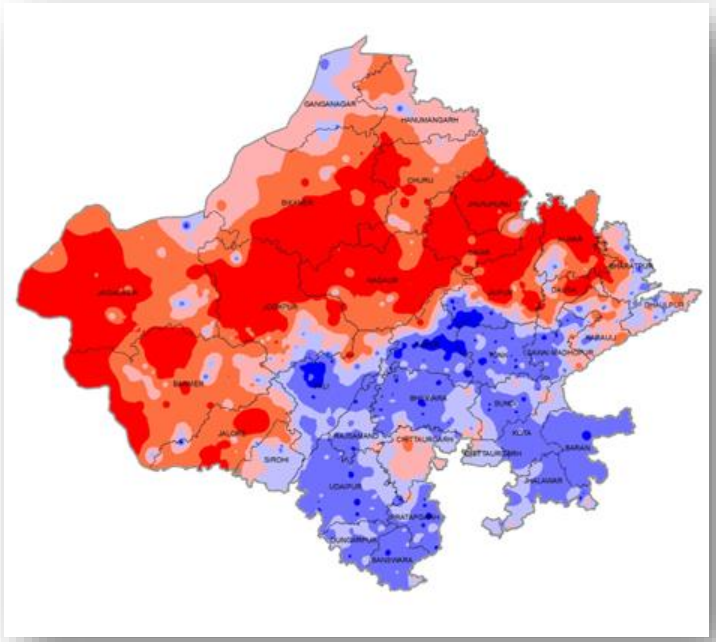


GROUND WATER LEVEL BULLETIN

MAY 2025

RAJASTHAN

ABSTRACT

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

CGWB,WESTERN REGION, JAIPUR

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. A network of 26351 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 30.03.2025, located all over the country is being monitored.

2.0 STUDY AREA

The State of Rajasthan comprising of 33 districts has a geographical area of 3,42,239 square kilometers (sq km) and is the largest State in the country. Administrative division map of Rajasthan is shown in Figure-1. It is situated between north latitudes 23°03' and 30°12' and east longitudes 69°30' and 78°17'. The ground water monitoring is being carried out through a network of observation wells- the National Hydrograph Network Stations (NHS).

Physiographically the state is divided into four major units, i.e., Aravalli hill ranges, Eastern plains, Western Sandy Plain and Sand Dunes & Vindhyan Scarpland and Deccan Lava Plateau.The Aravalli Hill Ranges from the main water divide in Rajasthan.

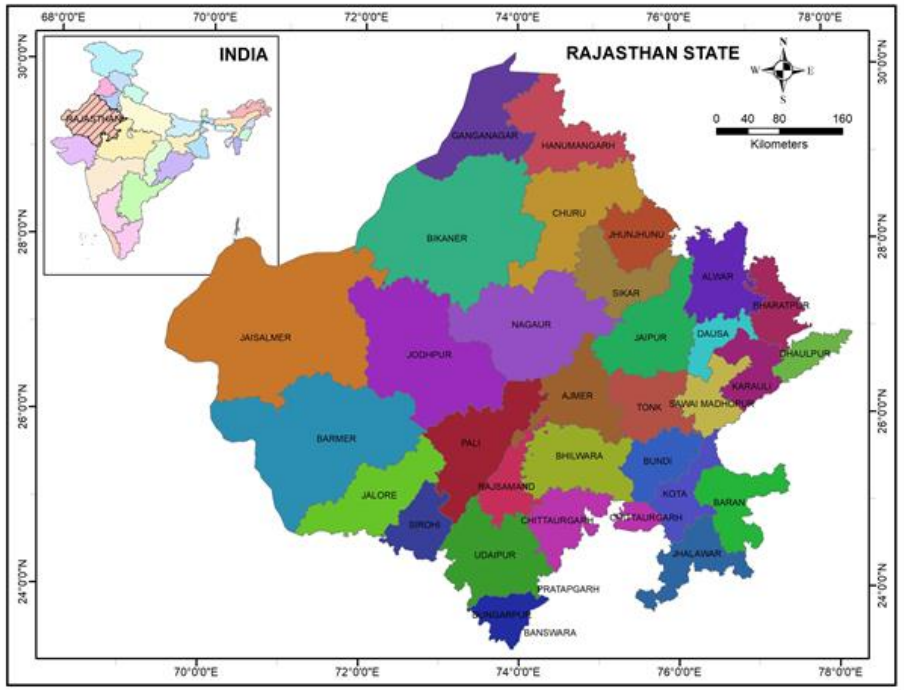


Figure-1: Map showing administrative divisions of Rajasthan

Luni is the only river west of Aravallis. In the remaining area of western Rajasthan comprising about 60% of the geographical area of the state, the drainage is internal, and the streams are lost in the desert sands after flowing for a short distance from the point of origin. In the east of Aravalli ranges, the main rivers are Chambal, Banganga, Banas, Sahibi, Kantli, Banas and Mahi.Diverse rock types ranging from the oldest Archaean Metamorphics to Sub-Recent to Recent alluvium and wind-blown sand are exposed in Rajasthan. However, in a major portion of the area, particularly in Western Rajasthan, the older rocks lie concealed below a cover of alluvium and blown sand and underlain by hard rock (nearly 40%) consisting of the Archaeans

crystalline (Bhilwara Super Group), Proterozoic rocks comprising Aravalli and Delhi Super Groups, Erinpura Granite, Malani volcanics and plutonic suite of rocks and their equivalents, Marwars, Vindhyans and Deccan Traps. The soft rocks include the alluvium and the blown sand, which occupy the major portion in the remaining part of the State.

3.0 GROUND WATER LEVEL MONITORING

The National Hydrograph Network Stations set-up is a system of spatially distributed observation points at which periodic monitoring of ground water and regime behavior viz. recording of water levels and temperature and collection of ground water samples for water (chemical) quality analysis are done. The main objectives of monitoring of water levels and water quality are to observe the rise and fall of ground water levels and to study changes in quality of water in space and time consequent to changes in the inputs and outputs. Database on ground water levels and quality created through this effort forms an important tool in the evaluation of optimum development and decision making on the various aspects of water resources management. Presently 1459 NHS comprises of 638 dug well and 821 piezometers in the state are being monitored.

