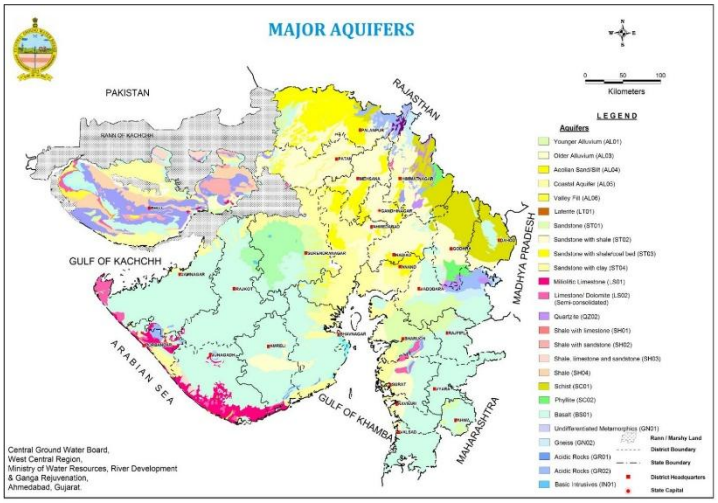
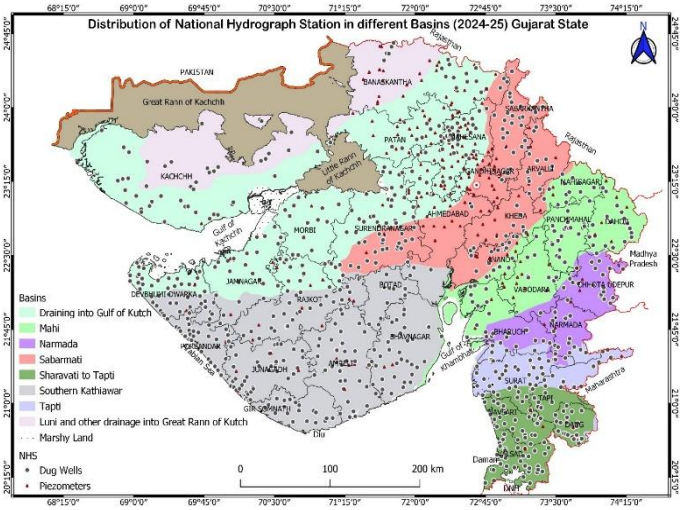
GROUND WATER LEVEL BULLETIN

May 2025

Gujarat





ABSTRACT

Ground water level Scenario during May 2025 highlighting the findings, status of ground water level in different aquifers and its annual and decadal comparison.

CGWB, WEST CENTRAL REGION, GUJARAT

Contents

1.0 Introduction

Groundwater bulletin is prepared by CGWB, WCR, Ahmedabad 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 pumping from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc. Initially, the monitoring commenced in the year 1969 with the establishment of 82 observation wells spread uniformly over the entire state, and since then, the numbers of stations were added regularly so as to get proper hydrological information of different hydrogeological and geo-morphological units. Fig.-1.

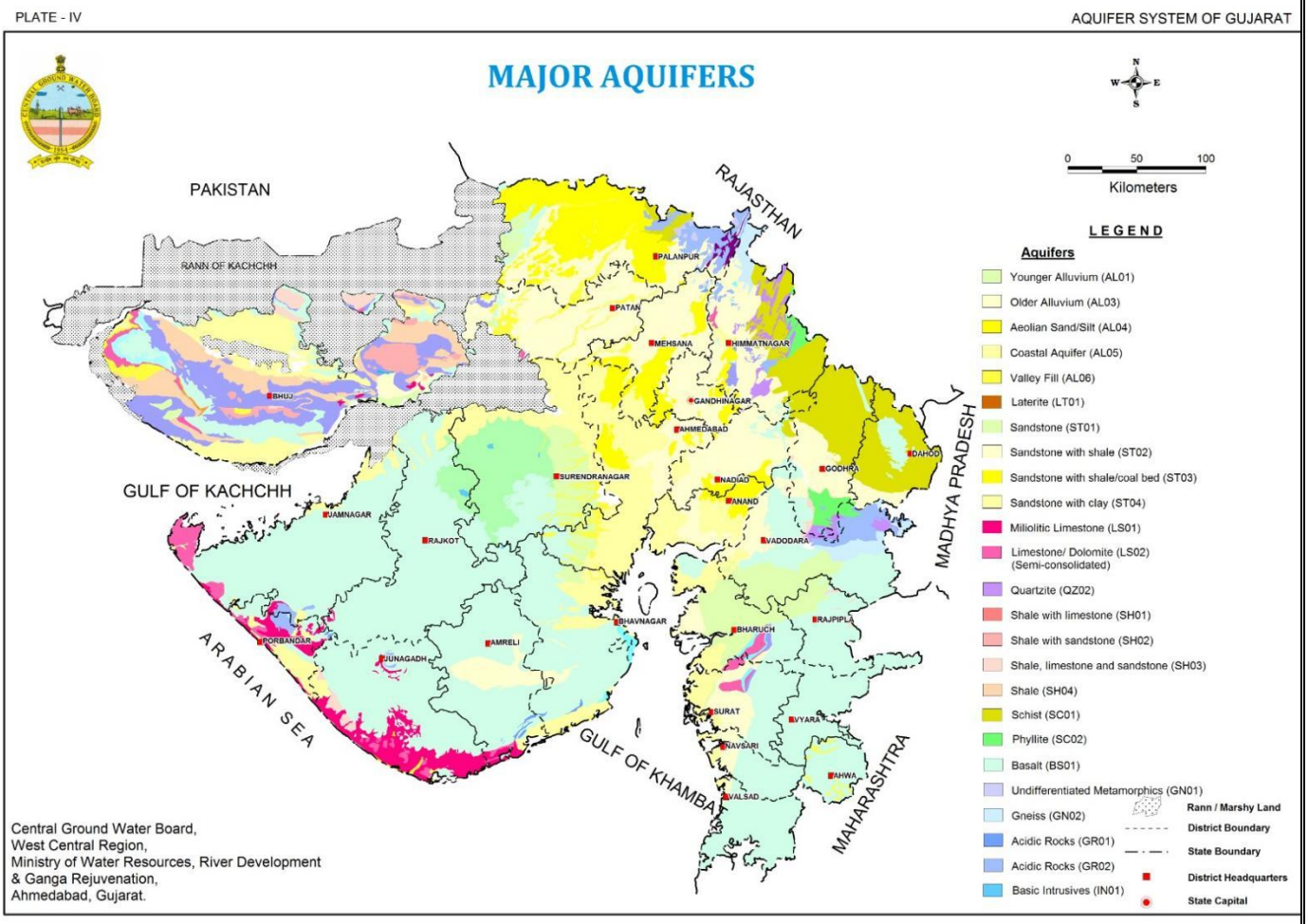


Fig. 1 Map showing major aquifers and administrative divisions of the state/study area

2.0 Study Area

The Gujarat is one of India's most prosperous states is situated along the western coast of India between North latitudes 20° 06' 00" to 24° 42' 00" and East longitudes 68° 10' 00" to 74° 28' 00". It has nearly 2,340.62 kilometers long coastline, which is the longest as compared to any other state in the country. It is extending from Lakhpat in north to Daman in south. The State has common boundaries with the states of Rajasthan, Madhya

Pradesh and Maharashtra and shares international border with Pakistan in northwest. Gujarat is fifth largest state in India by area, covering about 1,96,024 km^2. Administratively, Gujarat currently has 34 districts. The capital of Gujarat is Gandhinagar, with Ahmedabad as its largest city. Kutch is the largest district of Gujarat while Dang is the smallest. Ahmedabad is the most populated district while Dang is the least. There are 252 Talukas (subdivisions of districts) in Gujarat.

