GROUND WATER LEVEL BULLETIN

AUGUST 2024

JHARKHAND

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 25437 observation wells called National Hydrograph Network Stations (NHNS), as on 30.04.2024, located all over the country is being monitored.

2.0 STUDY AREA

Jharkhand state, was created on 15th November, 2000, consists of districts falling on Chotanagpur Plateau of erstwhile Bihar on the birthday of legendary tribal freedom fighter Birsa Munda. Presently it consists of 24 districts and 260 administrative blocks. The capital of the state is Ranchi. The state spreads over 79714 sq km, between Latitude 21º 55' 00" and 25º 15' 00" and Longitude 83º 15' 00"and 87º 55' 00". The state is bounded by Bihar in the north and by West Bengal in the east. The other two sides, west and south, are bounded by Chhattisgarh and Orissa states respectively (Fig.1).

The population of the state as per 2011 census is 03.30 crore. The population density is 414 person/km^2. The urban population is 7.912 million and the rural population is 25.05 million. The tribal population constitutes about 28% of total population. The state

is moderately urbanized with Ranchi as its capital city. Nearly 24% of total population of the state lives in urban areas. Important urban centers are in the state are Jamshedpur, Dhanbad, Hazaribagh, Daltonganj, Dumka and Deoghar.

Fig 1: Administrative Map of Jharkhand

3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board, State Unit Office Ranchi, is monitoring changes in groundwater regime in Jharkhand state on quarterly basis continuously. This is facilitated by a network of monitoring stations in the State located in diverse hydrogeological and geomorphic units. The number of operational wells till March 2024 was 582 which include 460 dug wells and 122 piezometers (Fig 2). In August 2024, 562 wells monitored (458 DW, 104 Pz, out of which 49 wells were dry), while 25 wells (9 dug wells and 16 piezometers) 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**.

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

Sl.No	District	DW	PZ	TOTAL
1	Bokaro	16	1	17
2	Chatra	17	4	21
3	Deoghar	11	5	16
4	Dhanbad	20	4	24
5	Dumka	17	7	24
6	E. Singhbhum	36	3	39
7	Garhwa	23	8	31
8	Giridih	18	4	22
9	Godda	19	3	22
10	Gumla	17	3	20
11	Hazaribagh	28	10	38
12	Jamtara	11	5	16
13	Khunti	14	6	20
14	Koderma	7	6	13
15	Latehar	12	6	18
16	Lohardaga	12	2	14
17	Pakur	11	4	15
18	Palamu	25	7	32
19	Ramgarh	17	6	23
20	Ranchi	56	12	68
21	Sahibganj	21	3	24
22	Saraikela	14	1	15
23	Simdega	14	7	21
24	W Singhbhum	24	5	29
Total		**460**	**122**	**582**

