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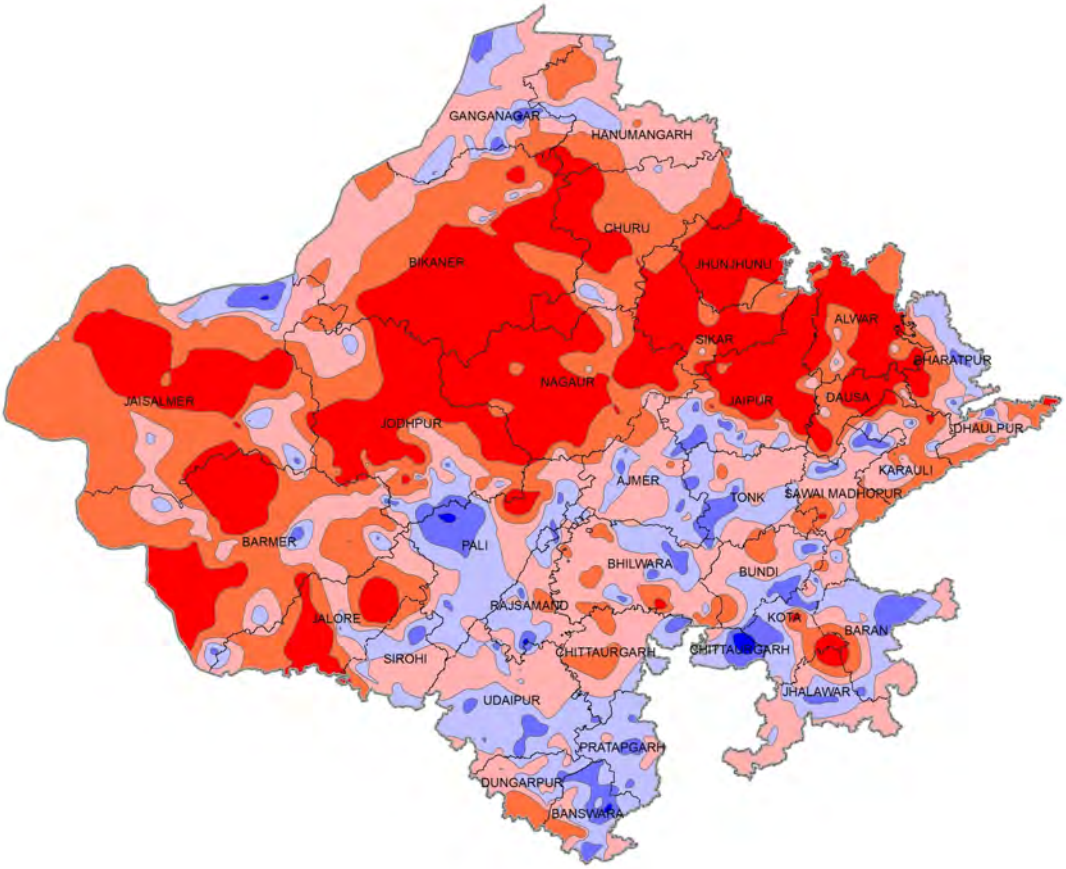
CENTRAL GROUND WATER BOARD
Water Resources, River Development and Ganga Rejuvenation Department
Ministry of Jal Shakti
Government of India



GROUND WATER REGIME MONITORING BULLETIN, RAJASTHAN
May, 2024

Western Region
Jaipur

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Ground Water Regime Monitoring Bulletin, Rajasthan
(May, 2024)

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Western Region
Jaipur

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Introduction

Central Ground Water Board is the National apex organisation vested with responsibilities “to develop and disseminate technologies and monitor and implement National policies for the scientific and sustainable development and management of India’sground water resources, including their exploration, assessment, conservation, augmentation, protection from pollution and distribution based on principles of economic and efficiency and ecological equity.”

Central Ground Water Board (CGWB), as a part of its National HydrographMonitoring programme, has established a network of observation wells in the state of Rajasthan for periodic monitoring of ground water and regime behaviour viz. recording of water levels, temperature and collection of ground water samples for chemicalquality analysis. The main objectives of monitoring of water levels is to observe the rise and fall of ground water levels in space and time consequent to changes in the inputs and outputs.

GROUND WATER REGIME MONITORING IN RAJASTHAN STATE

The Rajasthan being the largest State of India, has a geographical area of 3, 42,239 sq.km. It is situated between North latitudes 23^0 03’ and 30^0 12’ and East longitudes 69^0 30’ and 78^0 17’. The State has a very mature topography developed during large periods of denudation and erosional processes. Physiographically, the State is divided into four units, i.e., Aravalli hill ranges, Eastern Plains, Western sandy plains & Sand dunes, Vindhyan scarpland & Deccan lava plateau.