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

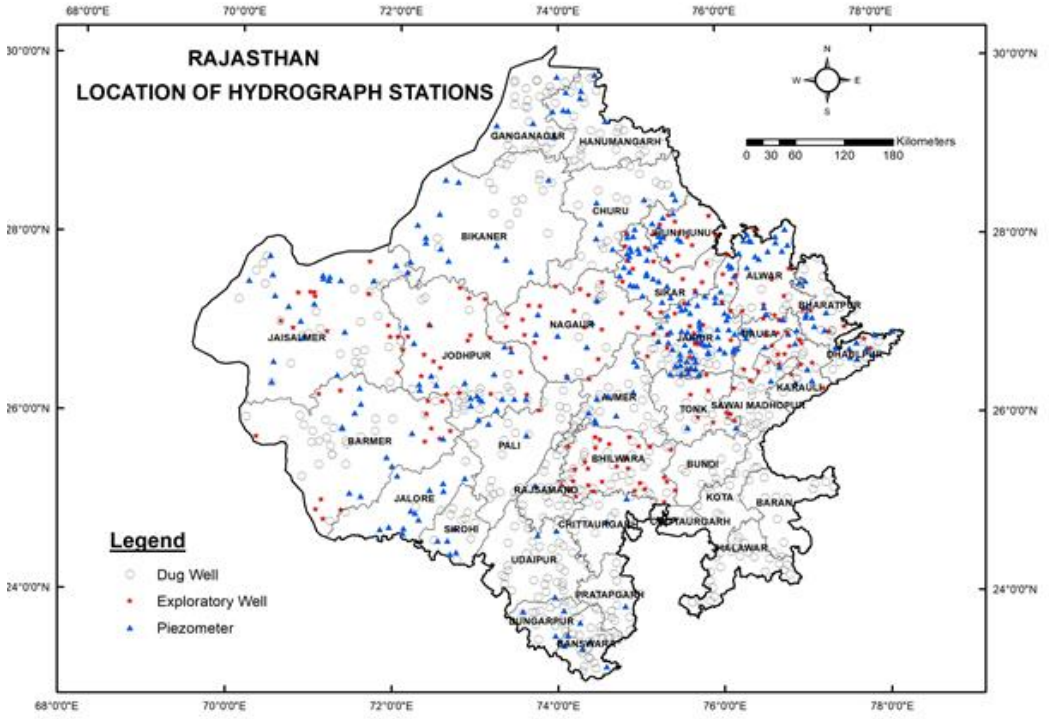


Figure- 2: Map showing locations of monitoring wells (NHNS) in Rajasthan State

Sl. No.+	District	Geographical area (sq km)	Total Number of NHS			Number of NHS monitored		
			Dug well	Piezometer	Total	Dug well	Piezo meter	Total
1	Ajmer	8481	27	20	47	22	13	35
2	Alwar	8380	10	39	49	7	31	38
3	Banswara	4536	28	19	47	26	14	40
4	Baran	6955	17	1	18	13	0	13
5	Barmer	28387	31	55	86	25	42	67
6	Bharatpur	5100	15	20	35	13	19	32
7	Bhilwara	10455	36	32	68	36	31	67
8	Bikaner	27244	19	35	54	14	26	40
9	Bundi	5550	12	9	21	10	7	17
10	Chittaurgarh	7880	16	2	18	10	2	12
11	Churu	16830	19	11	30	18	11	29
12	Dausa	3470	5	26	31	5	23	28
13	Dhaulpur	3000	9	13	22	9	11	20
14	Dungarpur	3770	16	13	29	15	11	26
15	Ganganagar	10978	31	6	37	26	6	32
16	Hanumangarh	9656	29	24	53	21	20	41
17	Jaipur	11066	30	121	151	28	89	117
18	Jaisalmer	38401	35	48	83	29	41	70
19	Jalore	10640	7	17	24	4	17	21
20	Jhalawar	6219	27	2	29	23	2	25
21	Jhunjhunu	5928	0	30	30	0	24	24
22	Jodhpur	22850	25	97	122	20	79	99
23	Karauli	5016	14	26	40	14	23	37
24	Kota	5481	16	5	21	11	3	14
25	Nagaur	17718	13	38	51	12	30	42
26	Pali	12387	22	13	35	20	13	33
27	Pratapgarh	4360	19	2	21	14	1	15
28	Rajsamand	4768	26	4	30	22	3	25
29	Sawai Madhopur	5043	17	11	28	16	11	27
30	Sikar	7732	2	50	52	2	43	45
31	Sirohi	5136	11	7	18	7	4	11
32	Tonk	7194	16	21	37	15	20	35
33	Udaipur	11761	38	4	42	35	2	37
	Total	342,239	638	821	1459	542	672	1214

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

4.0 RAIN FALL

Rajasthan receives much lower rainfall compared to the other parts of the country. Out of the total rainfall, a sizable portion is in the beginning of the rainy season which is mainly used for building the soil moisture and is also lost to evaporation because of the arid conditions. The amount infiltrating through the soil mass to contribute to ground water storage is of the order of 5% to 7% in areas underlain by hard rocks and 10% to 15% in alluvial areas.

The normal annual rainfall of Rajasthan is 549 mm. However, during the period from 2015-24, highest average annual rainfall of the State occurred in the year 2019 and 2024 and lowest inthe year 2017. The average annual rainfall (2024) is 33.8% more than the normal annual rainfall. The average annual rainfall of the State during the period 2024 works out to be 826 mm.

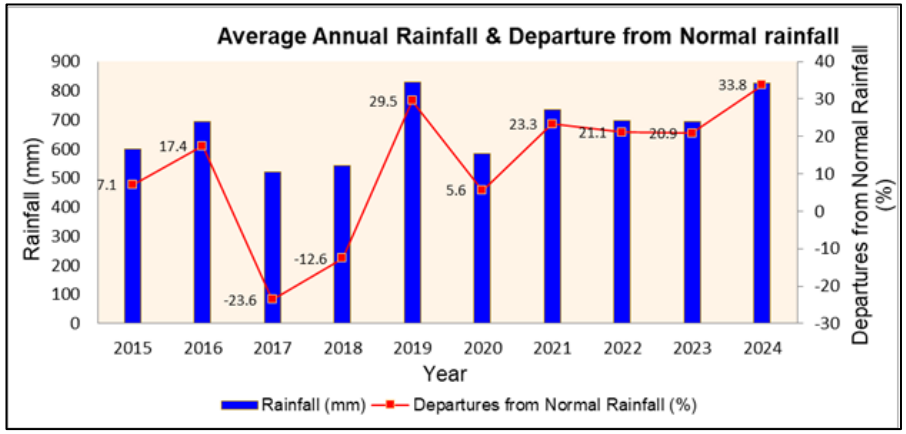


Figure-3: Average annual rainfall and departure from normal rainfall

5.0 GROUND WATER LEVEL SCENARIO PRE-MONSOON (May 2025)

5.1.1 Depth To Water Level (May 2025)

A total of 1214 monitoring stations were analyzed across Rajasthan during May 2025.Depth to water level varies from 0.04 mbgl (Khara,Jodhpur district) to 142.18 mbgl (Sajjara, Jodhpur district).