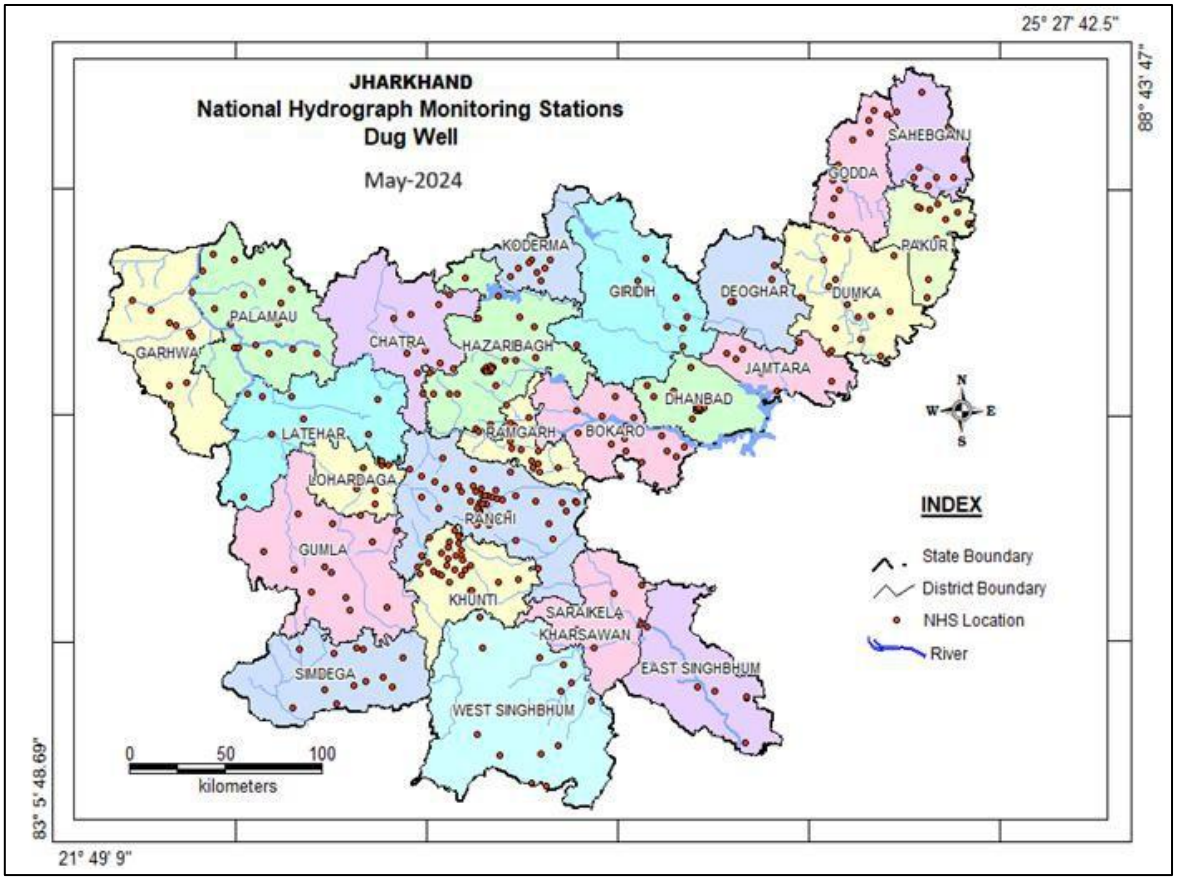

Figure-2: Map showing location of National Hydrograph Monitoring Stations of Jharkhand

5.0 GROUND WATER LEVEL SCENARIO (AUGUST 2024)

5.1 SHALLOW AQUIFER (UNCONFINED AQUIFER)

5.1.1 DEPTH TO WATER LEVEL

Depth To Water Level in Unconfined Aquifer (August 2024)

The depth to water level of 400 wells is used for the analysis. Analysis of depth to water level data of 400 wells shows water levels vary between 0.20 m to 13.0 m bgl. Water level of less than 2 m bgl is recorded in 39.5 % of wells, between 2 to 5 m bgl in 43.5% of wells, between 5 to 10 m bgl in 15.0% of wells, between 10 to 20 m bgl in 2 % of wells.

Shallow water level of less than 2 m bgl is found in Ranchi, East Singhbhum , Gumla, Hazaribagh, Simdega, Garhwa, Sahibganj and Dhanbad districts of state . Water level of

2 to 5 m bgl is observed Ranchi, Ramgarh, East Singhbhum, Dhanbad, Hazaribagh, Chatra districts of state. Depth to water level of 5 to 10 m bgl is observed throughout the state covering Ranchi, East Singhbhum, Godda, Hazaribagh, Lohardaga. Water level of 10 to 20 m bgl is covered maximum in Saraikela, Palamu, Khunti district of the State.