The ground water level observed over a period provides valuable information about the behaviour of ground water regime, which is subjected to change due to changes in recharge and draft. The difference of these factors results in the increase or decrease of ground water storage and the response is ultimately reflected through the fluctuation of water level.

Presently, 1488 nos. of National Hydrograph Stations (NHS) including 646 dug wells and 842 piezometers (Pz) are being monitored in Rajasthan State. The network of

observation stations is being progressively strengthened through construction of new purpose-built piezometers and establishment of new observation wells for the even distribution of observation stations to facilitate a better scientific environ to depict the true State of water levels in the State. Under the present scenario, the density of NHS stations is approximately one station per 270 sq.km. The district wise distribution of NHS in Rajasthan State is presented in Fig–I and Table–I.

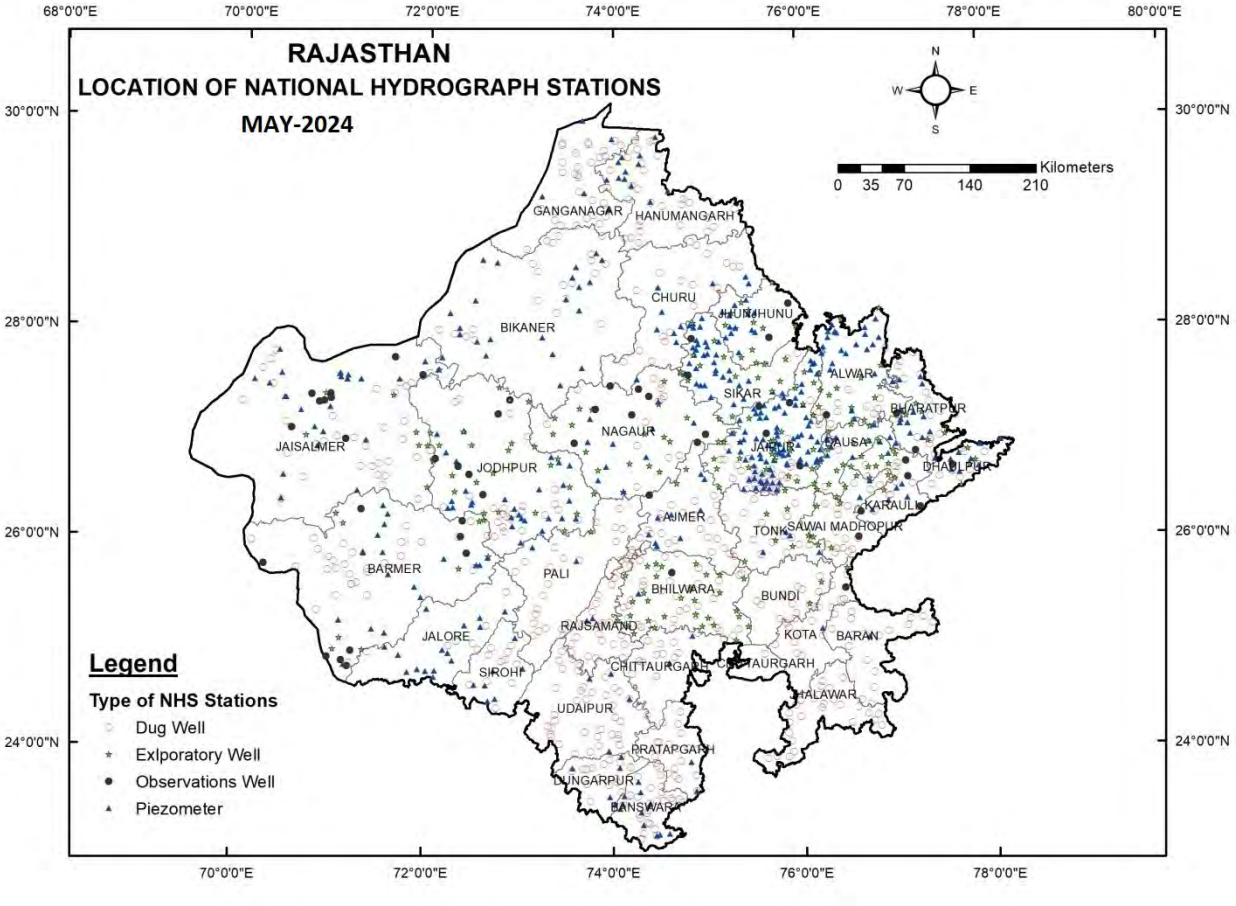

Fig1: Location of National Hydrograph Stations

Table I: The district wise distribution of National Hydrograph Station

Sl. No.	District	Geographical area (sq km)	Total Number of NHS			Number of NHS monitored		
			Dug well	Piezometer	Total	Dug well	Piezometer	Total
1	Ajmer	8481	27	20	47	22	11	33
2	Alwar	8380	11	39	50	3	31	34
3	Banswara	4536	28	20	48	26	16	42
4	Baran	6955	18	1	19	12	0	12
5	Barmer	28387	31	56	87	25	31	56
6	Bharatpur	5100	17	22	39	14	15	29
7	Bhilwara	10455	36	33	69	27	28	55
8	Bikaner	27244	20	36	56	11	25	36
9	Bundi	5550	13	9	22	8	9	17
10	Chittorgarh	7880	16	2	18	11	2	13
