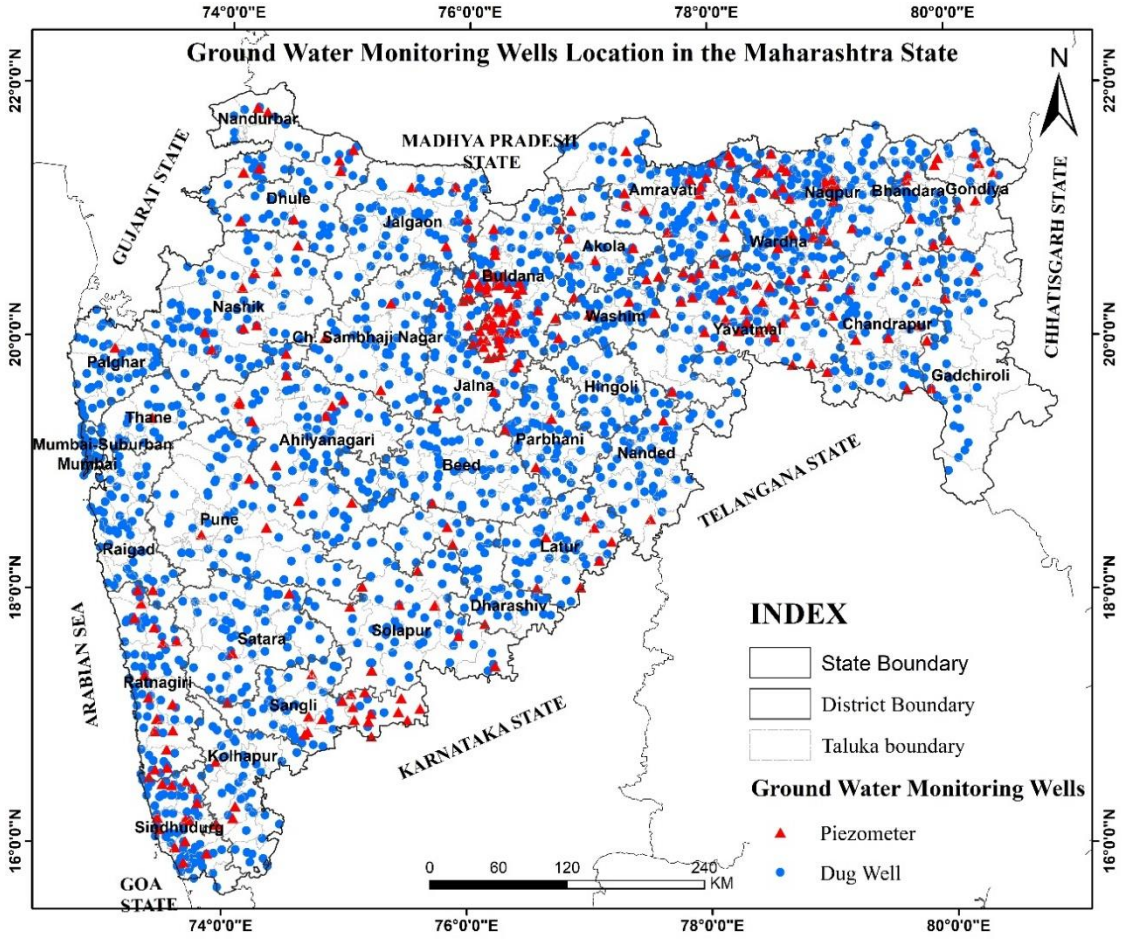


Fig.2: Ground Water Monitoring Wells (GWMWs), Maharashtra.

4.0 RAINFALL

As per the IMD, the departure of monsoon rainfall from normal rainfall for the period from 1st June 2024 to 30th September 2024 in 36 districts of Maharashtra has been considered to correlate the prevailing ground water level scenario. It is observed that out of 36 districts, 22 districts received

excess rainfall, Hingoli district received deficient rainfall and remaining 13 districts received normal rainfall during this period (**Table-2 & Fig. 3**).

Table-2: District wise departure of rainfall with respect to Normal Rainfall (01-06-2024 to 30-09-2024).

S. No.	District	% Departure of Rainfall wrt Normal Rainfall	Category
1	Ahilyanagar(Ahmednagar)	49	Excess
2	Akola	13	Normal
3	Amravati	-2	Normal
4	C. Sambhaji Nagar (Aurangabad)	19	Normal
5	Beed	29	Excess
6	Bhandara	13	Normal
7	Buldhana	24	Excess
8	Chandrapur	14	Normal
9	Dhule	37	Excess
10	Gadchiroli	25	Excess
11	Gondia	8	Normal
12	Hingoli	-35	Deficient
13	Jalgaon	46	Excess
14	Jalna	31	Excess
15	Kolhapur	45	Excess
16	Latur	37	Excess
17	Mumbai	18	Normal
18	Mumbai Suburban	33	Excess
19	Nagpur	11	Normal
20	Nanded	15	Normal
21	Nandurbar	36	Excess
22	Nashik	44	Excess
23	Dharashiv (Osmanabad)	23	Excess
24	Palghar	32	Excess
25	Parbhani	32	Excess
26	Pune	43	Excess
27	Raigad	21	Excess
28	Ratnagiri	26	Excess
29	Sangli	48	Excess
30	Satara	15	Normal
31	Sindhudurg	40	Excess
32	Solapur	12	Normal
33	Thane	12	Normal
34	Wardha	29	Excess
35	Washim	16	Normal
36	Yavatmal	29	Excess