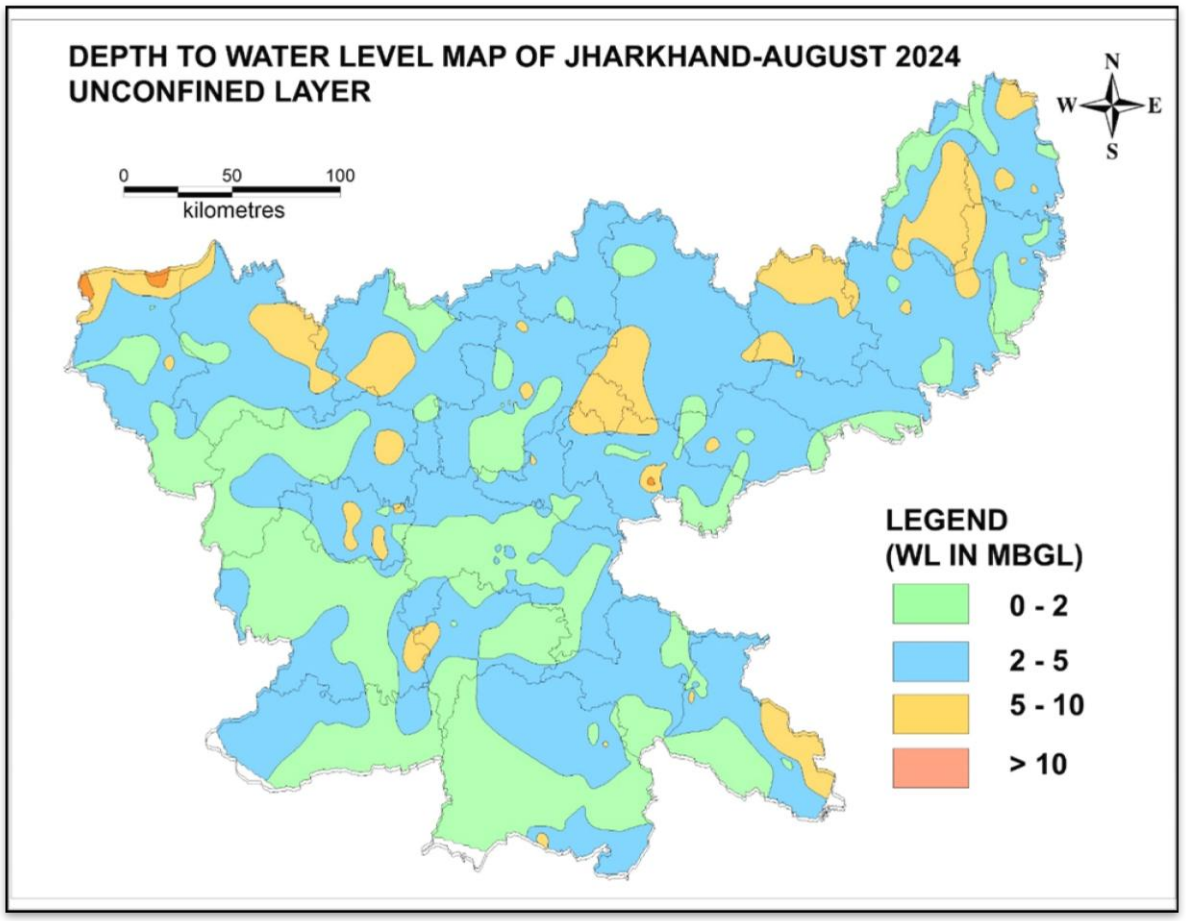

Figure 3-Monsoon (August-2024) Depth to water level map of Jharkhand

Table 2 District wise well frequency for different ranges of depth to water level of HNS in August 2024 in Jharkhand State												
SN	**District**	**No. of wells analysed**	**Depth to water level (m bgl)**		**0-2 m**		**2-5 m**		**5-10 m**		**>10 m**	
			Min.	**Max.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
1	Koderma	3	1.58	3.60	1	33.3	2	66.7	0	0.0	0	0.0
2	Chatra	15	0.43	8.20	4	26.7	9	60.0	2	13.3	0	0.0
3	Devghar	11	3.01	6.88	0	0.0	7	63.6	4	36.4	0	0.0
4	Dhanbad	19	1.16	5.83	7	36.8	11	57.9	1	5.3	0	0.0
5	Dumka	16	1.11	5.52	3	18.8	10	62.5	3	18.8	0	0.0
6	Garhwa	22	0.50	10.95	9	40.9	10	45.5	1	4.5	2	9.1
7	Giridih	10	1.52	5.30	1	10.0	8	80.0	1	10.0	0	0.0
8	Godda	16	0.89	8.84	5	31.3	6	37.5	5	31.3	0	0.0
9	Gumla	18	0.27	6.95	12	66.7	5	27.8	1	5.6	0	0.0
10	Hazaribag	27	0.22	9.73	11	40.7	12	44.4	4	14.8	0	0.0
11	Bokaro	8	1.14	3.75	6	75.0	2	25.0	0	0.0	0	0.0
12	Khunti	14	0.75	5.95	7	50.0	6	42.9	1	7.1	0	0.0
13	Simdega	13	0.60	4.61	10	76.9	3	23.1	0	0.0	0	0.0
14	Latehar	10	0.20	5.75	6	60.0	3	30.0	1	10.0	0	0.0
15	Lohardaga	12	1.30	7.65	2	16.7	5	41.7	5	41.7	0	0.0
16	Pakur	11	0.47	5.86	4	36.4	5	45.5	2	18.2	0	0.0
17	Palamau	18	0.97	13.00	2	11.1	10	55.6	4	22.2	2	11.1
18	Paschim Singbhum	18	0.32	5.32	7	38.9	9	50.0	2	11.1	0	0.0
19	Purba Singbhum	30	0.75	9.51	15	50.0	10	33.3	5	16.7	0	0.0
20	Ramgarh	16	1.05	6.10	5	31.3	10	62.5	1	6.3	0	0.0
21	Ranchi	58	0.75	12.05	27	46.6	15	25.9	12	20.7	4	6.9
22	Sahibgani	20	0.99	6.98	8	40.0	8	40.0	4	20.0	0	0.0
23	Saraikela	11	0.28	4.95	6	54.5	5	45.5	0	0.0	0	0.0
24	Jamtara	4	2.23	5.52	0	0.0	3	75.0	1	25.0	0	0.0
Total		**400**			**158**	**39.5**	**174**	**43.5**	**60**	**15.0**	**8**	**2.0**

5.1.2 SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water Level in Unconfined Aquifer (May 2024 to August 2024)

362 wells used for analysis for seasonal fluctuation (May 2024 to August 2024 in unconfined aquifer. 354 wells rising and 8 wells found to be falling.