3.0 Ground Water Level Monitoring

Central Ground Water Board, as a part of its national program, has established a network of observation wells in the state of Gujarat for periodic monitoring of groundwater levels and to study its quality variation in time and space. WCR, has set up a network of 792 observation wells in unconfined aquifers known as the Ground Water Monitoring Wells (GWMW's) located all over Gujarat. The distributions of monitoring wells in different districts are given in Table 1. Map showing hydrograph stations monitored during the year and their distribution in different basin and the district is presented as Fig. 2.

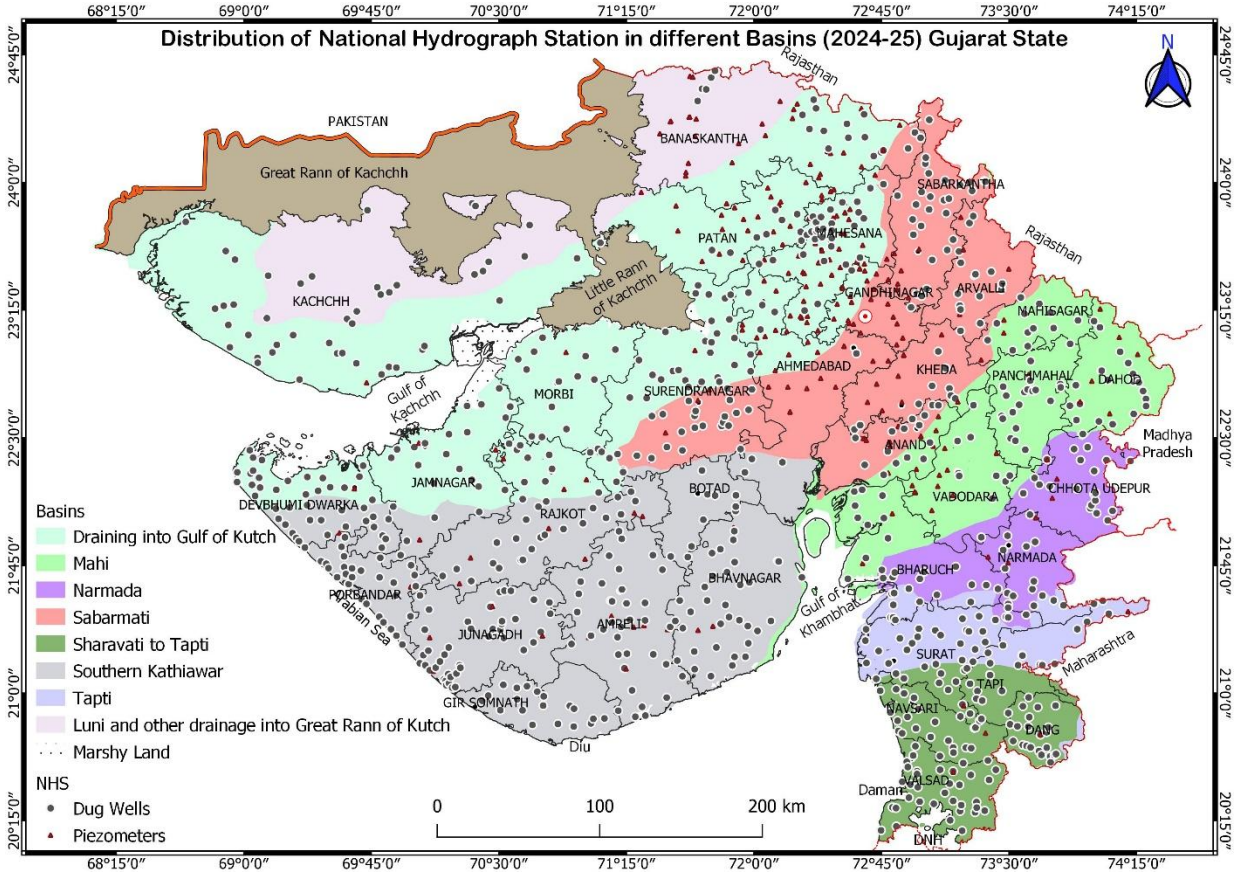


Fig. 2 Map showing locations of monitoring wells (NHNS) in the state/study area

Table 1: distributions of monitoring wells in different districts

District	No of stations
Ahmedabad	9
Amreli	38
Anand	16
Arvalli	5
Banas Kantha	16
Bharuch	30

Bhavnagar	38
Botad	6
Chhotaudepur	22
Dahod	26
Dangs	23
Devbhumi Dwarka	41
Dohad	1
Gandhinagar	1
Gir Somnath	19
Jamnagar	24
Junagadh	42
Kachchh	43
Kheda	16
Mahesana	25
Mahisagar	11
Morbi	12
Narmada	15
Navsari	17
Panch Mahal	22
Patan	11
Porbandar	28
Rajkot	42
Sabar Kantha	29
Surendranagar	51
Tapi	16
Vadodara	23
Valsad	31

4.0 Rainfall

Gujarat received 55 % more rainfall than the average rainfall. Almost entire area received normal rainfall. Figure 3.