Source: https://sandrp.in/2024/10/07/sw-monsoon-2024-district-wise-rainfall-in-india/

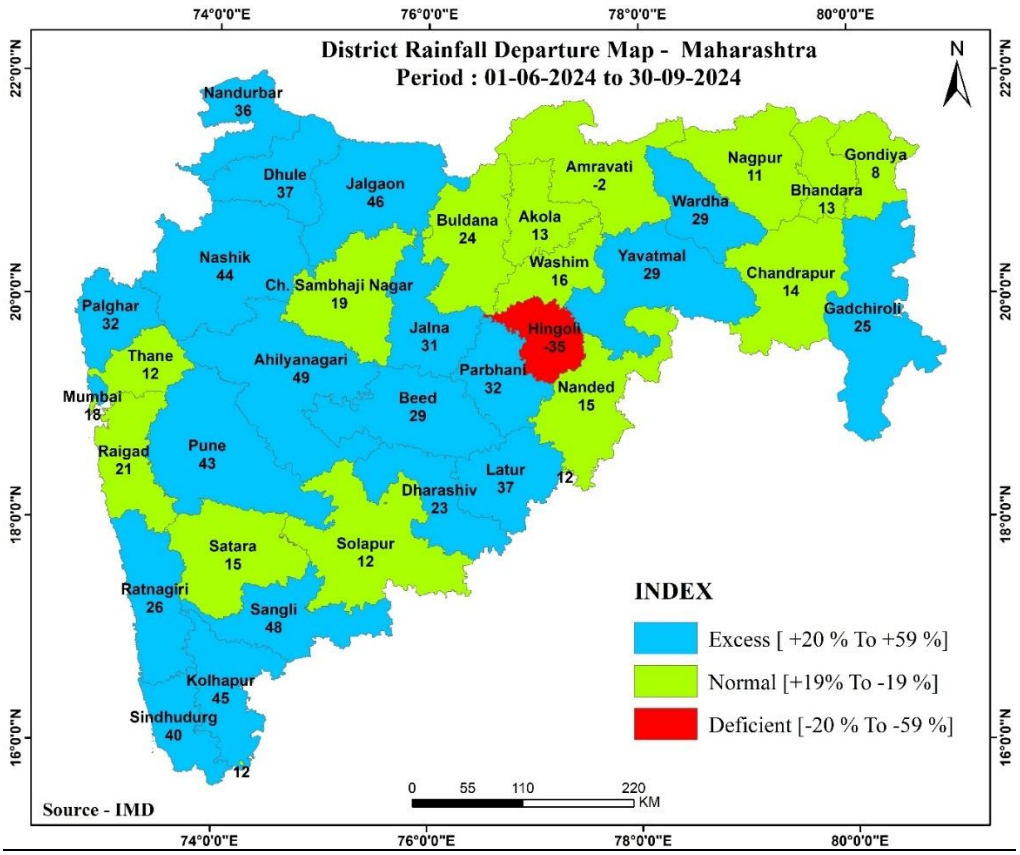


Fig. 3: Rainfall deviation (June to Sept 2024) from normal rainfall.

5.0 GROUND WATER LEVEL SCENARIO

5.1 Unconfined Aquifer

5.1.1 Depth to Water Level Data

The depth to water level data of 1704 wells is used for the analysis. Depth to water level in unconfined aquifer ranges from near ground level 0.01 mbgl (Pune district) to 48.50 mbgl (Jalgaon district). Water levels of < 2 mbgl is recorded in 13% of wells, between 2 to 5 m in 33% of wells, between 5 to 10 m in 39 % of wells, between 10 to 20 m in 14 % of wells, and water level more than 20 m is registered in ~1% of the wells **(Fig. 4)**.

Water levels less than 2 mbgl is covering about 22,085 sq km area covering mainly in parts of Thane, Pune, Sangli, Satara, Ratnagiri, Kolhapur and Sindhudurg districts. Water levels between 2 and 5 mbgl cover an area of ~ 95,969 sq km forming major part of all the districts of Konkan and Western Maharashtra regions; and also parts of all the districts of Khandesh, Marathwada and Vidarbha regions. Water levels between 5 and 10 mbgl are observed in major parts of the state covering an area of ~1,54,167 sq km. Depth to water levels in this range are observed in major parts of all the districts of Vidarbha, Marathwada and Khandesh regions; parts of Ratnagiri and Sindudurg districts of Konkan region; Solapur and

Sangli districts of Western Maharashtra region. Water levels between 10 and 20 mbgl covering an area ~33,933 sq. km. is mainly observed in Amravati, Akola, Buldhana, Jalgaon, Dhule and Nandurbar Districts and isolated parts of Chatrapati Sambhaji Nagar (Aurangabad), Parbhani, Nanded, Nashik, Ahilyanagar (Ahmednagar), Beed, Nagpur and Gadchiroli districts. Water levels > 20 mbgl is observed mainly in Amravati and Jalgaon districts covering ~2487 sq km. area **(Fig. 5)**.