11	Churu	16830	19	11	30	15	10	25
12	Dausa	3470	6	28	34	3	25	28
13	Dhaulpur	3000	9	14	23	5	12	17
14	Dungarpur	3770	16	14	30	13	13	26
15	Ganganagar	10978	31	6	37	31	4	35
16	Hanumangarh	9656	29	24	53	22	22	44
17	Jaipur	11066	30	124	154	25	84	109
18	Jaisalmer	38401	35	49	84	27	33	60
19	Jalore	10640	7	17	24	4	13	17
20	Jhalawar	6219	27	2	29	23	2	25
21	Jhunjhunu	5928	0	30	30	0	21	21
22	Jodhpur	22850	25	99	124	23	67	90
23	Karauli	5016	14	26	40	13	19	32
24	Kota	5481	16	5	21	15	5	20
25	Nagaur	17718	13	39	52	9	25	34
26	Pali	12387	22	13	35	19	3	22
27	Pratapgarh	4360	20	2	22	18	2	20
28	Rajsamand	4768	26	4	30	25	4	29
29	Sawai Madhopur	5043	17	11	28	15	8	23
30	Sikar	7732	2	53	55	2	43	45
31	Sirohi	5136	11	7	18	8	5	13
32	Tonk	7194	16	22	38	15	19	34
33	Udaipur	11761	38	4	42	37	4	41
RAJASTHAN		**342,239**	**646**	**842**	**1488**	**526**	**611**	**1137**

Following maps have been prepared in order to understand the ground water regime:

a) Depth to water level Map-- Unconfined Aquifer May, 2024.

b) Water level fluctuation map – May, 2022 to May, 2024.

c) Decadal Variation map -- Decadal average of May (2014–23) to May, 2024.

1. Depth to Water Level (Unconfined Aquifer) – May, 2024

The latest monitoring of National Hydrograph Stations (NHS) was carried out in May, 2024. The consolidated well wise details of monitoring is given in Annexure-1.

Out of 1488 monitoring stations, 1137 stations were analysed for May, 2024. A perusal of Fig-2 and Table II displays a wide variation of ground water level. Depth to water level varies from 0.45 mbgl (Ratanpura, Hanumangarh District) to 144.47 mbgl (Hanuman Sagar , Jodhpur district).