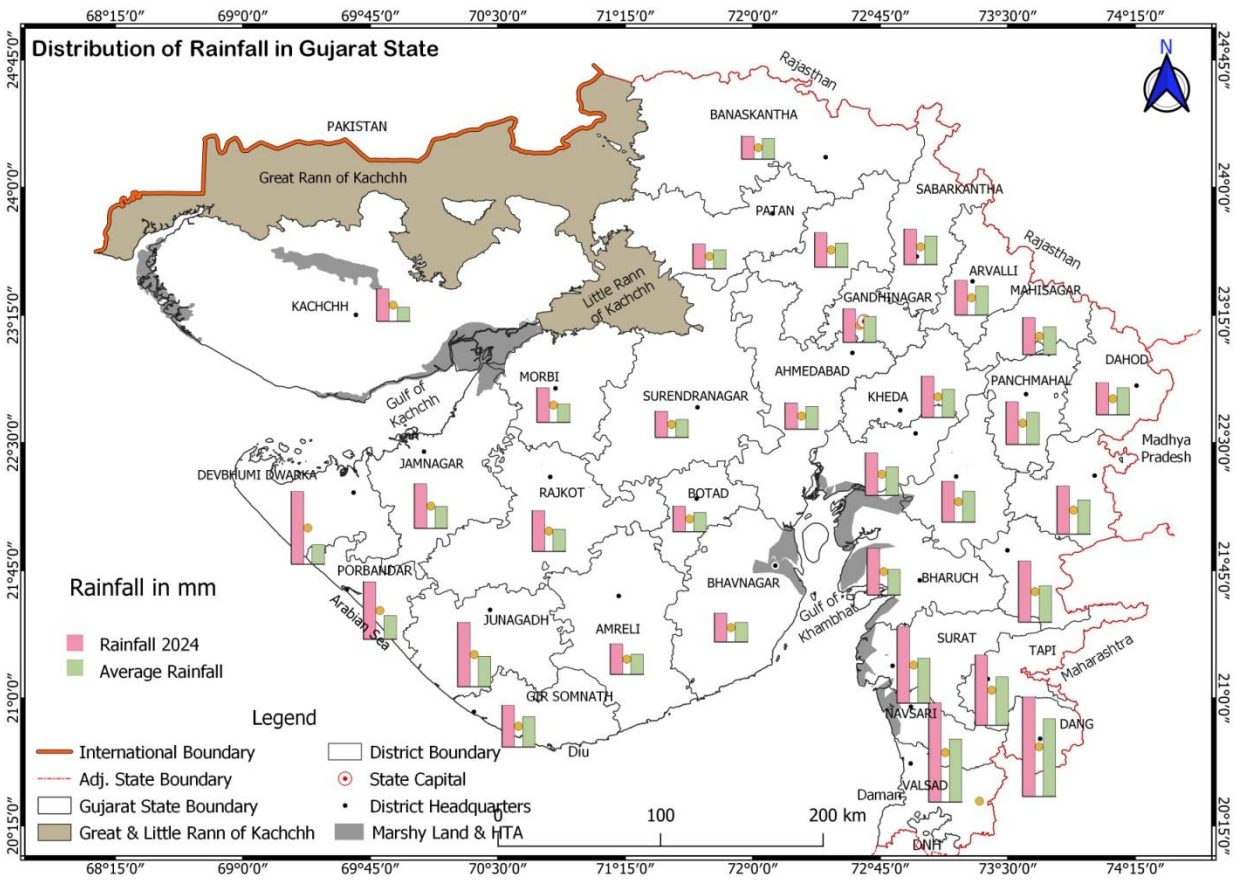


Figure 3: Rainfall deviation from normal rainfall

Table 2: District-wise variability of rainfall in the state

S. No.	District	Actual Rainfall 2024, mm	Normal Rainfall, mm	Departure % (Year 2024)
1	AHMEDABAD	762.00	660.5	15%
2	AMRELI	880.82	586.5	50%
3	ANAND	1230.63	829.7	48%
4	ARVALLI	1006.17	842.4	19%
5	BANASKANTHA	664.64	599.3	11%
6	BHARUCH	1357.56	743.9	82%
7	BHAVNAGAR	834.70	570.1	46%
8	BOTAD	736.25	560.3	31%
9	CHHOTAUDEPUR	1396.50	995.3	40%

10	DAHOD	927.89	782	19%
11	DANGS	2884.33	2249.5	28%
12	DEVBHUMI DWARKA	2104.00	565.7	272%
13	GANDHINAGAR	974.00	751.2	30%
14	GIR SOMNATH	1204.00	880.3	37%
15	JAMNAGAR	1290.67	635	103%
16	JUNAGADH	1862.50	884.5	111%
17	KACHCHH	937.60	409.5	129%
18	KHEDA	1195.20	817.6	46%
19	MAHESANA	998.20	698.8	43%
20	MAHISAGAR	1072.00	806	33%
21	MORBI	1000.40	533.5	88%
22	NARMADA	1772.80	1057.1	68%
23	NAVSARI	2874.67	1829.8	57%
24	PANCHMAHALS	1234.29	930	33%
25	PATAN	723.22	554.3	30%
26	PORBANDAR	1663.67	688	142%
27	RAJKOT	1181.27	643	84%
28	SABARKANTHA	1023.63	826.2	24%
29	SURAT	2204.30	1302.3	69%
30	SURENDRANAGAR	759.60	521.9	46%
31	TAPI	2032.86	1402.3	45%
32	VADODARA	1184.38	897.7	32%
33	VALSAD	3169.33	2064.5	54%
	Gujarat State	**1368.00**	**882.38**	**55%**

5.0 Ground Water Level Scenario

Systematic and regular monitoring of groundwater levels brings out the changes taking place in the groundwater regime. The maps so generated are of immense help for regional groundwater flow modelling which serves as a groundwater management tool to provide the necessary advance information to the user agencies to prepare contingency plans in case of unfavorable groundwater recharge situation. The data also has immense utility in deciding the legal issues arising out of conflicting interests of groundwater users.

5.1 Unconfined Aquifer

5.1.1 Depth to Water Level Data

During May 2025, in the pursuance of *Figure 4 and 5* reveals that water levels varies between 0.03 m bgl (Godhra village,Panch Mahals district) to 39.7 m bgl (Goraj, Junagadh). Water level of less than 2 m bgl is recorded in 8.6 % of wells, between 2 to 5 m bgl in 24.7% of wells, between 5 to 10 m bgl in 36.4% of wells, between 10 to 20 m bgl in 27.3 % of wells, above 20 m bgl in 5.77% of wells. Shallow water level of less than 2 m bgl occurs as isolated patches in parts of Dang, Kachchh, Ananad, Panchmahals, Surendranagar districts. Water level of 2 to 5 m bgl is observed in all the districts of Gujarat state except in Banaskantha. Depth to water level of 5 to 10 m bgl is observed throughout the state except in Ahmedabad district. Water level of 10 to 20 m bgls observed throughout the state except in Bharuch district. Deeper water level of more than 20 m covering districts of Gandhinagar, Jamnagar, Kachchh, Panch Mahal, Patan, Sabar Kantha, Vadodara, Banaskantha, Anand, Mahesana, Amreli, Devbhumi Dwarka, Junagadh, and Porbander districts of Gujarat State.

In North Gujarat, about 64.90% of the total well analysed falls within the water level range of 0-10 m bgl and out of which alone 31.57% represent the water level range of 0-5 m bgl. Deeper water levels range more than 20 mbgl are experienced in major part of Pancha Mahal, Patan, Mahesana, Sabar Kantha, Anand, Banas Kantha, Gandhinagar districts. The deepest water level of 26.11 m bgl in Banas Kantha district whereas shallowest water level of .03 m bgl has been recorded at Panch Mahal district.