Rise in Water Levels

Water level rise of less than 2 m is recorded in 11.6% of wells, 2 to 4 m in 33.4% wells, more than 4 m in 52.8% of wells Water level rise of less than 2 m is seen significantly in East Singhbhum, Ranchi, Dhanbad, West Singhbhum, Gumla, Bokaro, Pakur, Ramgarh, Dumka, Lohardaga, districts. Water level rise of 2 to 4 m is observed mainly in Garhwa, Ramgarh, Hazaribagh, Ranchi, Sahebganj, Simdega districts. Rise of more than 04 m is significantly observed in Ranchi, Hazaribagh, Gumla, East Singhbhum, Sahebganj, Garhwa, Bokaro West Singhbhum districts.

Fall in Water Levels:

Out of 362 wells,only 8 wells have registered fall in water levels, situated in E Singhbhum, Palamu, Hazaribagh, Chatra and Dhanbad.

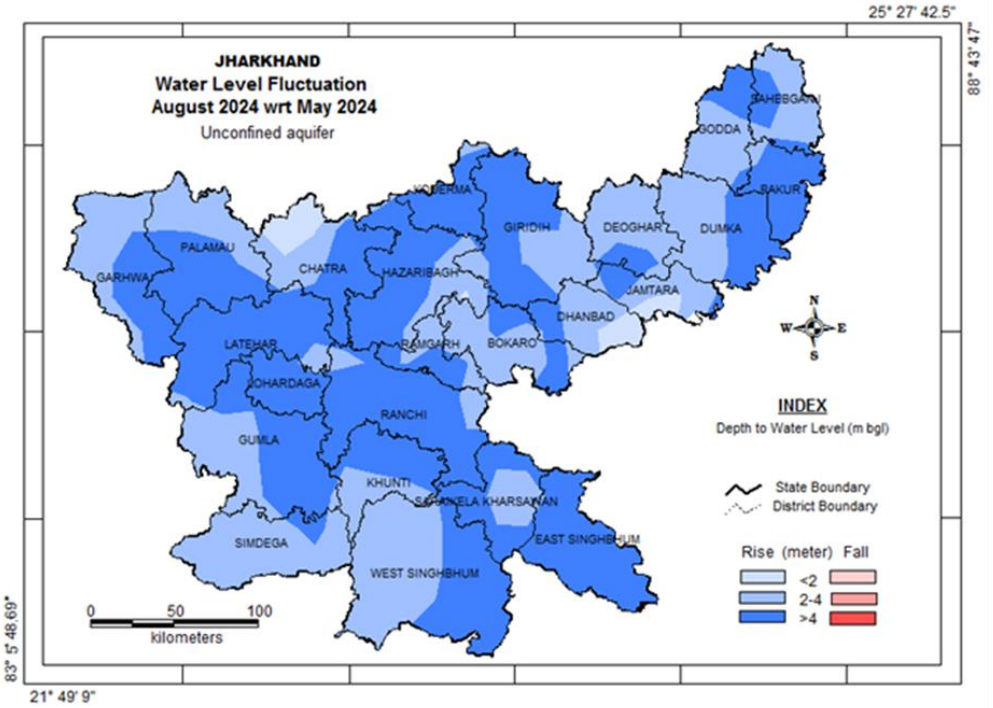

Figure 4: Seasonal water level fluctuation in unconfined Aquifer (May 2024 to August 2024)

Table 3: District wise categorization of fluctuation and their frequency of water levels of HNS of August. 2024 w.r.t. May 2024