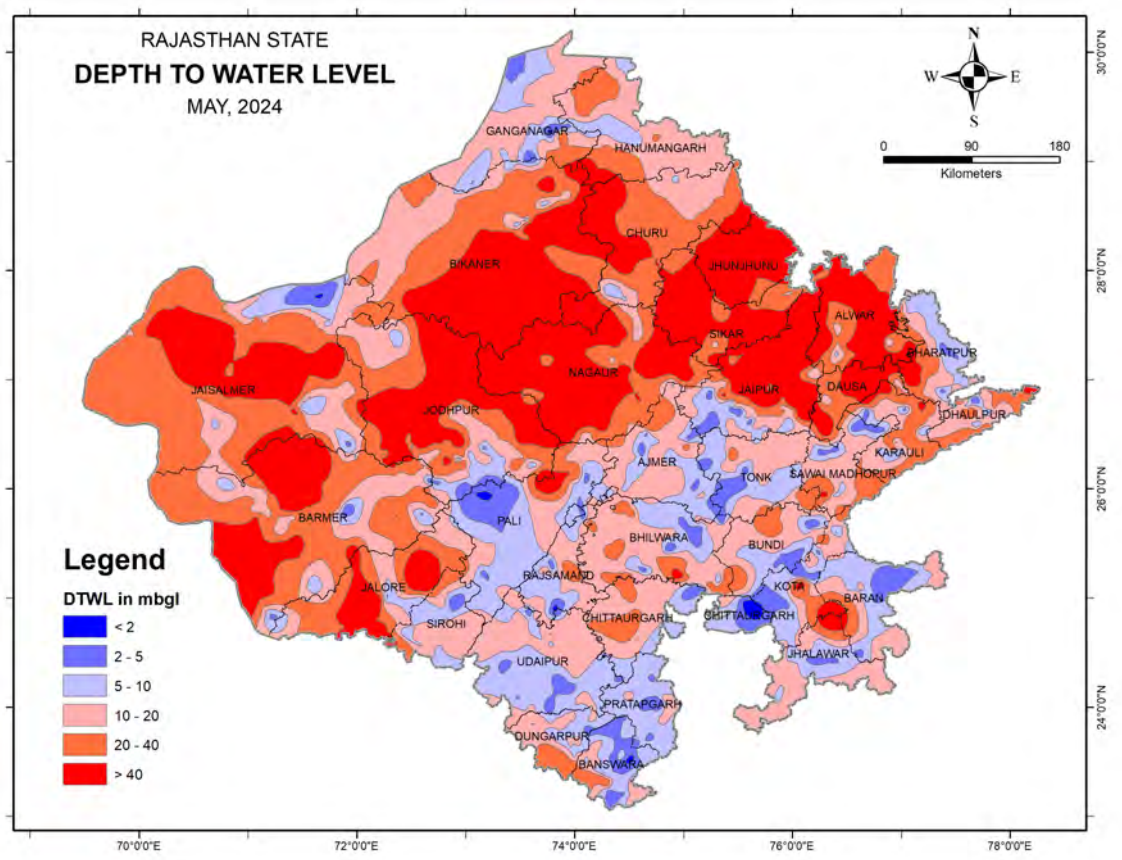

Fig2:Depth to Water level map ,2024

Water level more than 40 mbgl was monitored at 23.22 % stations and spread from north west to western and upper central parts covering mostly Jhunjhunu, Sikar, Jalore, Jaipur, Jodhpur, Alwar, Nagaur & Churu districts and isolated patches in Barmer, Jaisalmer, Dausa, Bikaner & Hanumangarh districts.

Depth to water level between 20 to 40 mbgl was recorded in 19.96% monitoring stations, stretching from north east to western part of the State, covering major parts of Churu,Jaisalmer,Alwar, Hanumangarh,Nagaur, , Dausa, Bikaner, Barmer, Jodhpur, Dholpur & Bharatpur districts and isolated locations in Karauli, Sikar, Bhilwara, Jaipur, Chittrogarh, Ganganagar & Jalore districts.

Depth to water level between 10 & 20 mbgl was recorded in 27.88% stations falling mostly in, Rajsamand, Gangangar, Sirohi, Jhalawar, Chittorgarh,Hanumangarh, Dholpur, Bikaner, Dausa, Bhilwara, Pratapgarh, Pali, Kota, Udaipur, Karauli & Nagaur districts and at isolated locations in all the districts except Baran, Dungarpur & Jhunjhunu districts.

Depth to water level ranging from 5 to 10 mbgl was recorded at 17.94% stations in falling in south & south eastern part of the state and spread in large patches in Baran, Dungarpur, Sawai Madhopur, Ajmer, Pratapgarh, Jhalawar, Pali, Udaipur, Kota, Sirohi, Rajsamand, Bharatpur, Bhilwara, Ganganagar & Tonk districts as well as at isolated pacthes in all the districts except Hanumangarh, Jhunjhunu & Nagaur districts.

Water level ranging between 2 & 5 mbgl was observed at 10.11% stations spread over south, south east, northern part of State falling in Bundi, Banswara , Kota,Pratapgarh & Pali Districts and isolated patches in Sawai Madhopur, Ajmer, Banswara, Baran, Dholpur, Bharatpur, Jaipur, Sirohi, Jhalawar, Bhilwara, Karauli & Jalore districts.

Shallow water level i.e. less than 2 mbgl have been observed at 0.88% stations at isolated locations falling in Chittaugarh, Pali,Sawai Madhopur,Ganganagar districts.

2. Water Level Fluctuation - May 2023 to May 2024

Total number of wells analysed are 861. A perusal of map (Fig-3) and Table III of annual water level fluctuation from May 2023 to May 2024 reveals that 65.2% stations shown rise, 35.8% decline stations in water level. Area of rise in water spreads from south east to south-central, north western, western and west central parts of the State. Minimum & maximum rise was recorded 0.01m in (Banswara, Kota and churu district) and 23.65 m (Sop1 pz of Tonk district).