Water level more than 40 mbgl was monitored at 23% stations and spread from north west to western and upper central parts covering mostly covering Jhunjunu, Sikar, Nagaur, Jodhpur, Jalore, Alwar, Churu, Jaipur, Bikaner, Dausa, Jaisalmer, Bharatpur districts. Depth to water level between 20 to 40 mbgl was recorded in 19 % monitoring stations, stretching from north east to western part and upper central parts covering districts such as Hanumangarh, Alwar, Jaisalmer, Churu, Bikaner, Chittaurgarh, Barmer, Jalore, Dausa, Nagaur, Bharatpur,Karauli, Sikar, Jodhpur, Jaipur, Dhaulpur. Depth to water level between 10 & 20 mbgl was recorded in 20% stations falling mostly in Ganganagar, Jhalawar, Chittaurgarh, Hanumangarh, Bhilwara, Sirohi, Bundi, Rajsamand, Bikaner, Dhaulpur, Karauli, Churu, Dungarpur and at isolated locations. Depth to water level ranging from 5 to 10 mbgl was recorded at 20% stations in falling predominantly in southern/southeastern districts: Bara, Banswara, Pratapgarh, Dungarpur, Sirohi, Tonk, Kota, Udaipur, Pali, Ajmer, Sawai Madhopur, Rajsamand, Dhaulpur, Jhalawar, Dausa, Karauli, Bundi, Bhilwara .Water level ranging between 2 & 5 mbgl was observed at 15 % stations spread over south, south east part of State falling in Udaipur, Bundi, Ajmer, Pali,Tonk, Sawai Madhopur, Rajsamand, Pratapgarh,Bhilwara, Dhaulpur, Baran, Banswara, Jaipur, Dungarpur, Karauli, Bharatpur, Chittaurgarh, Jhalawar, Kota and Jalore .Shallow water level i.e. less than 2 mbgl have been observed at 3% stations and falling in Kota, Pali, Baran, Bharatpur, Jaipur, Bhilwara, Bundi, Ajmer, Tonk, Udaipur, Jalore, Rajsamand, Jhalawar, Sawai Madhopur, Barmer, Jodhpur, Jaisalmer districts

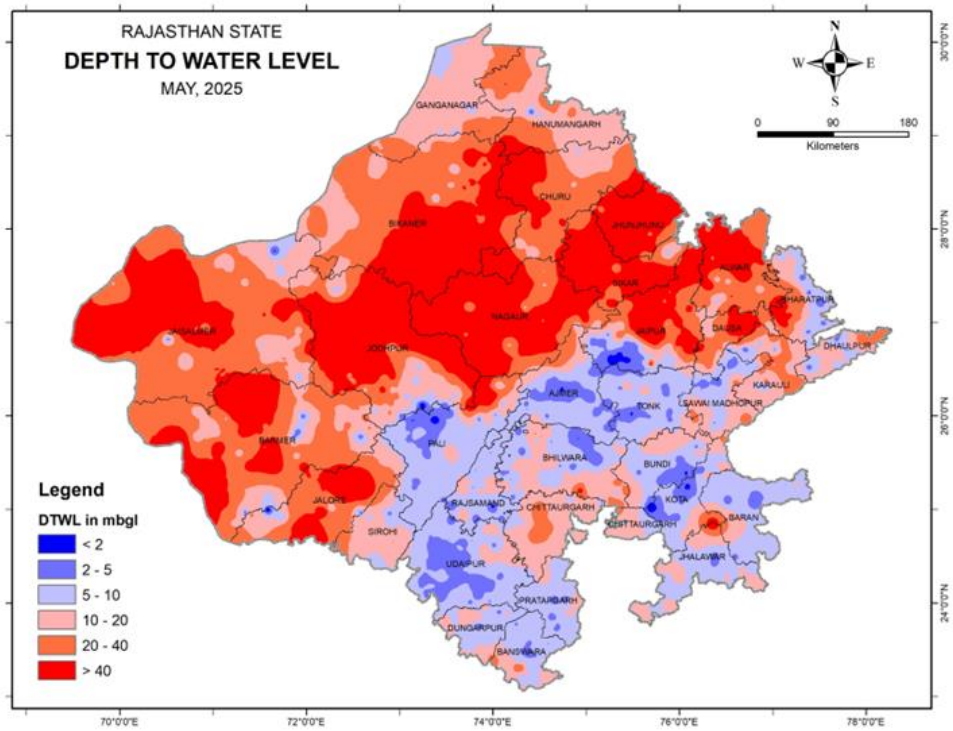
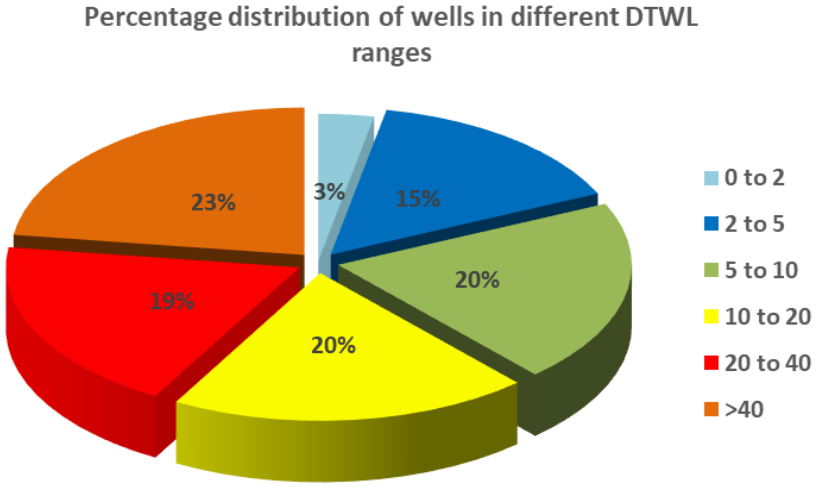


Fig4: Depth to Water level map of May 2025



5.1.2 Seasonal Fluctuation in Water Level in Unconfined Aquifer

Seasonal Fluctuation in Water Level in Unconfined Aquifer - (August 2024 - May 2025)

Total number of wells analyzed are 972. A perusal of map (Fig-5) of water level fluctuation from August 2024 to May 2025 reveals that 24% stations shown rise, 76% decline in water level.