SN	District	No. of HNS	No. of Wells / Percentage showing fluctuation												Total	
			Fall						Rise							
			<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Fall	Rise
1	Bokaro	8	0	0	0	0	0	0	3	37.5	1	12.5	4	50	0	8
2	Chatra	15	1	6.7	1	6.7	0	0	2	13.3	4	26.7	7	46.7	2	13
3	Devghar	11	0	0	0	0	0	0	0	0	8	72.7	3	27.3	0	11
4	Dhanbad	18	1	5.6	0	0	0	0	4	22.2	5	27.8	8	44.4	1	17
5	Dumka	16	0	0	0	0	0	0	2	12.5	6	37.5	8	50	0	16
6	Garhwa	21	0	0	0	0	0	0	0	0	11	52.4	10	47.6	0	21
7	Giridih	10	0	0	0	0	0	0	0	0	4	40	6	60	0	10
8	Godda	16	0	0	0	0	0	0	1	6.3	7	43.8	8	50	0	16
9	Gumla	15	0	0	0	0	0	0	4	26.7	2	13.3	9	60	0	15
10	Hazaribag	26	1	3.8	0	0	0	0	0	0	9	34.6	16	61.5	1	25
11	Jamtara	4	0	0	0	0	0	0	0	0	1	25	3	75	0	4
12	Khunti	13	0	0	0	0	0	0	1	7.7	5	38.5	7	53.8	0	13
13	Koderma	3	0	0	0	0	0	0	0	0	1	33.3	2	66.7	0	3
14	Latehar	10	0	0	0	0	0	0	0	0	2	20	8	80	0	10
15	Lohardaga	12	0	0	0	0	0	0	2	16.7	3	25	7	58.3	0	12
16	Pakur	11	0	0	0	0	0	0	0	0	5	45.5	6	54.5	0	11
17	Palamau	17	2	11.8	0	0	0	0	2	11.8	4	23.5	9	52.9	2	15
18	W Singbhum	18	0	0	0	0	0	0	2	11.1	5	27.8	11	61.1	0	18
19	E Singbhum	29	2	6.9	0	0	0	0	9	31	7	24.1	11	37.9	2	27
20	Ramgarh	15	0	0	0	0	0	0	1	6.7	8	53.3	6	40	0	15
21	Ranchi	33	0	0	0	0	0	0	3	9.1	6	18.2	24	72.7	0	33
22	Sahibgani	19	0	0	0	0	0	0	2	10.5	7	36.8	10	52.6	0	19
23	Saraikela	10	0	0	0	0	0	0	1	10	4	40	5	50	0	10
24	Simdega	12	0	0	0	0	0	0	3	25	6	50	3	25	0	12
	Total	362	7	1.9	1	0.3	0	0	42	11.6	121	33.4	191	52.8	8	354

5.1.3 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer (August 2024 to August 2023)

340 wells used for analysis for annual fluctuation (August 2024 to August 2023 in unconfined aquifer. 196 wells found to be rising and 144 wells falling.

Rise in Water Levels:

Out of 196 wells, water level rise of less than 2 m is recorded in 38% wells, 2 to 4 m in 13.5% wells and more than 4 m in 6.2% of the wells. Water level rise of less than 2 m is

seen in almost entire state. Water level rise of 2 to 4 m is observed mainly in districts such as Ranchi, Ramgarh, Dumka, Hazaribagh, Bokaro, Sahebganj, West Singhbhum districts. Rise of more than 4 m is significantly observed in Ranchi, Ramgarh, Hazaribagh, Lohardaga Dhanbad, Dumka districts.

Fall in Water Levels:

Out of 144 wells that have registered fall in water levels, 35% have recorded less than 2 m while 7% in the range of 2 to 4 m and only 1 well situated in Ranchi district shows water level fall of more than 4 m. Fall of less than 2 m is observed in all districts of Jharkhand. Fall of 2 to 4 m is observed mainly in Dumka, West Singhbhum, Hazaribagh, East Singhbhum and Sahibganj districts. Fall of beyond 4 m is observed in Pakur, Sahibganj, Saraikela districts.