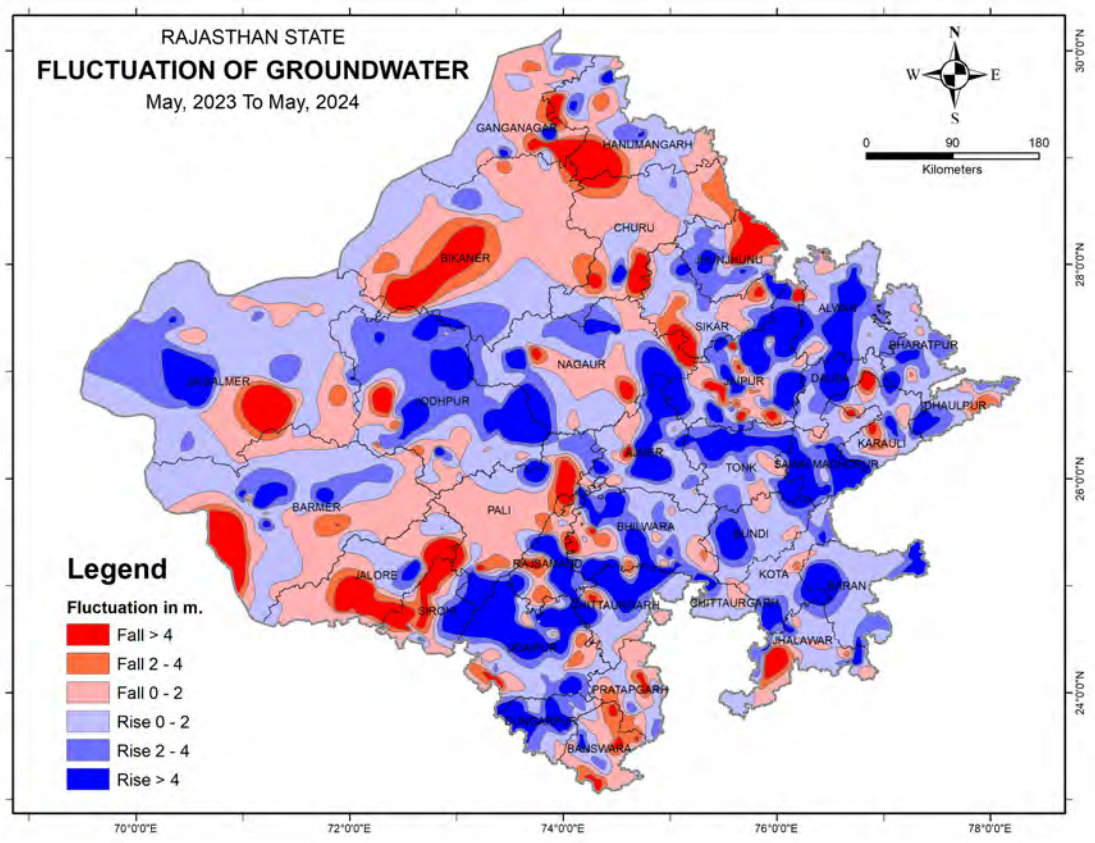

Fig3:Fluctuation map May 2023 to May 2024

Rise in water level < 2m in 33.4% stations was observed falling mostly in Ganganagar, Baran, Jaisalmer, Bharatpur, Kota, Dausa, Dholpur, Hanumangarh, Churu, Chittrogarh, Karauli, Bhilwara, Bikaner, Udaipur, Sawai Madhopur, Jalore, Barmer, Alwar, Jhalawar, Jodhpur, Ajmer & Jaipur districts and at isolated locations in all the remaining districts.

Water level rise between 2 & 4m was shown by 13.2% stations mostly falling in Sirohi, Rajsamand, Kota, Jaipur & Barmer districts and at isolated patches in Ajmer, Bhilwara, Karauli, Jodhpur, Baran, Sawai Madhopur, Tonk, Udaipur and Bundi districts.

Rise of more than 4m has been recorded at 18.5% stations falling mostly in Tonk, Sirohi, Pali, Ajmer, Rajasmand, Sawai Madhopur & Jalore districts and at isolated locations in Jodhpur, Bundi, Jaipur, Dausa, Dholpur, Nagaur, Bhilwara, Barmer & Banswara districts.

About 34.8% stations scattered in all the districts, mostly in north-eastern, south, south weastern, north& north central parts, shows decline in water level during this period. Minimum & maximum decline was recorded at 0.01 m in (Ajmer, Jhalawar and Jodhpur district) and 19.05 m (Bhundel, Nagaur district).

Decline in water level <2m was recorded in 21.4% stations falling mostly in Sikar, Dungarpur, Jhunjhunu, Pratapgarh, Bundi, Hanumangarh, Alwar, Churu, Nagaur, Banswara, Bharatpur, Jhalawar, Bikaner, Chittorgarh, Karauli, Udaipur, Tonk & Ganganagar districts and at isolated locations in all districts except Sirohi district.