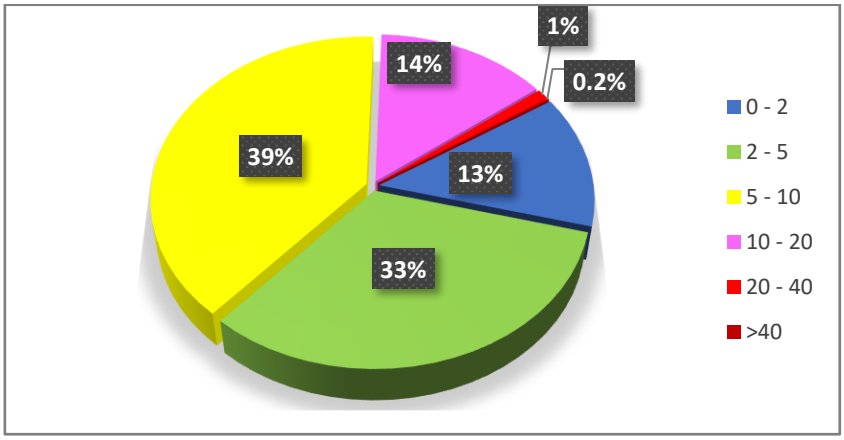


Fig. 4: Percentage of wells in different water level ranges in an unconfined aquifer.

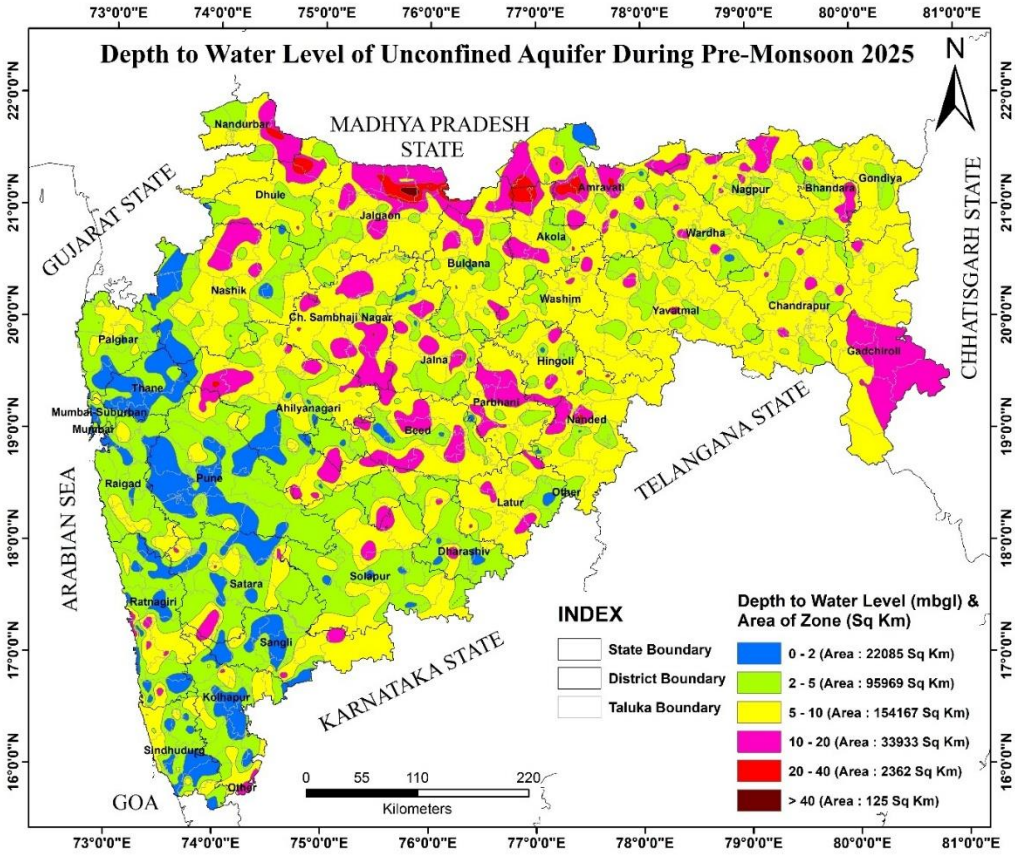


Fig. 5: Depth to Water Level of unconfined aquifer during Pre-Monsoon 2025.

5.1.2 Annual Fluctuation in Water Level

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

Water Levels from 1605 stations were compared with that of May 2024 to know the annual changes in ground water in May 2025 and it was observed that ~69% of wells have recorded a rise in water level and the remaining 31% of the wells have recorded a fall in water level. **(Fig. 6)**.

Rise in Water Levels:

Rise in water level of less than 2 m is recorded in ~33% wells, 2 to 4 m in 18% wells and more than 4 m in 18% of wells. About 69 % of wells show a rise in water level in the order of 0 to >4 m which cover an area of ~2,27,264 sq km.

Rise in water levels less than 2 m is observed in ~1,07,178 sq km area covering major part of the state, whereas rise in water level between 2-4 m and > 4 m are observed mainly in parts of almost all the districts of Marathwada, Khandesh, Western Maharashtra and Konkan regions and Buldhana and Washim districts of Vidarbha region covering an area of ~1,20,086 sq km **(Fig. 7).**

Fall in Water Levels:

About 31 % of wells, which cover an area of ~81,366 sq km of the state show a decline in water level in the range of 0 to >4 m. Fall in water levels of less than 2 m is recorded in 22% wells, 2 to 4 m in 6% wells and more than 4 m in 3% wells.