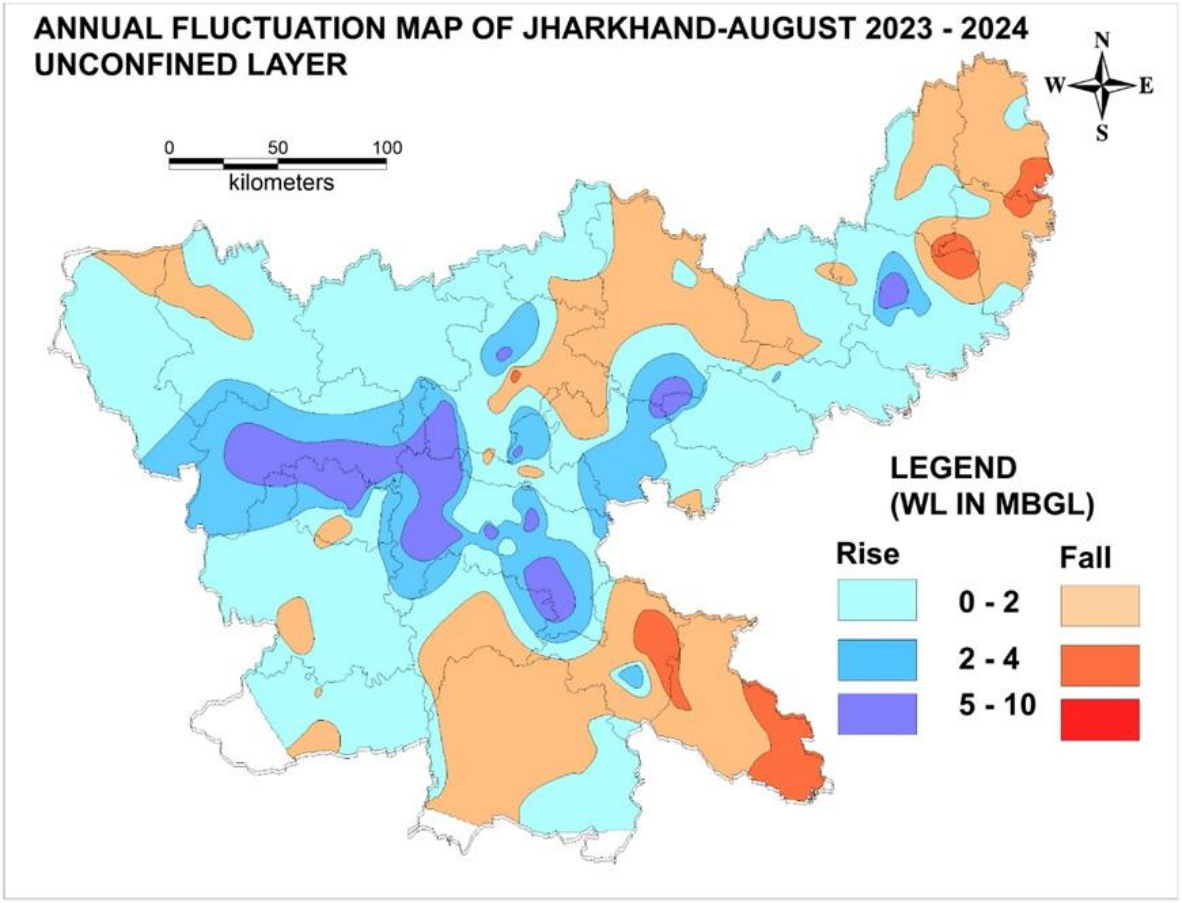

Figure 5 : Annual water level fluctuation in unconfined aquifer (August 2023 to August 2024)

Table 4: District wise categorization of fluctuation and their frequency of water levels of HNS of August. 2024 w.r.t. August 2023

SN	District	No. of HNS	No. of Wells / Percentage showing fluctuation												Total	
			Fall						Rise							
			<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Fall	Rise
1	Bokaro	7	2	28.6	0	0	0	0	4	57.1	1	14.3	0	0	2	5
2	Chatra	11	3	27.3	0	0	0	0	7	63.6	1	9.1	0	0	3	8
3	Devghar	11	2	18.2	0	0	0	0	8	72.7	1	9.1	0	0	2	9
4	Dhanbad	12	3	25	0	0	0	0	6	50	1	8.3	2	16.7	3	9
5	Dumka	14	0	0	1	7.1	0	0	8	57.1	4	28.6	1	7.1	1	13
6	Garhwa	10	2	20	0	0	0	0	8	80	0	0	0	0	2	8
7	Giridih	10	7	70	0	0	0	0	3	30	0	0	0	0	7	3
8	Godda	14	10	71.4	0	0	0	0	4	28.6	0	0	0	0	10	4
9	Gumla	16	3	18.8	0	0	0	0	11	68.8	2	12.5	0	0	3	13
10	Hazaribag	26	6	23.1	1	3.8	0	0	10	38.5	5	19.2	4	15.4	7	19
11	Jamtara	2	1	50	0	0	0	0	0	0	1	50	0	0	1	1
12	Khunti	12	5	41.7	0	0	0	0	5	41.7	2	16.7	0	0	5	7
13	Koderma	3	0	0	0	0	0	0	3	100	0	0	0	0	0	3
14	Latehar	8	0	0	0	0	0	0	5	62.5	3	37.5	0	0	0	8
15	Lohardaga	11	1	9.1	0	0	0	0	6	54.5	1	9.1	3	27.3	1	10
16	Pakur	11	7	63.6	1	9.1	0	0	3	27.3	0	0	0	0	8	3
17	Palamau	13	3	23.1	0	0	0	0	7	53.8	2	15.4	1	7.7	3	10
18	Paschim Singbhum	15	9	60	1	6.7	0	0	5	33.3	0	0	0	0	10	5
19	Purba Singbhum	25	17	68	7	28	0	0	1	4	0	0	0	0	24	1
20	Ramgarh	15	5	33.3	0	0	0	0	3	20	6	40	1	6.7	5	10
21	Ranchi	54	7	13	10	18.5	1	1.9	12	22.2	15	27.8	9	16.7	18	36
22	Sahibgani	19	15	78.9	2	10.5	0	0	2	10.5	0	0	0	0	17	2
23	Saraikela	10	7	70	1	10	0	0	1	10	1	10	0	0	8	2
24	Simdega	11	4	36.4	0	0	0	0	7	63.6	0	0	0	0	4	7
	Total	340	119	35	24	7.1	1	0.3	129	37.9	46	13.5	21	6.2	144	196

5.1.4 DECADAL FLUCTUATION IN WATER LEVEL

Decadal Fluctuation of Water Level in Unconfined Aquifer (Decadal Mean August (2014-2023) to August 2024)

Rise in Water Levels:

Out of 230 wells, water level rise of less than 2 m is recorded in 50% wells, 2 to 4 m in 19% wells and more than 4 m in only 2 wells situated in Hazaribagh and Chatra district. Water level rise of less than 2 m is seen in almost all the districts. Water level rise of 2 to 4

m is observed mainly in Ranchi, Godda, Gumla, Ramgarh, Giridih, Jamtara and Palamu districts and rise of more than 4 m is significantly observed in Hazaribagh, Dumka, Chatra, Koderma districts.