Rise in Water Levels:

Area of rise in water in scattered in districts such as Barmer, Pali, Nagaur,Jaisalmer, Bikaner, Churu and few districts in eastern part of the state. Minimum & maximum rise was recorded 0.02 m in Neecha Taalab ,Udaipur district and 29.58 m Khokagaon ,Jalore district.Rise in water level < 2m in 15.43% stations mostly in western and eastern part of Rajasthan. Water level rise between 2 & 4m was shown by 4.22% stations more than 4m has been recorded at 4.32 % stations scattered mostly in districts falling in western and eastern part of Rajasthan.

Decline in Water Levels:

About 76% stations falling in all the districts of the State, mostly in north-eastern, south, south western, north& north central parts, shows decline in water level during this period. Minimum & maximum decline was recorded at 0.01 m in Laxmangarh,Alwar district and 45.12 m Bastawa Matha ,Jodhpur district. Decline in water level <2m was recorded in 30.35% stations. Decline in water level between 2 & 4m as recorded at 19.44% stations. Water level decline >4m was exhibited by 26.33% stations mostly falling in south and eastern part of the State.

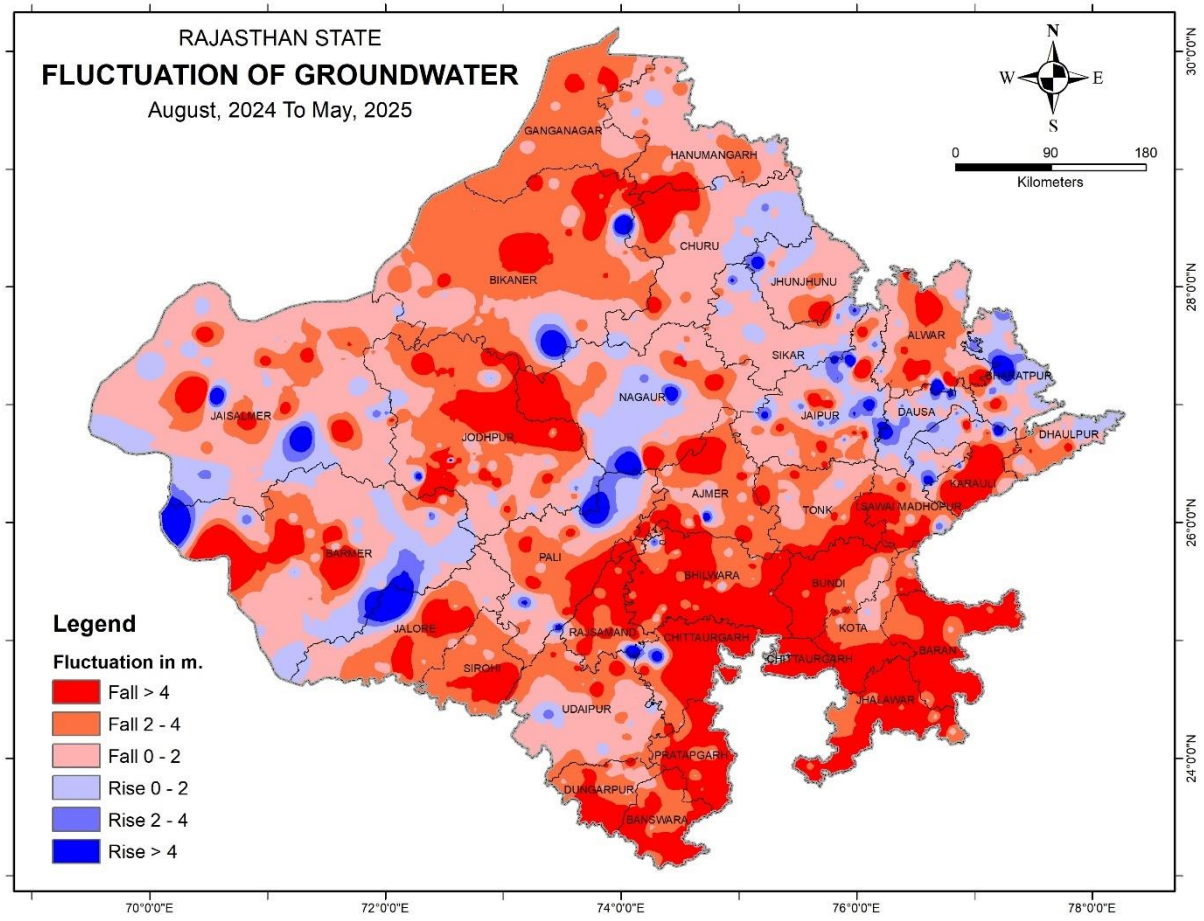


Fig5: Water level Fluctuation map August 2024 to May 2025

Seasonal Fluctuation in Water Level in Unconfined Aquifer - (November 2024 - May 2025)

Total number of wells analysed are 1041. A perusal of map (Fig-6) of water level fluctuation from November 2024 to May 2025 reveals that 21.33% stations shown rise, 78.67% decline in water level.

Rise in Water Levels:

Area of rise in water spreads central, north, westernand central parts of the State. Minimum & maximum rise was recorded 0.01 m in Daipara Khichiyan , Jodhpur district and 46.44 m Phulia , Jaisalmer district. Rise in water level < 2m in 13.83% stations mostly in western part of Rajasthan. Water level rise between 2 & 4m was shown by 3.17% stations more than 4m has been recorded at 4.32 % stations .

Decline in Water Levels:

About 78.67% stations scattered in all the districts, mostly in north-eastern, south, south eastern, north& north central parts, shows decline in water level during this period. Minimum & maximum decline was recorded at 0.03 m in Ratanpur, Hanumangarh District and 26.73 m Daukiyan ka bass .Jodhpur district. Decline in water level <2m was recorded in 35.83% stations. Decline in water level between 2 & 4m as recorded at 21.33% stations Water level decline >4m was exhibited by 21.52% stations .