Fall in water level <2 m is observed mainly in parts of all the districts of Vidarbha region, Raigad district of Konkan region, Solapur and Satara districts of Western Maharashtra region. Apart from this, isolated patches are observed in almost all the districts except Mumbai and Ch. Sambhaji Nagar (Aurangabad) districts covering ~63,473 sq km area of the state.

Fall in water level > 2 m is observed mainly in parts of Gadchiroli district of Vidarbha region and Raigad district of Konkan region; isolated patched are observed in almost all the districts except Gondia, Mumbai, Mumbai Suburban, Nandurbar and Thane districts covering ~17,893 sq km area of the state **(Fig. 7)**.

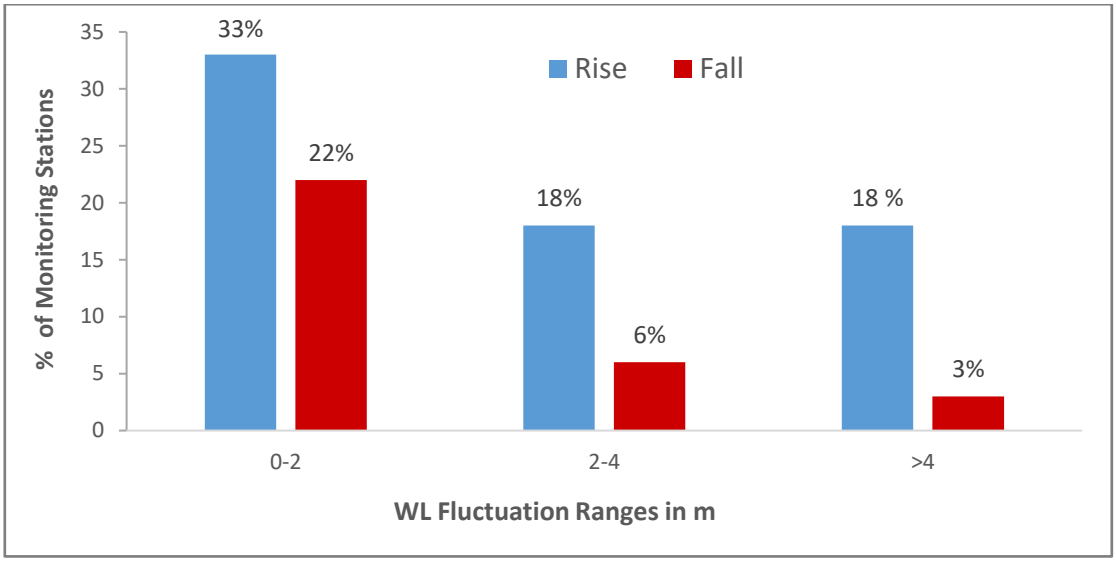


Fig. 6: Percentage of wells showing rise and fall in water level in unconfined aquifer (Pre-monsoon 2024 to Pre-monsoon 2025)