Decline in water level between 2 & 4m was recorded at 5% stations at scattered locations in Nagaur, Banswara, Dausa, Jhalawar, Jhunjhunu & Pali Districts.

Water level decline>4m was exhibited by 8.5% stations at scattered locations in Pali, Sirohi, Jalore, Jhunjhunu, Pali, Bhilwara and Dholpur districts.

3. Water Level Fluctuation - January 2024 to May 2024

Total number of wells analysed are 936. Comparison of water level for January 2024 with that of May, 2024 (Fig-4& Table IV) infer that water level in 36.9% stations show rise wheras 63.6% shows decline in water level. Rise is mostly in isolated pockets scattered mainly in northern part and very few isolated pockets of southern part of the State. Minimum & maximum rise was recorded at 0.01 m (Lakhasar,Bikaner district) and 18.97 m (Bhundel, Nagaur district).

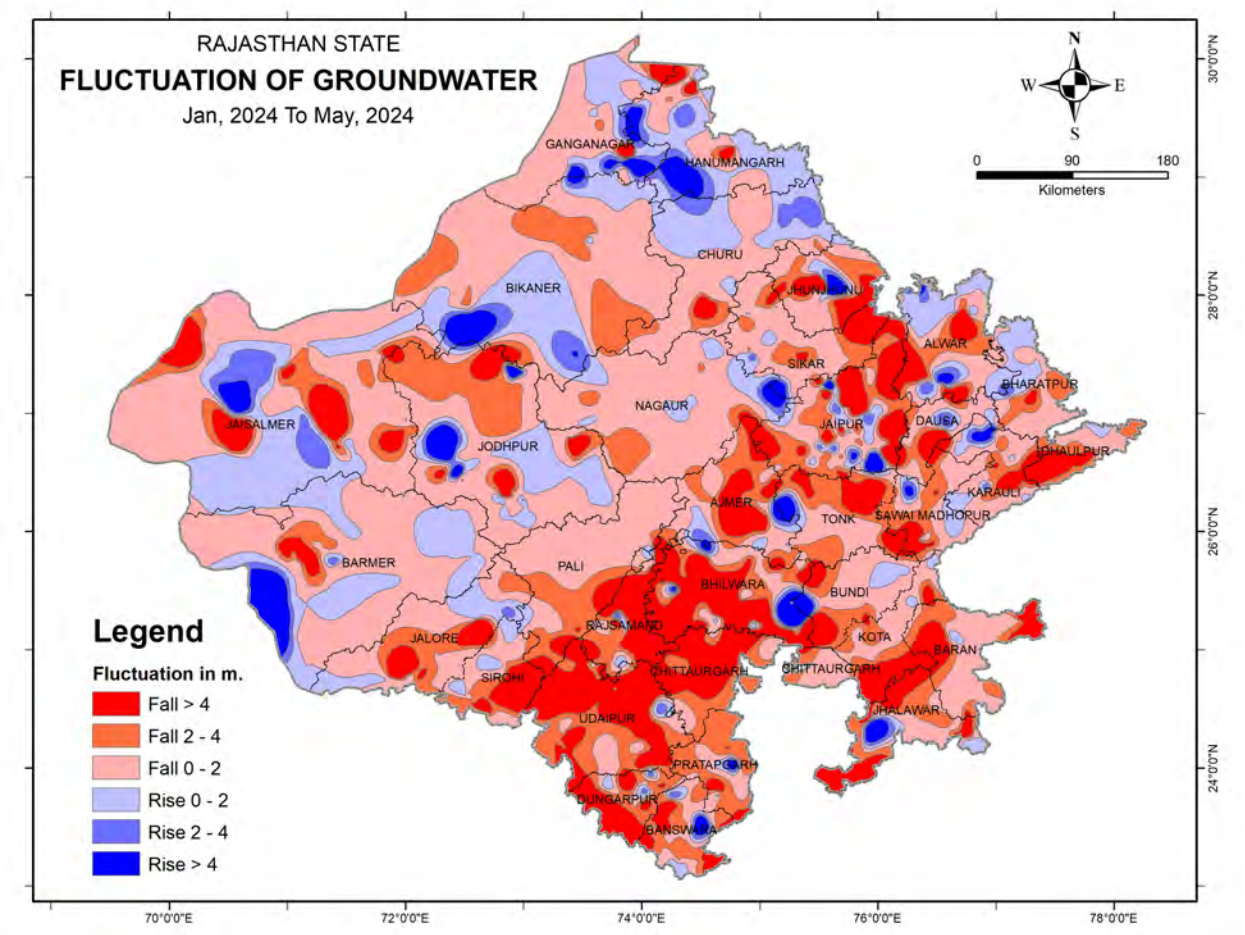

Fig4:Fluctuation map Jan 2024to May 2024

Rise in water level < 2m in 24.8% stations was observed falling mostly in Ganganagar, Churu, Hanumangarh, Jaisalmer, Bikaner, Jodhpur, Bharatpur, Nagaur & Sikar districts and at isolated locations in all the remaining districts except Chittorgarh, Bundi,Jhalawar, Pratapgarh and Sirohi Districts.