In South Gujarat, about 81.92% of the total wells has recorded water level less than 10 m bgl. Deeper water levels of more than 20 m bgl mainly observed in isolated patch in major parts of Vadodara district. The deepest water level of 22.87 m bgl is recorded at Vadodara district whereas the shallowest water level of 0.32 m bgl has been recorded at Dang district.

In Saurashtra region, about 59.93% of the total well shows water levels 0-10 m bgl and water levels of 10 to 40 mbgl are sporadically disbursed in isolated patches. The shallowest water level of 0.7 m bgl observed at Modhvana village, Surendranagar district. The deepest water level of 39.7 m bgl recorded in Goraj, Junagadh district.

In Kachchh region, more than 73.68% of the total well analysed, the water level ranges in less than 10 mbgl in major part of the district. In eastern part of Kachchh, the water level more than 10 m bgl in isolated patches. The deepest water level of 23.96 m bgl is recorded at Rapar and the shallowest water level of 0.26 m bgl at Taragoga.

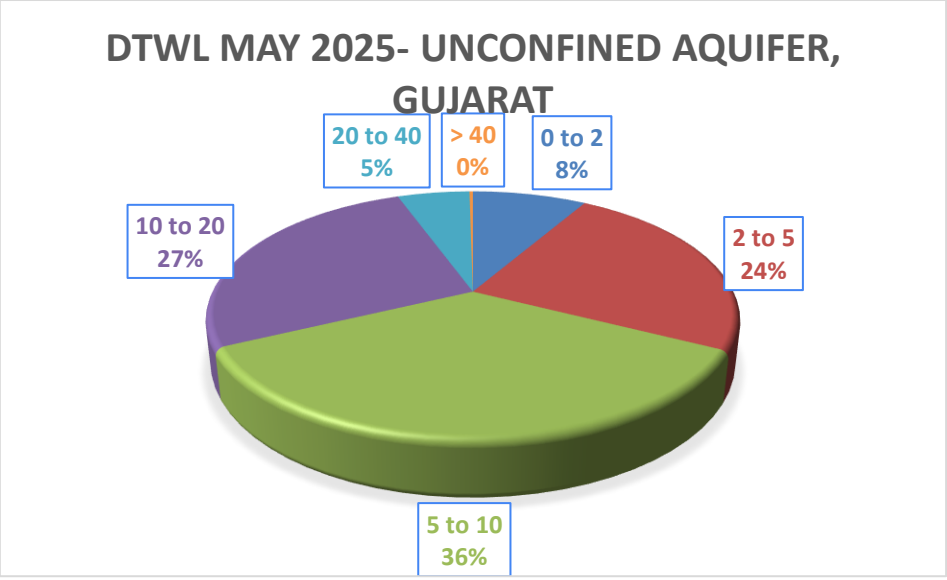


Figure 4: Percentage of wells in different water level ranges in an unconfined aquifer.