Fall in Water Levels:

Out of the 230 wells that have registered fall in water levels, 31% have recorded less than 2 m while 5% in the range of 2 to 4 m and remaining 4% wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in almost all districts of the state. Fall of 2 to 4 m, recorded in Ramgarh, Lohardaga, Sahebganj, West Singhbhum districts. Fall beyond 4 mis recorded mainly in East Singhbhum.

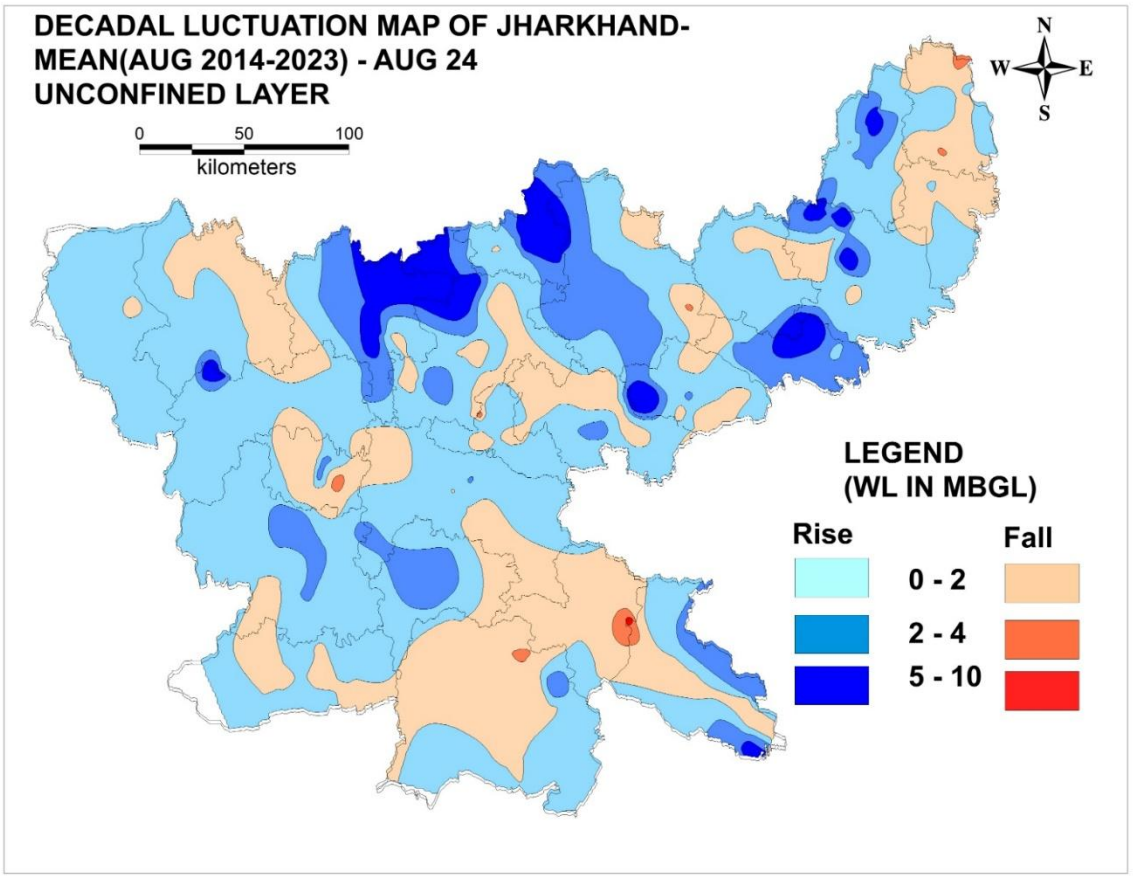

Figure 6: Decadal water level fluctuation in unconfined Aquifer (August 2024 to Decadal Mean August (2014-2023))

Table 5: District wise categorization of fluctuation and their frequency of water levels of HNS of August. 2024 w.r.t. mean (August 2012 to August 2023)