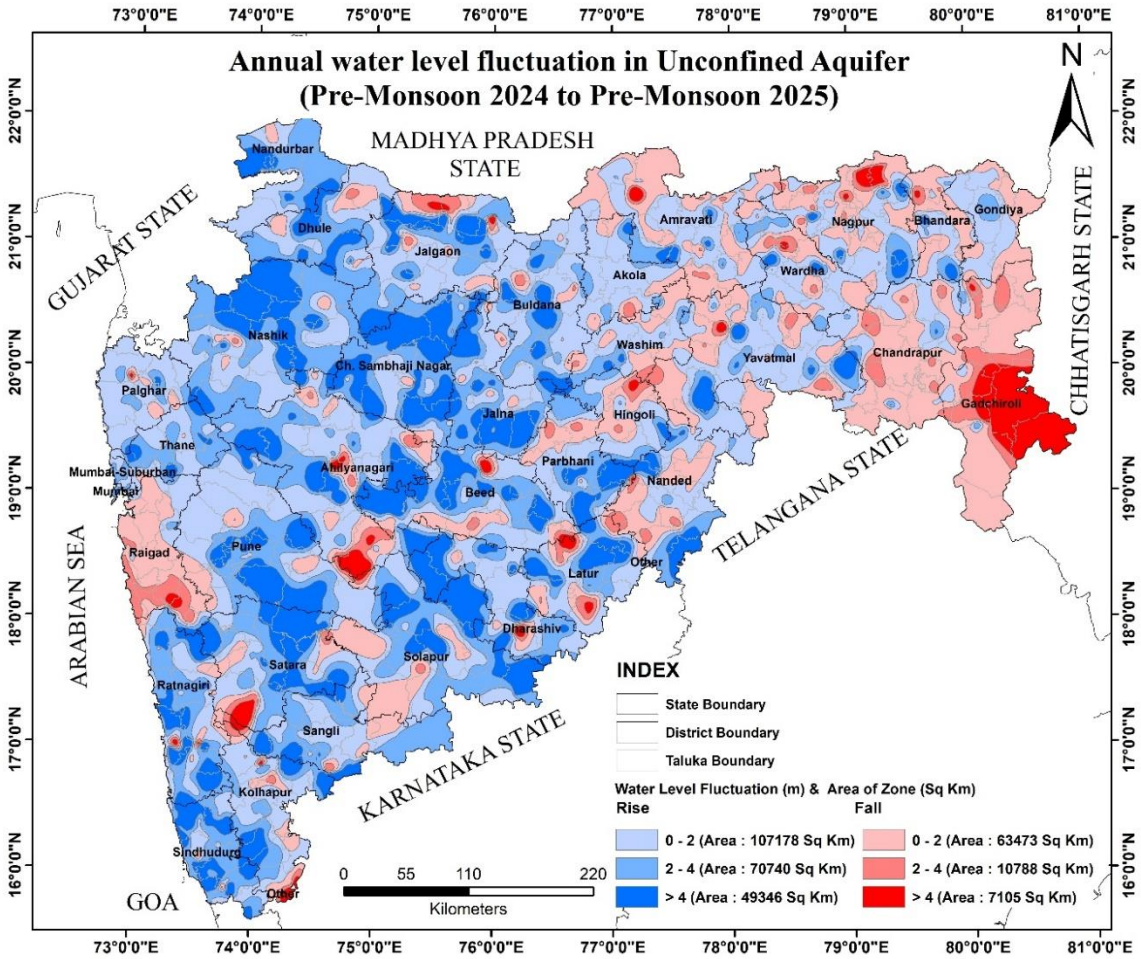


Fig. 7: Annual water level Fluctuation in unconfined aquifer. (Pre-monsoon 2024 to Pre-monsoon 2025)

Annual Fluctuation of Water level in Unconfined Aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

Water Levels from 1463 stations were compared with that of May 2023 to know the annual changes in ground water in May 2025. Approximately ~64% of wells have recorded a rise in water level, the remaining ~36% of wells have recorded a fall in water level. **(Fig. 8)**.

Rise in Water Levels:

Rise in water level of less than 2 m is recorded in ~33% wells, 2 to 4 m in 17% wells and more than 4 m in 14% of wells. About 64 % of wells show a rise in water level in the order of 0 to >4 m which cover an area of ~2,05,526 sq km.

Rise in water levels less than 4 m is observed in ~1,73,951 sq km area covering major part of all the districts of Western Maharashtra, Khandesh and Marathwada regions: Palghar district of Konkan region and Nagpur, Akola, Buldhana and Washim districts of Vidarbha region.

A significant rise in water level > 4 m (14 % of wells) are observed mainly in parts of Ahilya Nagar (Ahmednagar), Dharashiv (Osmanabad), Ratnagiri, Sindhudurg, Pune, Satara, Solapur, Hingoli and Nanded districts. Apart from this, isolated patches are observed in almost all the districts except Gadchiroli district covering an area of ~31,525 sq km **(Fig. 9).**

Fall in Water Levels:

About 36 % of wells, which cover ~1,03,098 sq km area of the state show a decline in water level in the range of 0 to >4 m. Fall in water levels of less than 2 m is recorded in 25% wells, 2 to 4 m in 4% wells and more than 4 m in 7% wells.

Fall in water level < 2 m is observed mainly in parts of Gadchiroli, Chandrapur, Bhandara, Gondia, Yavatmal and Amravati districts of Vidarbha region, Parbhani, Hingoli, Nanded, Ch. Sambhaji Nagar (Aurangabad) districts of Marathwada region, Dhule, Jalgaon districts of Khandesh region and Raigad district of Konkan region covering ~80,249 sq km area of the state.

Fall in water level > 2 m is observed mainly in parts of Nanded, Yavatmal, Ch. Sambhaji Nagar, Solapur and Jalgaon districts. Apart from this, isolated patches are observed in almost all the districts except Mumbai, Nandurbar, Sindhudurg and Thane districts covering ~22,849 sq km area of the state **(Fig. 9)**.