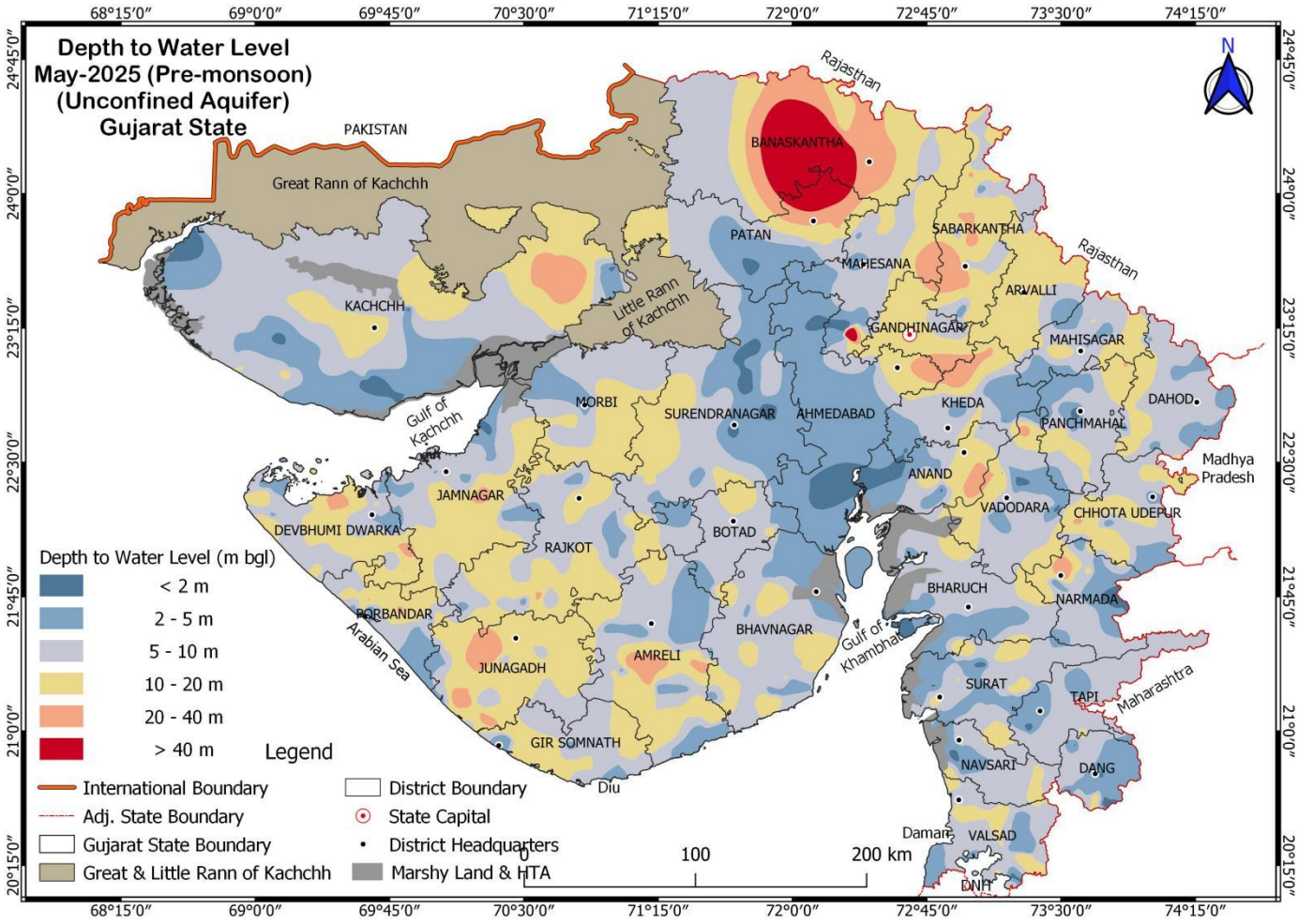


Figure 5: Depth to water level of unconfined aquifer during Pre-monsoon 2025

5.1.2 Annual Fluctuation in Water Level

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

A perusal of Figure 6 and 7 reveals that out of total monitoring wells, water level rise of less than 2 m is recorded in 41.6% wells, 2 to 4 m in 9.1% wells and more than 4 m in 10.2% of the wells. Piezometric level rise of less than 2 m is seen in all the districts, significantly in, Gandhinagar, Kheda, Mahesana, Narmada, Navasari, Surat, tapi, Dang, Valsad, Kachchh, Surendranagar districts. Piezometric level rise of 2 to 4 m is observed mainly in districts such as, Anand, Banas Kantha, Chhotaudeour, Navsari, Dang, Amreli, Bhavanagar, Porbandar, Rajkot districts. Rise of more than 4 m is significantly observed in Ahmedabad, Arvalli, Vadodara, Amreli, Bhavnagar, Botad, Gir Somnath, Rajkot districts. fall in water levels, 29.9% have recorded less than 2 m while 6% in the range of 2 to 4 m and remaining 3.1% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Gandhinagar. Patan, Junagadh, Jamanagar, Porbanadar districts. Fall of 2 to 4 m is observed mainly in Arvalli, Mahisagar, Panch Mahal, Botad, Gir Somnath, Morbi region. Fall of beyond 4 m is observed in Arvalli, Mahisagar, Panch Mahal, Rajkot, districts.

About 47.4% of the total well shows the fall of water level in the North Gujarat and most of which (32.2%) shows fall in between 0-2 m is observed in almost all area of the region. Rise of 0-2 m is seen in all districts. The maximum rise of 7.5 m is at (Karanpur, Arvalli) whereas the maximum decline of 7.2m is observed at (Santrampur, Mahisagar).

About 72.9% of the Souh Gujarat region has experienced the rise in water level; 54.8% in the range of 0 to 2 m of the total well analysed. The fall in water level also found in 27.9% of total well distributed all over the region. Out of these 22.6% of well observed in 0-2 m is predominantly found in all district in the region. About 11.3% area of the region observed rise of 2-4 is observed in all districts of the region. The maximum rise of 8.28m is at (Tundav, Vadodara) whereas the maximum decline of 6 m is observed at (Jhankhvav, Surat).

About 57.5% of the Saurashtra region has experienced the rise in water level; 34.2% in the range of 0 to 2 m of the total well analysed. The fall in water level also found in 42.5% of total well distributed all over the Saurashtra region. Out of these 33.6% of well observed in 0-2 m is predominantly found in all district in the region. About 14.7% area of the region observed rise of more than 4 m is observed in all districts of the region except Jamnagar district. The maximum rise of 8.9 m is at (Dhari, Amreli) whereas the maximum decline of 7.9 m is observed at (Gopalpura Vanda, Amreli).

In Kachchh region, fall in water level experienced in 31.6% of total well equally distributed in the region. Fall of water level mainly ranges in 0 to 2 m is observed in 26.3% of total well of the region. Rise in water level experienced in 68.4 % of the region. Rise of water level mainly ranges in 0 to 2 m is observed in 55.3% of total well of the region. The maximum rise of 4.5 m is at Kokaliya whereas the maximum decline of 3.38 m is observed at Lakhpat.

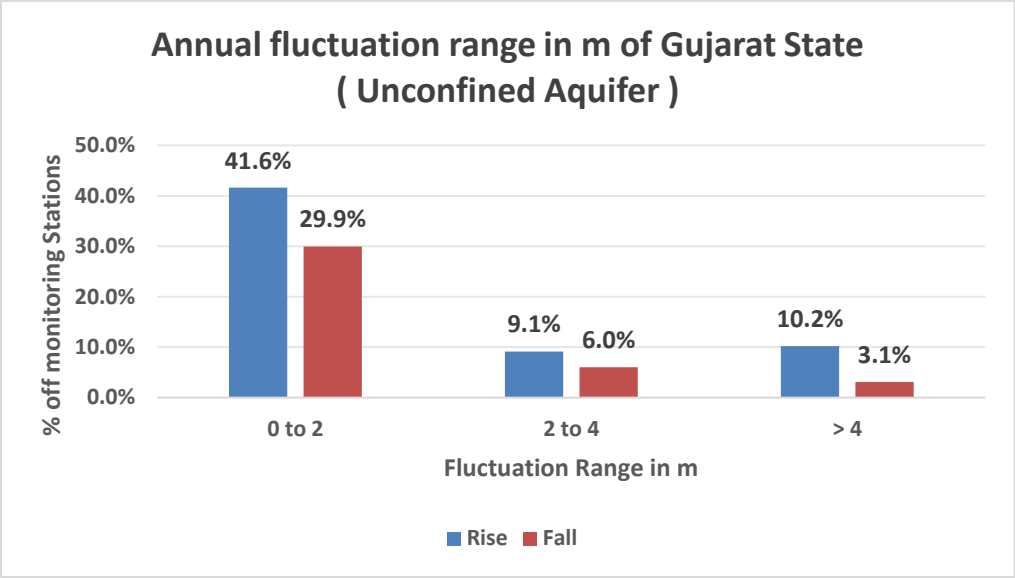


Figure 6: Percentage of wells showing rise and fall in WL in an unconfined aquifer. (Pre-monsoon 2024 to Pre-monsoon 2025)