Water level rise between 2 & 4 m was shown by 5.9% stations scattered mainly in Bikaner, Jaisalmer, Hanumangargh, Ganganagar districts. Rise of

more than 4 m has been recorded at 3.9 % stations scattered in Ganganagar, Hanumangarh, Barmer, Bikaner, Jaisalmer. Jodhpur, Jhunjunu, Sikar, Bilwara.

About 63.6% stations scattered in all the districts, mostly in north-eastern, south, south weastern, north & north central parts, shows decline in water level during this period. Minimum & maximum decline was recorded at 0.02 m (Sangasar-Churu district,TickelPz -Jaipur district,Lauhra-Karauli district and Mandana of Kota district) and 23.24m (Bharunda Khurd, Jhunjhunu district).

Decline in water level <2m was recorded in 31.3% stations falling mostly in Nagaur, Dausa, Jalore, Pali, Sikar, Baran, Bundi, Barmer, karauli, Hanumangarh, Ganganagar, Kota, Jhunjhunu, Jaipur, Jodhpur, Bikaner, Alwar, Banswara, Bharatpur, Sirohi, Chittorgarh & Churu Districts and at isolated locations in all remaining districts.

Decline in water level between 2 & 4m was recorded at 13.8% stations at Sirohi, Pratapgarh, Bundi, Rajsamand, Jhalawar, Dungarpur, Tonk, Banswara & Alwar districts and and at isolated locations in Sawai Madhipur, Jhunjhunu, Bhilwara, Kota, Bharatpur, Udaipur Baran, Dausa, Biknaer, Barmer, Chittorgarh, Ajmer, Jaipur ,Jodhpur &Jaisalmer districts.

Water level decline>4m was exhibited by 18.5% stations at Bhilwara, Chittorgarh, Sawai Madhopur, Udaipur,Rajsamand Tonk, Karauli, Ajmer Kota,Bara,Jaipur,Sikar,Jhujhunu,Alwar & Dholpur districts and at isolated locations inJaisalmer, Pratapgarh,Barmer,Hanumangargh,Ganganagar, & Jhunjhunu districts.

4. Decadal Variation - Decadal average of MAY (2014-2023) to MAY, 2024

Total number of wells analysed are 960. Comparison of water level for May, 2024 with that of mean May (2014-2023) (Fig-4& Table IV) infer that water level in 59.5% stations show rise wheras 40.5% shows decline in water level. Rise is mostly in south to south-central, north western, western and west central parts of the State. Minimum & maximum rise was recorded at 0.01m (Tala Pz -Bhilwara district, and Lauha-Karauli district) and 26.47 m (Bagra1,Jalore district).