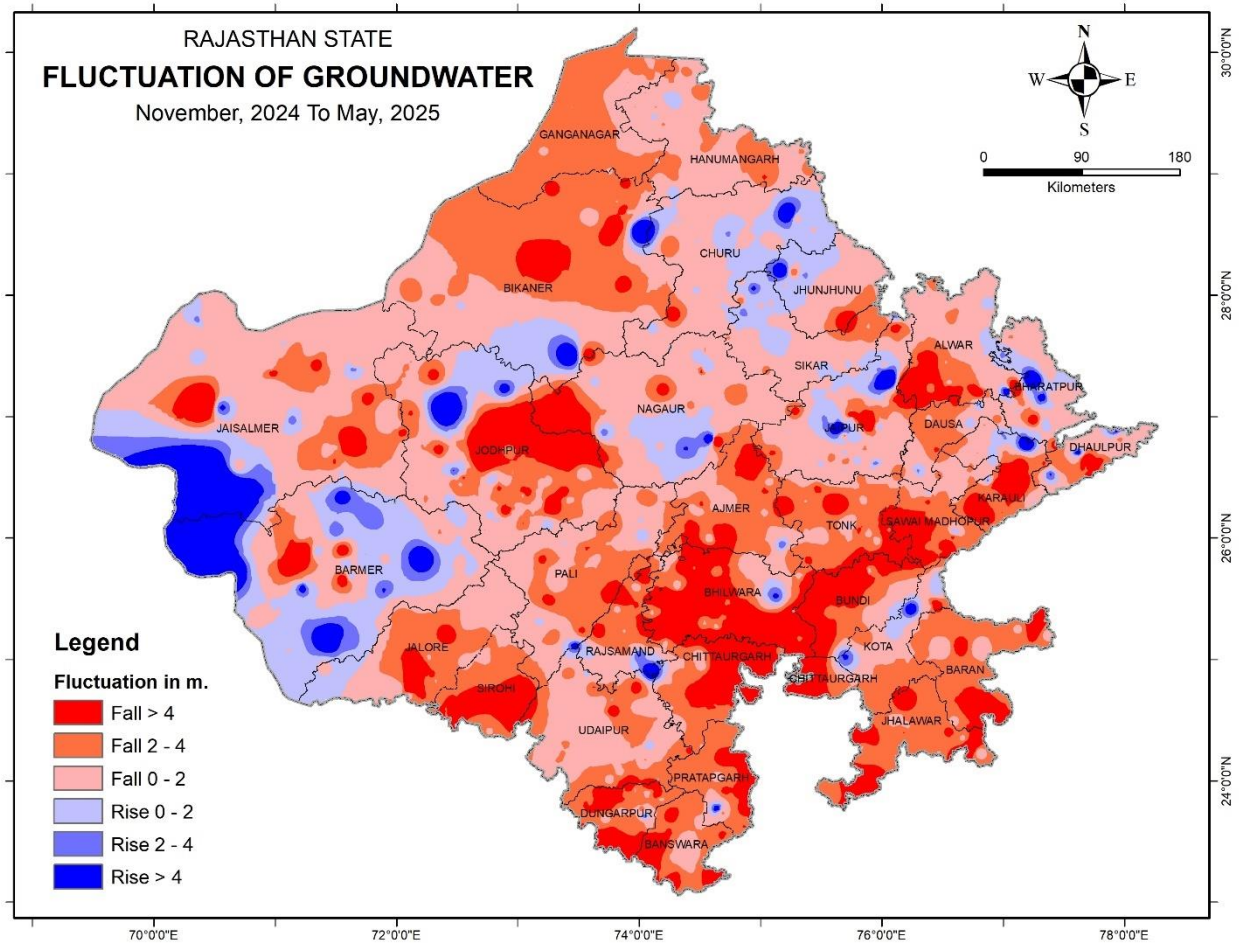


Fig6: Water level Fluctuation map November 2024 to May2025

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Seasonal Fluctuation in Water Level in Unconfined Aquifer (January 2025 - May 2025)

Total number of wells analysed are 1094. A perusal of map (Fig-7) of water level fluctuation from January 2025 to May 2025 reveals that 26.6% stations shown rise, 72.9 % decline & 0.5% stations shows no change in water level.

Rise in Water Levels:

Area of rise in water found in small patches in districts falling along the west to north eastern parts of the State. Minimum rise in water level is recorded 0.02 m at Bharewala station at Jaisalmer district & maximum rise was recorded 22.32 m in Kherli, Alwar district. Rise in water level < 2m in 19.7% stations mostly in western part of Rajasthan.Water level rise between 2 & 4m was shown by 3.2% stations more than 4m has been recorded at 3.7% stations and found in small patches in districts falling in western and north eastern parts of the State.

Decline in Water Levels:

About 72.9% stations scattered in all the districts, mostly in north-eastern, south, south eastern, north& north central parts, shows decline in water level during this period. Minimum decline is recorded at Bamboo, Churu district,Chakwara,Jaipur district & Dhirpura, Jodhpur district.Maximum decline was recorded at 31.04 m in Dhod, Sikar district Decline in water level <2m was recorded in 38.9% stations and falling overall the State. Decline in water level between 2 & 4m as recorded at 19% stations mostly in districts faling in southern and northern part of the State. Water level decline >4m was recorded in 15% stations falling in western, central and eastern parts of the State .