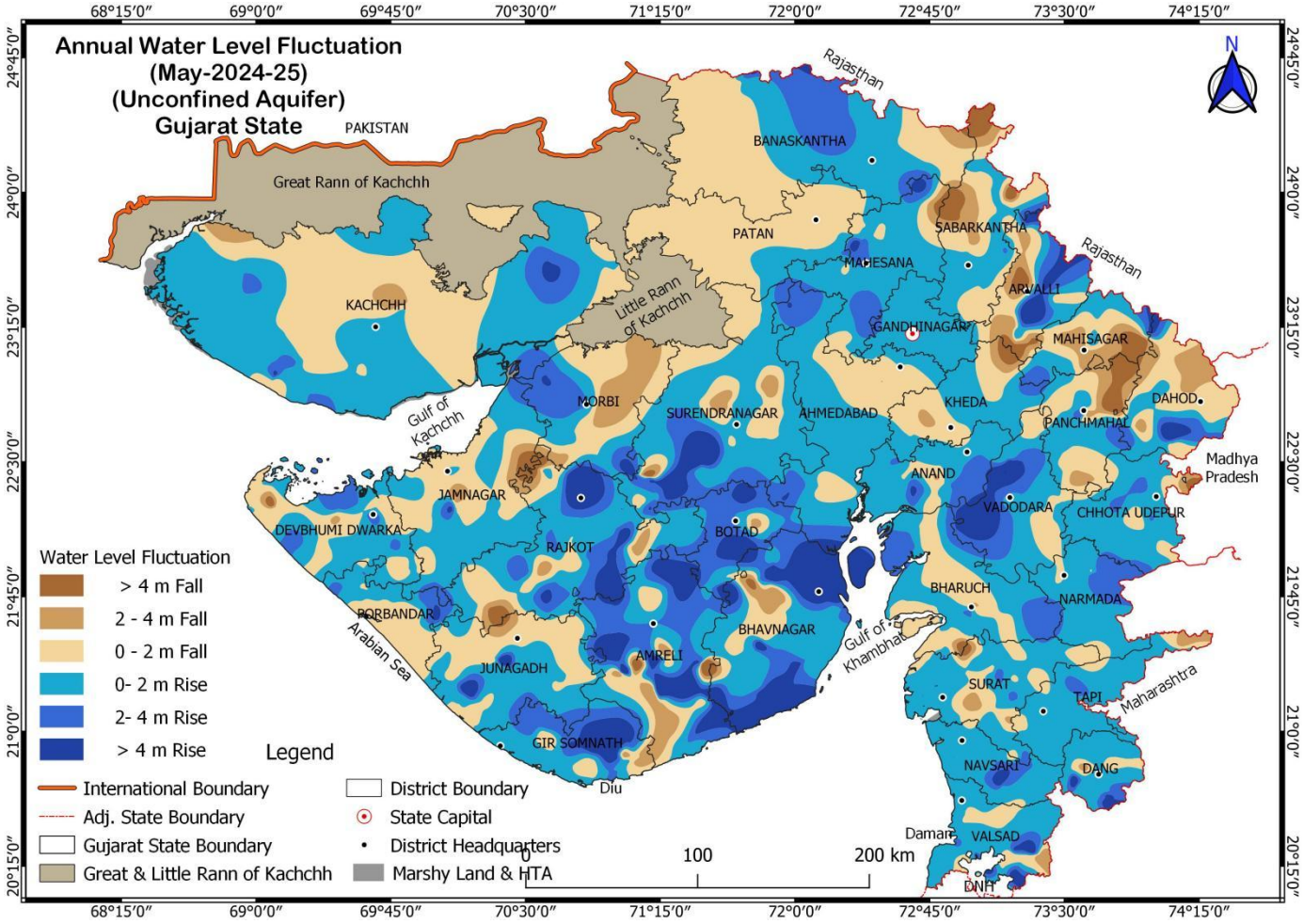


Figure 7: Annual water level fluctuation in unconfined aquifer (Pre-monsoon 2024 to Pre-monsoon 2025)

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

A perusal of Figure 8 and 9 reveals that out of total monitoring wells, water level rise of less than 2 m is recorded in 35.5% wells, 2 to 4 m in 13.5% wells and more than 4 m in 10.1% of the wells. Piezometric level rise of less than 2 m is seen in all the districts, significantly in Ahmedabad, Anand, Arvali, Banas Kantha, Chhotaudeour, Narmada, Navasari, Surat, Tapi, Valsad, Surendranagar districts. Piezometric level rise of 2 to 4 m is observed mainly in districts such as, Anand, Kheda, Mahesana, Panch Mahal, Bharuch, Narmada, Tapi, Bhavanagar, Gir Somnath, Rajkot, Kachchh districts. Rise of more than 4 m is significantly observed in Ahmedabad, Arvalli, Gandhinagar, Kheda, Panch Mahal, Amreli, Bhavnagar, Botad, Surendranagar districts. Fall in water levels, 27.9% have recorded less than 2 m while 8% in the range of 2 to 4 m and remaining 5.1% wells, registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Patan, Bharuch, Surat, Vadodara, Devbhumi Dwaraka, Jamnagar, Junagadh, Porbanadar districts. Fall of 2 to 4 m is observed mainly in Dahod, Sabar Kantha, Surat, Valsad, Amreli, Botad, Gir Somnath Junagadh, Morbi and Porbanadar districts. Fall of beyond 4 m is observed in Banas Kantha, Devbhumi Dwaraka, Morbi and Porbanadar district.

About 31.3% of the total well shows the fall of water level in the North Gujarat and most of which (22.7%) shows fall in between 0-2 m is observed in almost all area of the region. Rise of 0-2 m is seen in all districts except Aravalli. The maximum rise of 10 m is at (Sarkhej, Kheda) whereas the maximum decline of 6.38 m is observed at (Meda, Banas Kantha).

About 66.7% of the Souh Gujarat region has experienced the rise in water level; 52.1% in the range of 0 to 2 m of the total well analysed. The fall in water level also found in 33.3 % of total well distributed all over the region. Out of these 26.5% of well observed in 0-2 m is predominantly found in all district in the region. About 10.3% area of the region observed rise of 2-4 is observed in all districts of the region except Surat. The maximum rise of 6.54 m is at (Netrang, Bharuch) whereas the maximum decline of 6.38 m is observed at (Chhaliyar, Vadodara).

About 50.3% of the Saurashtra region has experienced the rise in water level; 24.3% in the range of 0 to 2 m of the total well analysed. The fall in water level also found in 49.7 % of total well distributed all over the Saurashtra region. Out of these 30.6% of well observed in 0-2 m is predominantly found in all district in the region except Botad. About 12.8 % area of the region observed rise of more than 4 m is observed in all districts of the region. The maximum rise of 11.27 m is at (Gadu, Junagadh) whereas the maximum decline of 10.58 m is observed at (Nichi Mandal, Morbi).

In Kachchh region, fall in water level experienced in 42.4% of total well equally distributed in the region. Fall of water level mainly ranges in 0 to 2 m is observed in 33.3% of total well of the region. Rise in water level experienced in 57.6 % of the region. Rise of water level mainly ranges in 0 to 2 m is observed in 36.4 % of total well of the region. The maximum rise of 3.73 m is at Shinaya whereas the maximum decline of 4.14 m is observed at Sankhiari.

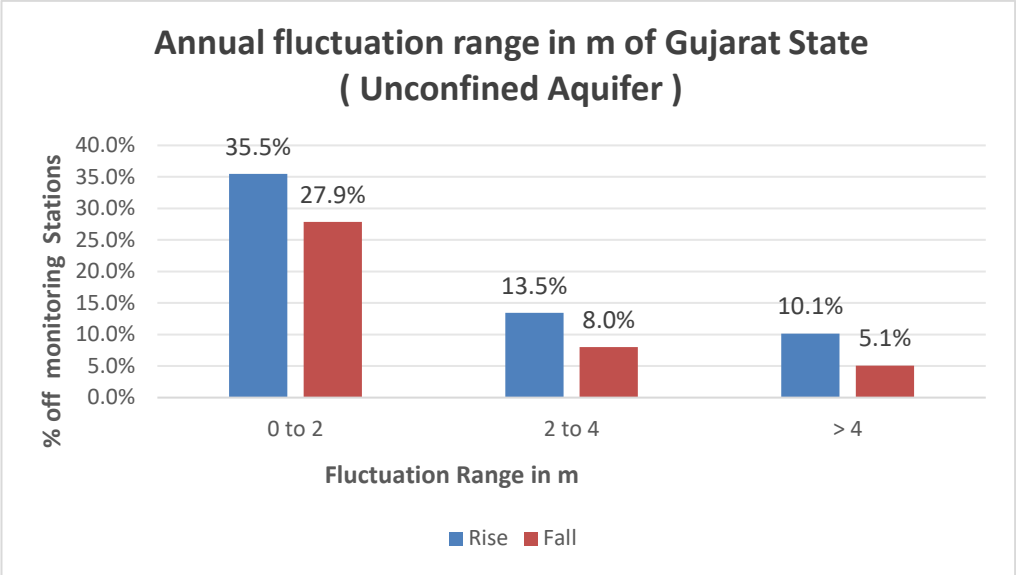


Figure 8: Percentage of wells showing rise and fall in WL in an unconfined aquifer. (Pre-monsoon 2023 to Pre-monsoon 2025)