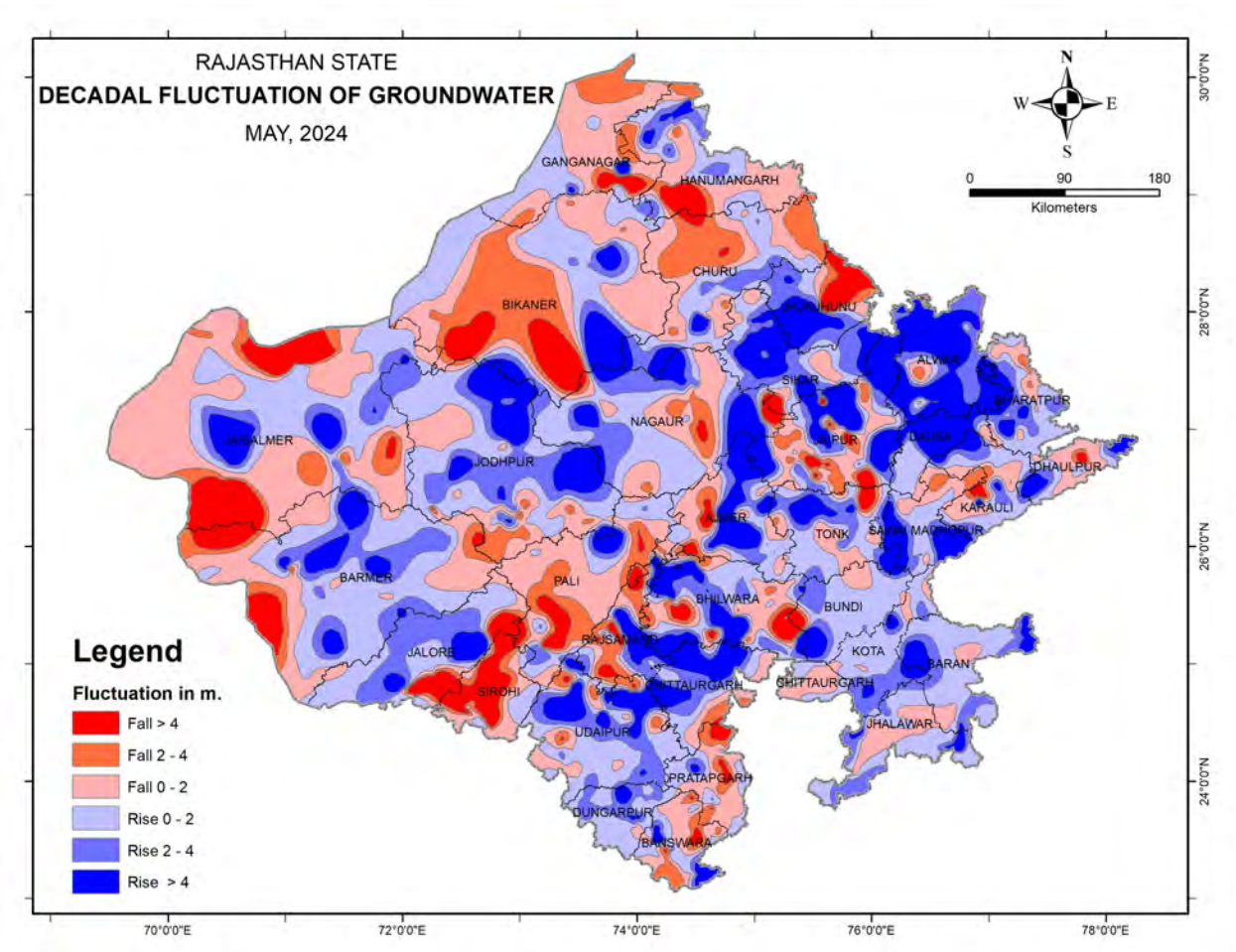

Fig5: Decadal Fluctuation map JMay (2014-2023) to May 2024

Rise in water level <2m in 22.6% stations was observed falling mostly in Baran, Churu, Bundi, Tonk, Bikaner, Bharatpur, Sirohi, Jhalawar, Kota, Chittorgarh, Karauli, Banswara, Ajmer, Dungarpur,Bhilwara, Jalore,Nagaur, Udaipur,Jodhpur,Barmer&Jaisalmer districts and at isolated locations in all the remaining districts except Alwar & Jhunjhunu district.

Rise in water level between 2 & 4m was shown by 13.8% stations falling mostlyJalore,Jodhpur,Nagaur,Jhunjunu,Udaipur,Dungarpur,Kota,Baran,Churu ,Barmer districts and at scattered locations in all other districts .

Rise in water level more than 4 m has been recorded at 21.0% stations falling mostly in Alwar,Dausa, Ajmer,Bhilwara,Jhunjhunu,Chittaurgarh, Udaipur,Rajsamand,Saawai Madhopur, Baran,Jodhpur and in isolated pockets of Jaisalmer, Bikaner, Nagaur,Jalore,Barmer districts.

About 40.5% stations, scattered mostly in eastern, south western, north eastern & north central parts, shows decline in water level. Minimum & maximum decline was recorded at 0.01m (Dabla-Ganganagar district and Kalyanpura, Udaipur district) and 38.17 m (Phulia, Jaisalmer district) respectively.

Decline in water level <2m was recorded in 22.4% stations falling mostly in Pali,Bikaner,Churu,Nagaur,Bhilwara,Jhalawar,Tonk,Dalupur,Pratapgarh,Barmer,Jaisalmer,Hanumangarh and Ganganagar districts.

Water level decline between 2 & 4m was recorded at 8.8% stations scattered in Bikaner, Churu, Pali, Karauli,Pratapgarh,Rajsamand,Nagaur districts and isolated pockets of Hanumangarh , Ganganagar, Jaisalmer and Jodhpur districts.

Water level decline >4m was shown by 9.2% stations mostly in Sirohi,Pali, Jhunjhunu,Bikaner,Jaisalmer, Barmer,Bhilwara, Jaipur and Sikar districts and isolated pockets of Daulpur, Karauli, Banswara,Pratapgarh, Bhilwara and Bundi districts.