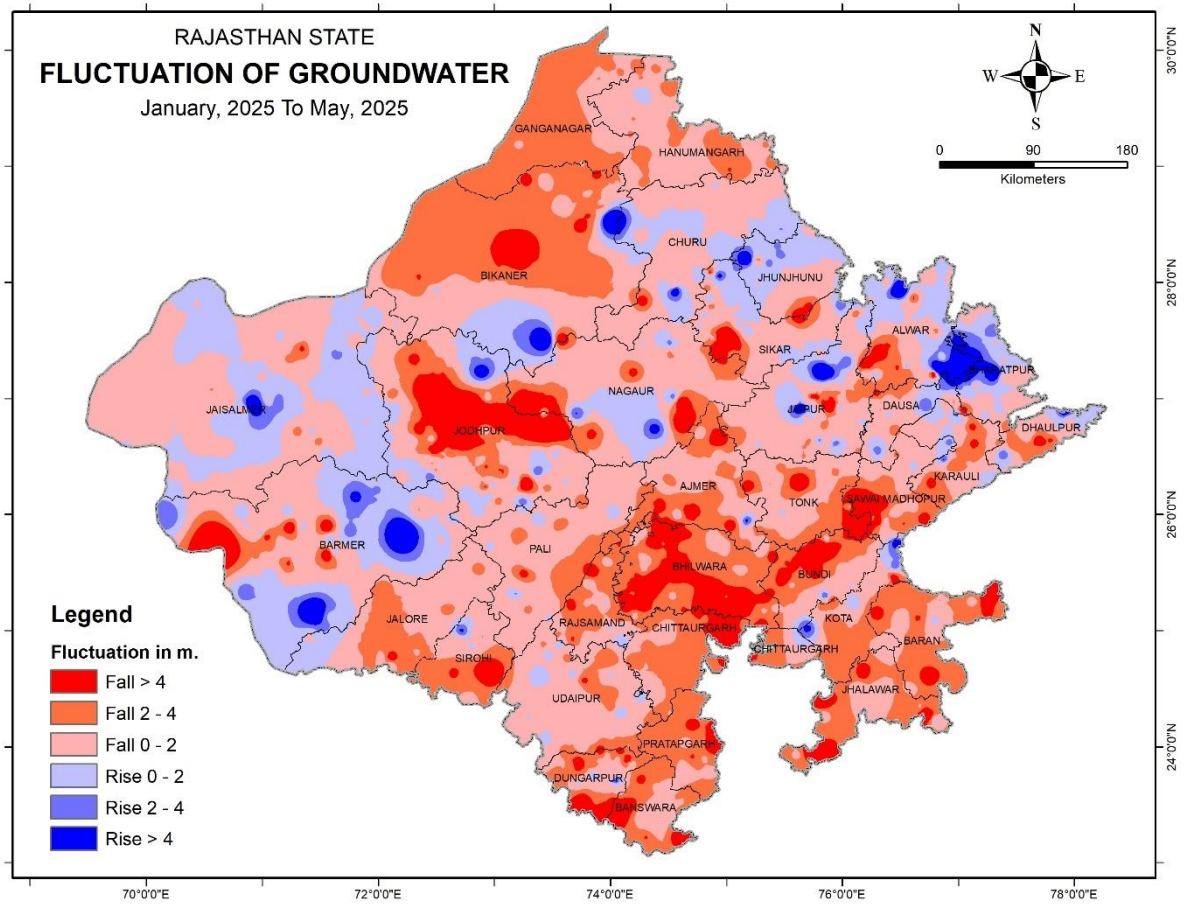

Fig7: Water level Fluctuation map January 2025 to May 2025

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5.1.3 Annual Fluctuation in Water Level

Annual Fluctuation in Water Level in Unconfined Aquifer (May 2024 to May 2025)

Total number of wells analyzed are 978. A perusal of map (Fig 9) of annual water level fluctuation from May 2024 to May 2025 reveals that 67.7% stations shown rise, 32% decline and 0.3 % stations shows no change .

Rise in Water Levels:

Area of rise in water spreads from eastern, western, southern and west central parts of the State. Minimum & maximum rise was recorded 0.03 m in Masotiya, Banswara district and 34.17 m Akli , Barmer district. Rise in water level < 2m in 28.1% stations mostly in western, eastern and central part of Rajasthan. Water level rise between 2 & 4m was shown by 14.2% stations mainly around western ,central and south eastern part of the State and more than 4m has been recorded at 25.4 % stations and most of the stations falling in the eastern part of the State .

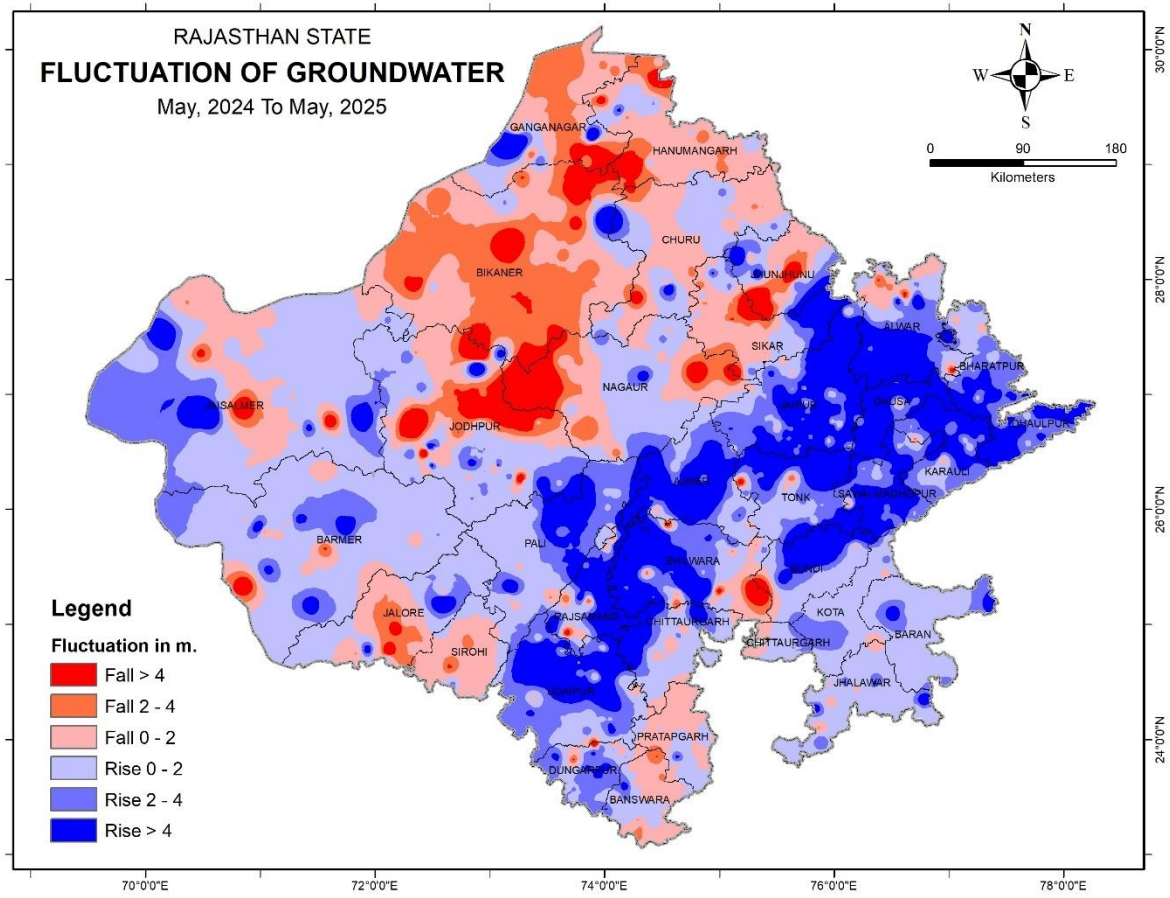

Fig8: Annual Water level Fluctuation map May 2024 – May 2025

Decline in Water Levels:

About 32 % stations shows decline in water level fluctuations and scattered in all the districts. Minimum & maximum decline was recorded at 0.1 m in Moondli , Jaipur district and 41.51 m Jhajhar , Jhunjunu district. Decline in water level <2m was recorded in 17.9% stations mainly falling in north western part of the state . Decline in water level between 2 & 4m as recorded at 8.3 % stations which is falling in the northern and western part of the State. Water level decline >4m was exhibited by 5.8% stations mostly falling in the northern part of the state .