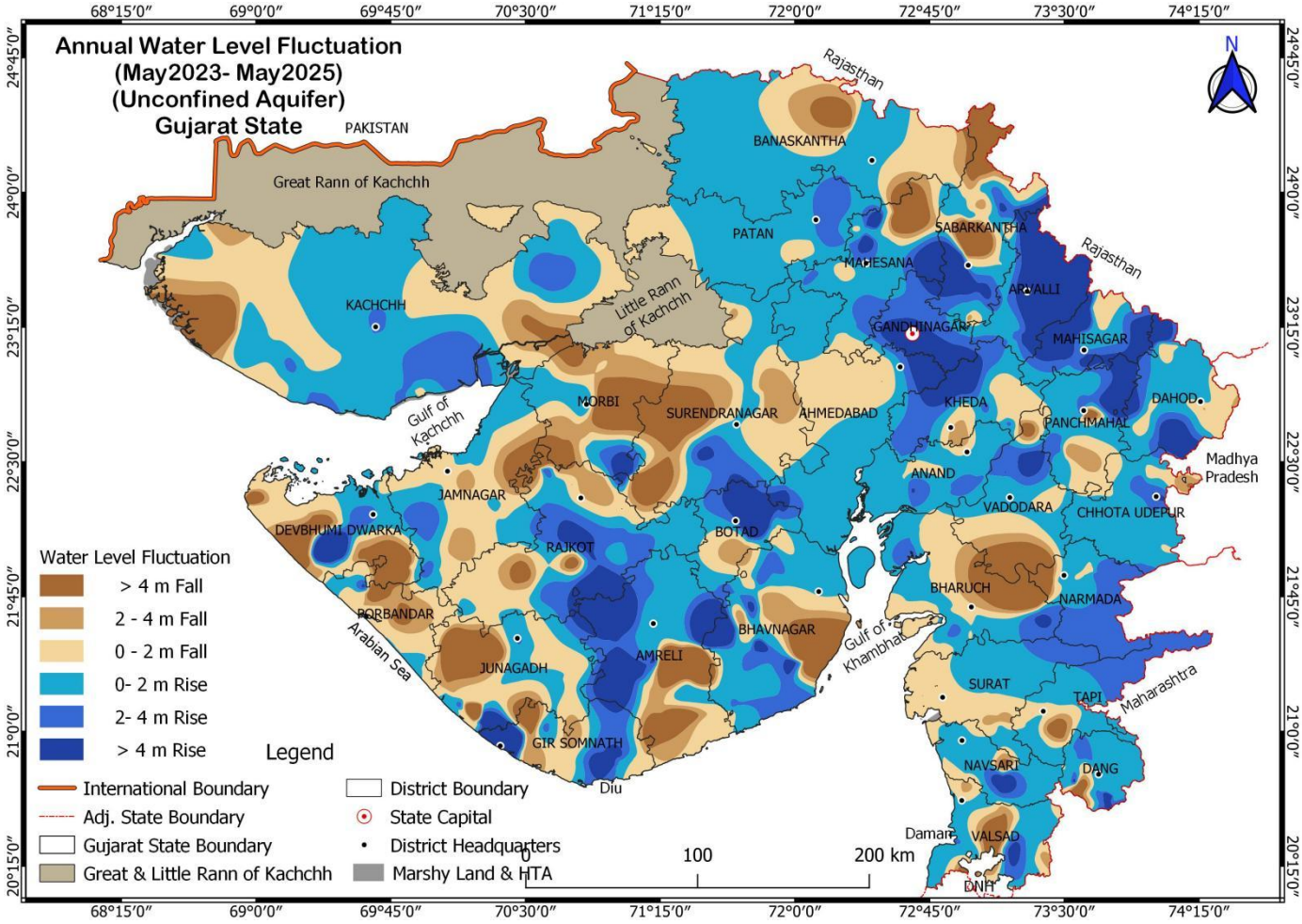


Figure 9: Annual water level fluctuation in unconfined aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

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)

A comparison of the water level of the November 2024 with the average water level of the November for last one decade (2014- 2023) Figure 10 and 11 reveals that there is the rise in water level in the state (76.5% of total well analysed). Rise and fall is mostly in the range of 0 to 2. The fall of more than 4 m is observed mostly in Saurashtra region of Gujarat State. The maximum rise of 26 m is recorded at Gir Somnath district whereas the maximum fall of 9 m is recorded at Junagadh district.

In *North Gujarat* 75% of wells are shown rise and mostly well are in range of 0 to 2 m (42.4% of wells) in entire North Gujarat. The fall of water level found in 25% of the wells of which 18.9% of wells were found in the range of 0 to 2 m. Fall of more than 4 m is mainly observed in Sabarkantha district. The maximum rise of 18 m is at (Takatuka, Arvalli) whereas the maximum decline of 21.36 m is observed at (Matoda,Sabar Kantha).

In *South Gujarat*,77.5% of total well analysed shows the rise where as 22.5% shows the fall. In the range of 0 to 2 m, 55% shows the rise and 19.2% shows the fall scattered in whole South Gujarat region. Fall of more than 4 m is predominantly observed in Surat district. The maximum rise of 8 m is at (Ghayaj, Vadodara) whereas the maximum decline of 7 m is observed at (Jhankhvav, Surat).

In *Saurashtra* region about 77.4 % of wells analysed show rise in water level and out of which 43.3% wells in more than 2 m. Fall of water level are experienced in 22.6% of the well and 16.8% are in the 0 to 2 m. More than 4 m rise in water level is observed in all ditricts of Saurashtra except Devbhumi Dwarika and Surendranagar district. The maximum rise of 26 m is at (Govindpura,Gir Somnath) whereas the maximum decline of 9 m is observed at (Khokharda, Junagadh).

In *Kachchh*, 26.7% of the total wells analysed are recorded fall in water level in the district. Fall is mostly (26.7% of wells) in the range of 0 to 2 m. Rise in water level is observed in 73.4% of the wells analysed in distributed all over the Kachchh region. Rise of more than 4 m is witnessed in isolated pockets in the region. The maximum rise of 6 m is at Whereas the maximum decline of 1.33 m is observed at Lakhpat.