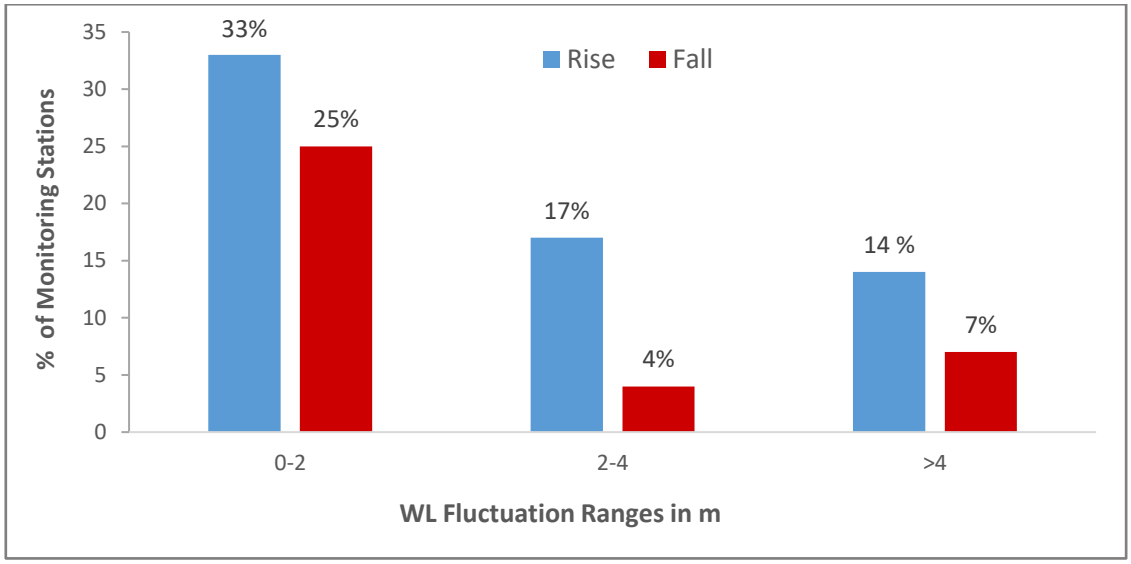


Fig. 8: Percentage of wells showing rise and fall in water level in unconfined aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

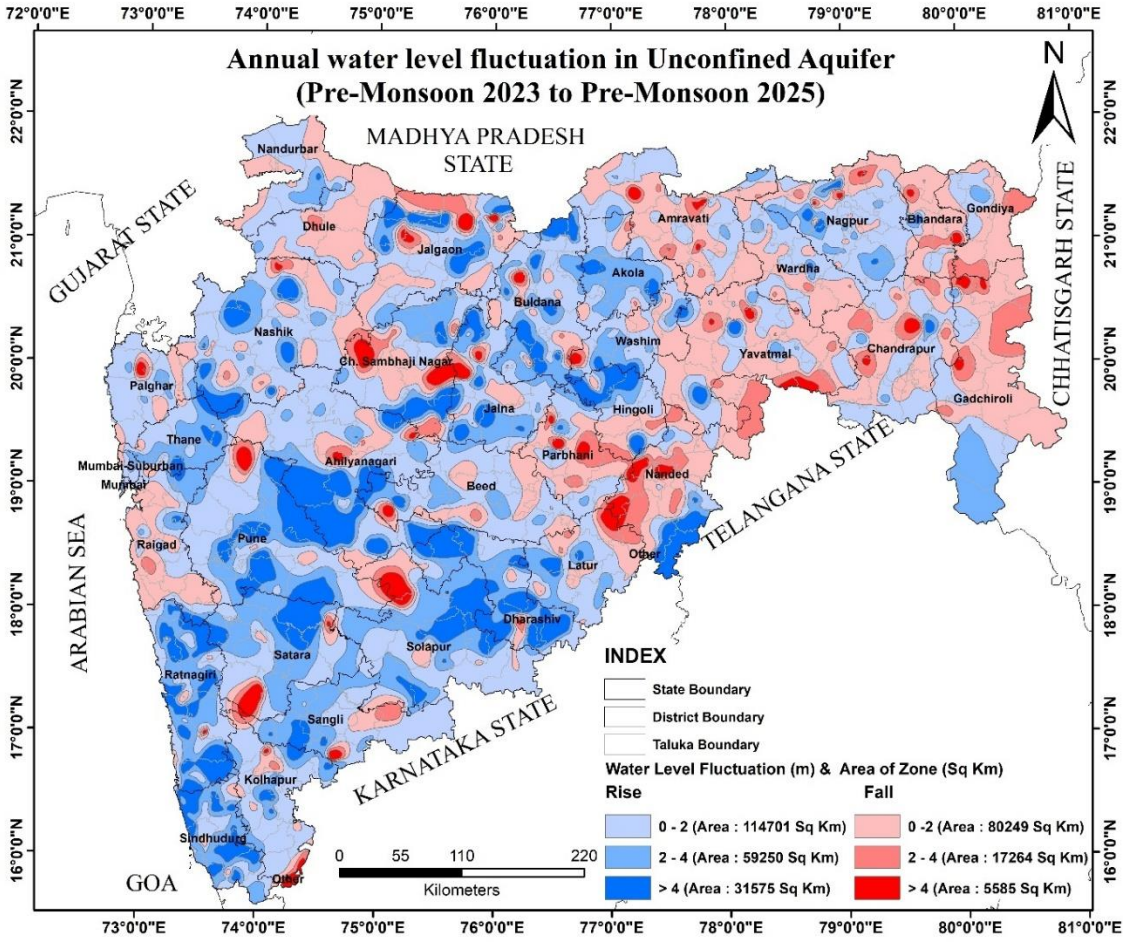


Fig. 9: Annual water level Fluctuation in unconfined aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

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 mean ground water levels of 1576 stations for the period of May 2015-24 were compared with the ground water level of May 2025. It is observed that 81% have shown a rise in water level and 19 % have shown a fall in water level **(Fig. 10)**.

Rise in Water Levels:

Rise in water level of less than 2 m is recorded in 33 % wells, 2 to 4 m in 27 % wells and more than 4 m in 21% of wells. The rise in water level up to 2 m, 2 to 4 m and less than 4 m recorded in ~81 % of wells, which cover an area of ~2,64,352 sq km.