5.1.3 Annual Fluctuation in Water Level

Annual Fluctuation in Water Level in Unconfined Aquifer (May 2023 to May 2025)

Total number of wells analyzed are 883. A perusal of map (Fig 9) of annual water level fluctuation from May 2023 to May 2025 reveals that 56.40 % stations shown rise, 43.60% decline in water level .

Rise in Water Levels:

Area of rise in water spreads from eastern, western, southern and central parts of the State. Minimum & maximum rise was recorded 0.03 m in Devgarh, Pratapgarh district and 41.3 m Azizpur,Karauli district. Rise in water level < 2m in 28.31% stations mostly in western, eastern and central part of Rajasthan. Water level rise between 2 & 4m was shown by 11.55% stations mainly around western ,central and eastern part of the State and more than 4m has been recorded at 16.53% stations and most of the stations falling in the eastern, west and central part of the State .

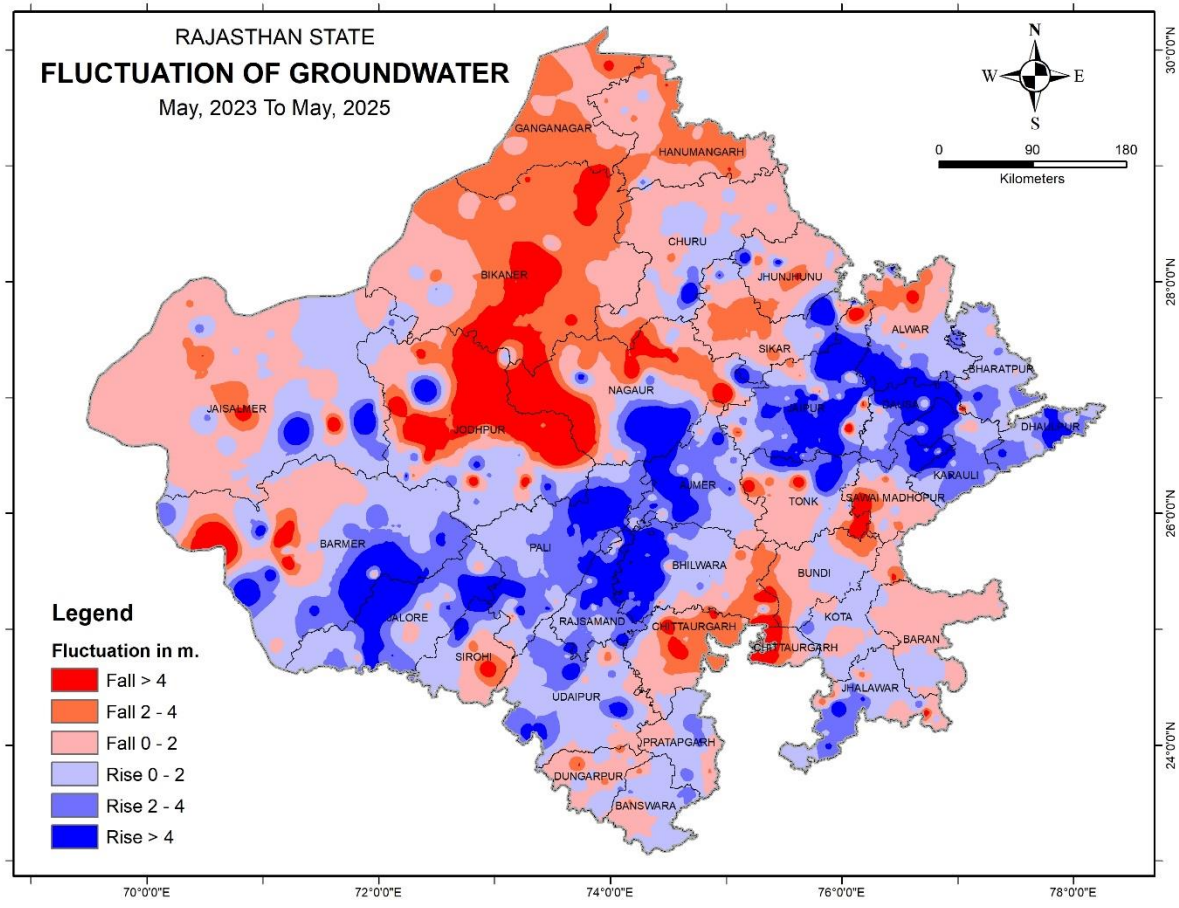

Fig9: Water level Fluctuation map May 2023 – May 2025

Decline in Water Levels:

About 43.60 % stations shows decline in water level fluctuations and mainly in western part of the State and scattered in all the districts. Minimum & maximum decline was recorded at 0.01 m in Maija, Bundi district and 24.6 m Choru,Tonk district. Decline in water level <2m was recorded in 24.69 % stations mainly falling in north western and south eastern part of the state . Decline in water level between 2 & 4m as recorded at 10.76% stations which is falling in the northern western and south eastern part of the State. Water level decline >4m was exhibited by 5.8% stations mostly falling in the northern part of the state .

5.1.4 Decadal Fluctuation in Water Level

Decadal Variation - Decadal average Fluctuation of May, (2015-2024) to May 2025

Total number of wells analyzed are 1134. A perusal of map (Fig 9) of decadal water level fluctuation from May(2015- 2024) to May 2025 reveals that 37% stations shown rise, 63% decline in water level

Rise in Water Levels:

Area of rise in water spreads from eastern, western, southern and west central parts of the State. Minimum & maximum rise was recorded 0.01 m in Moondli , Jaipur district and 41.51,Jhajar, Jhunjunu district. Rise in water level < 2m in 17.9% stations mostly in western, northern and central part of Rajasthan. Water level rise between 2 & 4m was shown by 8.7% stations mainly around northern part of the State and more than 4m has been recorded at 10.4 % stations and mostly falling in the northern , north eastern and central part of the State .

Decline in Water Levels:

About 63 % stations shows decline in water level fluctuations and scattered in all the districts. Minimum & maximum decline was recorded at 0.1 m in Anandhari, Sirohi district and 33.41 m Phulia , Jaisalmer district. Decline in water level <2m was recorded in 25% stations mainly falling in western, central and eastern part of the state . Decline in water level between 2 & 4m as recorded at 16.4% stations which is falling in the central, eastern north eastern and western part of the State. Water level decline >4m was exhibited by 21.5% stations mostly falling in the south western , central and north eastern part of the State.