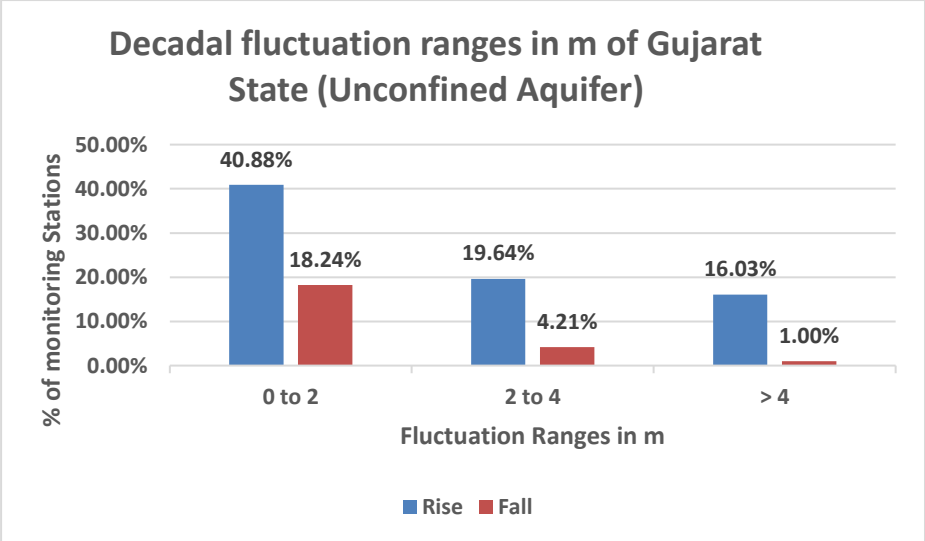


Figure 10: Percentage of wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean Pre-monsoon (2015-2024) to Pre-monsoon 2025) (Chart)

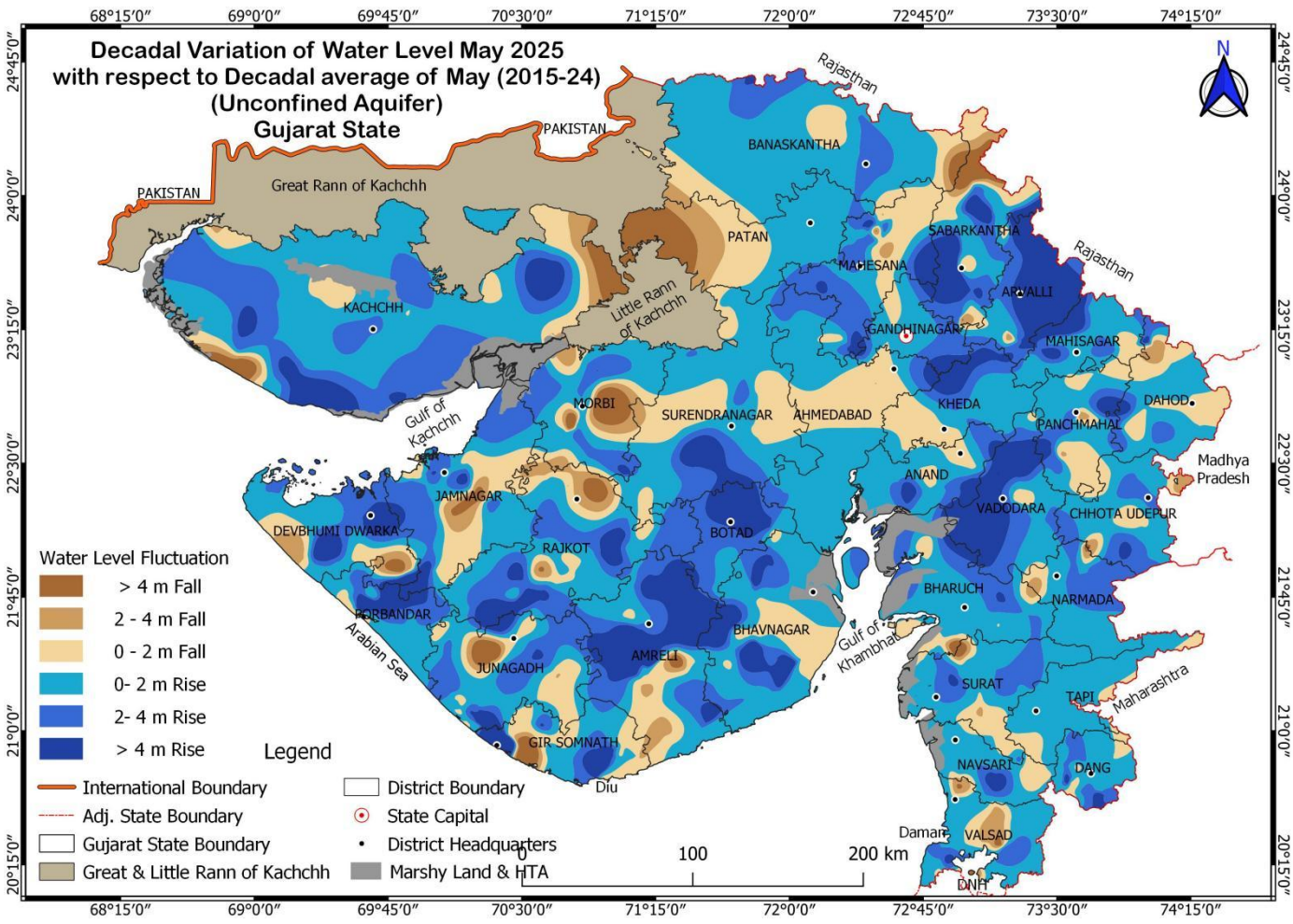


Figure 11: Decadal water level fluctuation in unconfined Aquifer (Decadal Mean Pre-monsoon (2015-2024) to Pre-monsoon 2025)

6.0 Summary

In May 2025, In unconfined aquifer, Water level of ranges from 0.03 mbgl at, Panch Mahals, to 39.7 mbgl at Junagadh. During May 2023 to May 2025 maximum rise of 11.27 m is recorded at Junagadh district whereas the maximum decline of 10.58 m is observed also in Morbi district. During May 2024 to May 2025 maximum rise of 8.9 m is recorded at Amreli district whereas the maximum decline of 7.88 m is observed also in Amreli district. Annual Water Level Fluctuation shows, 60.8 % of total monitoring wells show rise and 39.2 % shows fall in water level of the Gujarat state. Decadal fluctuation shows rise in 76.5 % wells and fall in 23.5 % of total well analysed.

7.0 Recommendations

Alarming declines in groundwater levels of Central Gujarat plains and in select areas of Saurashtra and Kachchh warrant immediate attention for taking-up of recharge schemes to arrest further declines and augment the groundwater resources. Pointed attention of the administrators and policy makers is drawn towards adoption of artificial recharge, public awareness and other appropriate measures for ensuring adequate groundwater availability and sustainability.