Rise in water Level less than 2 m is observed covering ~1,05,867 sq km in major parts of all the districts of the State. Rise in water level >2 m is observed in major parts of almost all the districts of Western Maharashtra, Marathwada, Konkan and Khandesh region and Akola, Buldhana and Washim districts of Vidarbha region covering an area of 1,58,485 sq. km **(Fig. 11).**

Fall in Water Levels:

Fall in water level of less than 2 m is recorded in 15 % wells, 2 to 4 m in 3 % wells and more than 4 m in 1 % of wells. The fall in water level up to 2 m, 2 to 4 m and more than 4 m recorded in ~19 % of wells, which cover an area of ~44,277 sq km.

Fall in water Level less than 2 m is observed mainly in parts of Gadchiroli, Chandrapur, Bhandara, Nagpur and Yavatmal districts of Vidarbha region and Raigad district of Konkan region. Apart from this, isolated patches are observed in almost all the districts except Mumbai and Nandurbar districts covering 37,469 sq km whereas fall in water level more than 2 m has been observed mainly in isolated parts of Sangli, Satara, Solapur, Beed, Nagpur, Latur and Jalgaon districts covering an area of 6,809 sq. km **(Fig. 11)**.

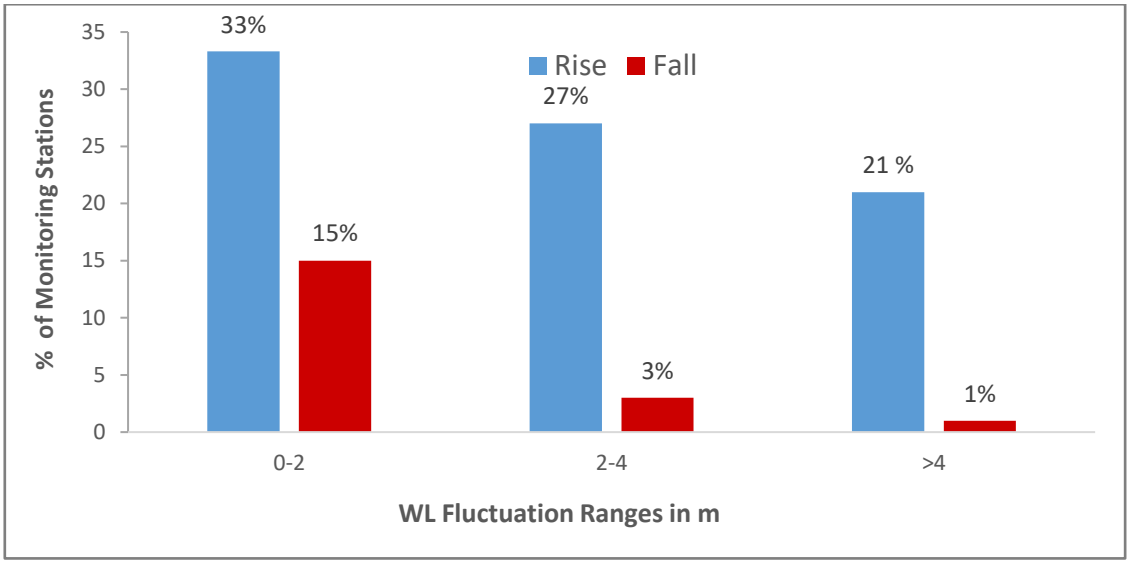


Fig. 10: Percentage of wells showing rise & fall unconfined Aquifer (Decadal Mean Pre-monsoon (2015 -2024) to Pre-Monsoon 2025).