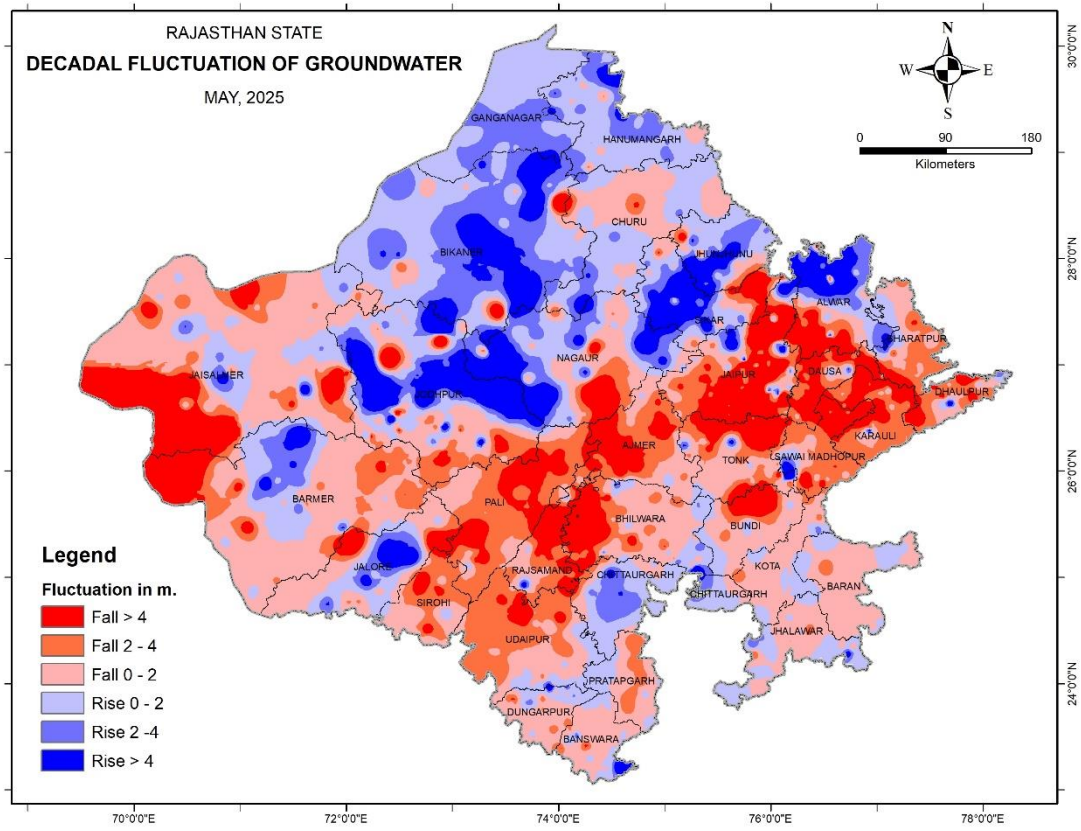

Fig10: Decadal Fluctuation May 2015-24 to May 2025

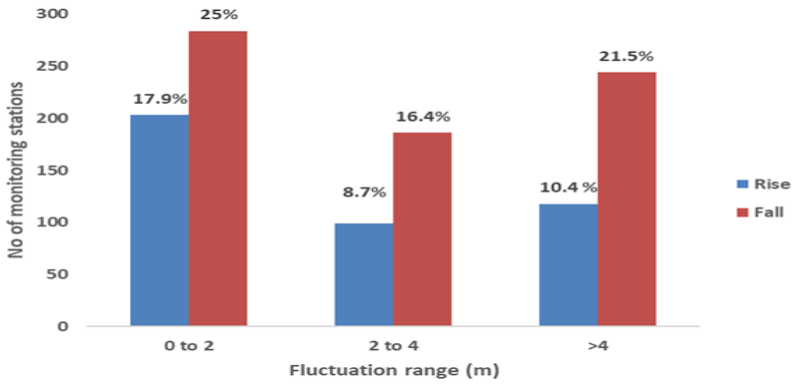

Fig 11:Percentage of wells showing rise and fall

6.0 Summary:

The Central Ground Water Board (CGWB), Western Region (WR), Jaipur, conducts quarterly groundwater monitoring under the National Ground Water Monitoring Programme. Monitoring is carried out in January (post-monsoon), May (pre-monsoon), August (post-monsoon), and November. Currently, 1,489 National Hydrograph Stations (NHS)—consisting of 647 dug wells and 842 piezometers—are being monitored across Rajasthan. Presently 1459 NHS comprises of 638 dug well and 821 piezometers in the state are being monitored.

In May 2025, 1214 monitoring stations were analyzed, revealing that the depth to water level varied significantly across the state. The shallowest water level was recorded at 0.04 mbgl (Khara,Jodhpur district), while the deepest was 142.18 mbgl (Sajjara, Jodhpur district). Seasonal water level fluctuations were assessed across different periods. From August 2024 to May 2025, analysis of 972 wells showed that 24% of stations experienced a rise in water levels, 76% saw a decline.For the period November 2024 to May 2025, 1041 wells were analyzed, with 21.33% showing a rise, 78.67% a decline. Similarly, from January 2025 to May2025, 1,094 wells were examined, revealing a rise in 26.6% of stations, 72.9 % decline & 0.5% stations shows no change.

The annual fluctuation (May2024 to May 2025) reveals that 67.7% stations shown rise, 32% decline and 0.3 % stations shows no change . And for May 2023 to May 2025 showed slightly different figures, with 56.4% of stations experiencing a rise, 43.6% a decline.A long-term comparison of May 2025 water levels with the mean of May (2015–2024) was conducted using 1134 wells. The findings revealed that 37% of stations showed a rise in water levels, while 63% exhibited a decline, indicating a concerning trend of groundwater depletion in many areas over the past decade.

7.0 Recommendations:

1. **Enforce strict extraction limits** in high-depletion zones with regulated borewell permits and penalties for overuse.
2. **Boost conservation** Promotion of Water Conservation Practices, such as rainwater harvesting, watershed management, and micro-irrigation techniques
3. **Accelerate aquifer recharge** :Recharge Initiatives like constructing check dams, percolation tanks, and artificial recharge structures in depleted regions to enhance aquifer replenishment.
4. **Educate communities** :Public Awareness Campaigns to educate farmers and industries on efficient water use and the adoption of drought-resistant crops.
5. **Implement smart monitoring** :Monitoring & Data-Driven Policies through real-time groundwater tracking and periodic reassessment of extraction limits based on aquifer health.