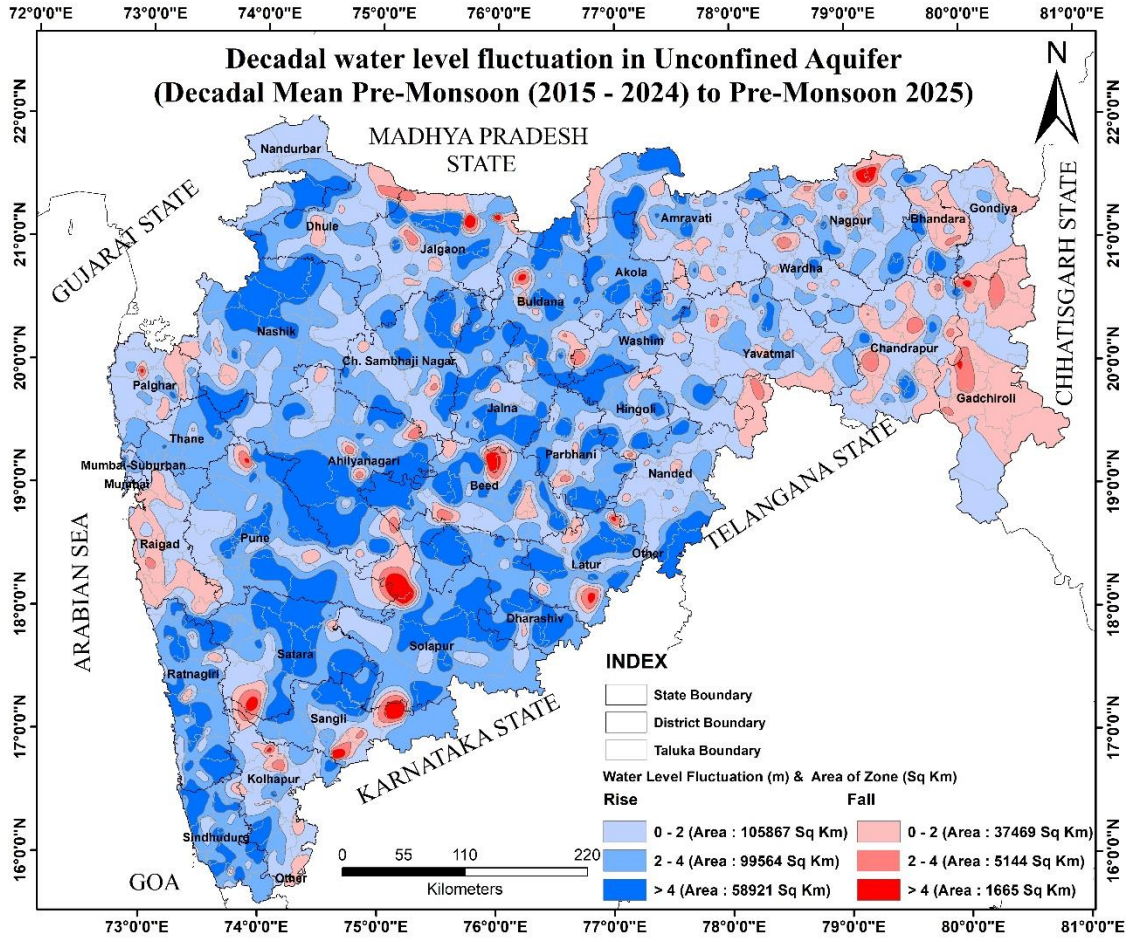


Fig. 11: Decadal Water level fluctuation in unconfined aquifer (Decadal Mean Pre-monsoon (2015 -2024) to Pre-Monsoon 2025).

6.0 SUMMARY

The groundwater levels in the state are monitored through a network of 2175 wells or evaluation of groundwater levels during May-2025.

- The water levels from un-confined aquifer are analyzed for their distribution with different ranges and compared with annual and decadal water levels.

- During this season, unconfined aquifer water levels are in the range of 0.01 to 48.50 mbgl and the more predominate water level range is 5-10 and 2-5 m, occupies about 1,54,167 sq km and 95,969 sq.km of geographical area respectively and in 72% of wells. Shallowest levels were observed in Pune district, while the deepest in Jalgaon district. In most coastal regions, water levels are very shallow (2-5 and 0-2 mbgl). In the northern part of the state covering Tapi- Purna alluvium deeper water levels (>10 m) are observed.

  The annual fluctuations during May-25 WRT May-24, 69% of wells shown rise in water levels in the ranges of 0-2, 2-4 and > 4 m and a fall in water level is observed in about 31 % of wells. The rise mostly occurred in almost all the districts of Khandesh, Western Maharashtra Konkan and Marathwada regions and fall in water level mostly observed in parts of almost all the districts of Vidarbha region.

- The annual fluctuations during May-25 WRT to May-23 show 64 % rise in water levels in the range of 0-2, 2-4 and > 4 m and 36 % of wells fall in water levels. Rise in water level is observed in parts of almost all the districts of Marathwada, Western Maharashtra, Khandesh and Konkan regions and fall in water level mostly observed in major parts of Vidarbha region and parts of Parbhani, Nanded, Ch. Sambhaji Nagar, Dhule, Jalgaon and Raigad districts.

- The decadal fluctuations in water levels during May-25 with respect to last decade (2015-24) of the same season shows rise in 81% of wells, rise in water level is observed in major parts of the state. Fall in water levels is observed in 19 % of wells and a decline of > 2 m is observed in isolated parts of Sangli, Satara, Solapur, Beed, Nagpur Latur and Jalgaon districts.

7. Recommendations:

- Analysis of the groundwater scenario of Maharashtra reveals that the dynamics of groundwater is intricately related to the variation in rainfall. Hence the following recommendations have been submitted:

- To sustain Monsoon Recharge, efforts must be made to harvest rainwater through check dams and percolation tanks at sites highlighted in Artificial Recharge Master Plan. It is also recommended to protect and enhance natural recharge zones identified in District Recharge Plan to retain monsoon benefits.

- Promoting efficient micro-irrigation techniques like drip and sprinkler irrigation to reduce groundwater extraction and encourage farmers to grow less water-intensive crops in drought-prone regions of Maharashtra. Adopting crop diversification to shift from high-water-consuming crops (paddy, sugarcane) to drought-resistant crops.

- In deep water level areas (>20 m), enforcing strict GW regulations while also providing incentives/facilitate for sustainable irrigation practices.

- In Urban areas, dependency on ground water has to be curbed by improving surface water supply for domestic use. Promoting the reuse of treated water for non-potable purposes to lessen groundwater exploitation. In Urban areas, promoting RTRWH structures for water conservation/ Recharging the aquifer.

- Promoting afforestation in depleted regions to improve soil moisture retention and groundwater recharge. Selecting native tree species with deep root systems to enhance percolation and groundwater sustainability.

- Escalating Community Awareness programs to educate farmers and industries on water-efficient practices. Establishing community water conservation groups to encourage participatory groundwater management.

- Regulating and monitoring industrial ground water use in areas where industrial activities are more, encouraging industries to use treated surface water wherever possible instead of Ground Water.