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Bokaro	6	0.42	0.93	0.33	0.85	3	50.0	0	0.0	0	0.0	3	50.0	0	0.0	0	0.0	3	3
2	Chatra	5	0.28	5.14	0.13	0.13	2	40.0	1	20.0	1	20.0	1	20.0	0	0.0	0	0.0	4	1
3	Devghar	6	0.06	1.41	0.70	0.70	5	83.3	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0	5	1
4	Dhanbad	8	0.37	2.56	0.13	0.82	3	37.5	1	12.5	0	0.0	4	50.0	0	0.0	0	0.0	4	4
5	Dumka	14	0.03	1.75	0.03	0.92	11	78.6	0	0.0	0	0.0	3	21.4	0	0.0	0	0.0	11	3
6	Garhwa	6	0.16	1.98	0.11	0.11	5	83.3	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0	5	1
7	Giridih	8	0.29	1.74	0.17	2.07	5	62.5	0	0.0	0	0.0	2	25.0	1	12.5	0	0.0	5	3
8	Godda	11	0.15	2.59	10	90.9	1	9.1	0	0.0	0	0.0	0	0.0	0	0.0			1	0
9	Gumla	14	0.55	3.21	0.34	1.25	6	42.9	5	35.7	0	0.0	3	21.4	0	0.0	0	0.0	11	3
10	Hazaribag	14	0.11	5.55	0.05	1.50	5	35.7	2	14.3	1	7.1	6	42.9	0	0.0	0	0.0	8	6
11	Jamtara	2	1.45	2.19			1	50.0	1	50.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0
12	Khunti	8	0.21	1.92	0.60	1.23	5	62.5	0	0.0	0	0.0	3	37.5	0	0.0	0	0.0	5	3
13	Koderma	2	1.36	1.36	0.07	0.07	1	50.0	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0	1	1
14	Latehar	8	0.11	2.74			7	87.5	1	12.5	0	0.0	0	0.0	0	0.0	0	0.0	8	
15	Lohardaga	10	0.70	2.28	0.06	2.42	3	30.0	1	10.0	0	0.0	5	50.0	1	10.0	0	0.0	4	6
16	Pakur	7	0.12	1.10	0.16	1.38	2	28.6	0	0.0	0	0.0	5	71.4	0	0.0	0	0.0	2	5
17	Palamau	11	0.32	1.56	0.10	3.57	4	36.4	0	0.0	0	0.0	6	54.5	1	9.1	0	0.0	4	7
18	W Singbhum	13	0.06	3.36	0.32	2.35	6	46.2	1	7.7	0	0.0	5	38.5	1	7.7	0	0.0	7	6
19	E Singbhum	8	0.10	0.20	0.24	1.72	3	37.5	0	0.0	0	0.0	5	62.5	0	0.0	0	0.0	3	5
20	Ramgarh	11	0.07	1.59	0.74	3.17	8	72.7	0	0.0	0	0.0	2	18.2	1	9.1	0	0.0	8	3
21	Ranchi	35	0.15	3.11	0.16	7.98	10	28.6	5	14.3	0	0.0	4	11.4	6	17.1	10	28.6	15	20
22	Sahibgani	12	0.10	1.56	0.22	2.75	4	33.3	0	0.0	0	0.0	7	58.3	1	8.3	0	0.0	4	8
23	Saraikela	4	0.41	0.41	0.41	1.02	1	25.0	0	0.0	0	0.0	3	75.0	0	0.0	0	0.0	1	3
24	Simdega	7	0.16	0.94	0.03	0.37	5	71.4	0	0.0	0	0.0	2	28.6	0	0.0	0	0.0	5	2
	Total	230					115	50.0	19	8.3	2	0.9	72	31.3	12	5.2	10	4.3	126	94

5.2 DEEPER AQUIFER (CONFINED/ SEMI-CONFINED)

5.2.1 DEPTH TO PIEZOMETRIC LEVEL

Depth To Piezometric Head in Confined/Semi-Confined Aquifer (August 2024)

Analysis of piezometric level data of 91 wells shows piezometric levels vary between 0.34 m.bgl (Pandeyabara, Chauparan block, Hazaribagh district) to 31.89m bgl (Benagadiya, Sikharipara block, Dumka district). 12% of Piezometric level of less than 2 m bgl is recorded in Hazaribagh, Ranchi, Gumla, Palamu, 44% of wells shows piezometric level between 2 to 5 m bgl, between 5 to 10 m bgl in 27.5% of wells, more than 10 m is observed in 16.5% of wells.

The water level recorded in less than 2 mbgl in confined/semi confined aquifer in Hazaribagh, Ranchi, Gumla, Palamu districts. Piezometric level of 2 to 5 m, bgl mainly observed in Deogarh, Dumka, Hazaribagh, Koderma, Latehar, Ramgarh districts. Piezometric level of 5 to 10 m bgl is recorded in Pakur, Ramgarh, Ranchi, Palamu, Hazaribagh, Garhwa districts. Piezometric level more than 10m bgl is recorded in Chatra, Dumka, Garhwa, East Singhbhum and Pakur districts.

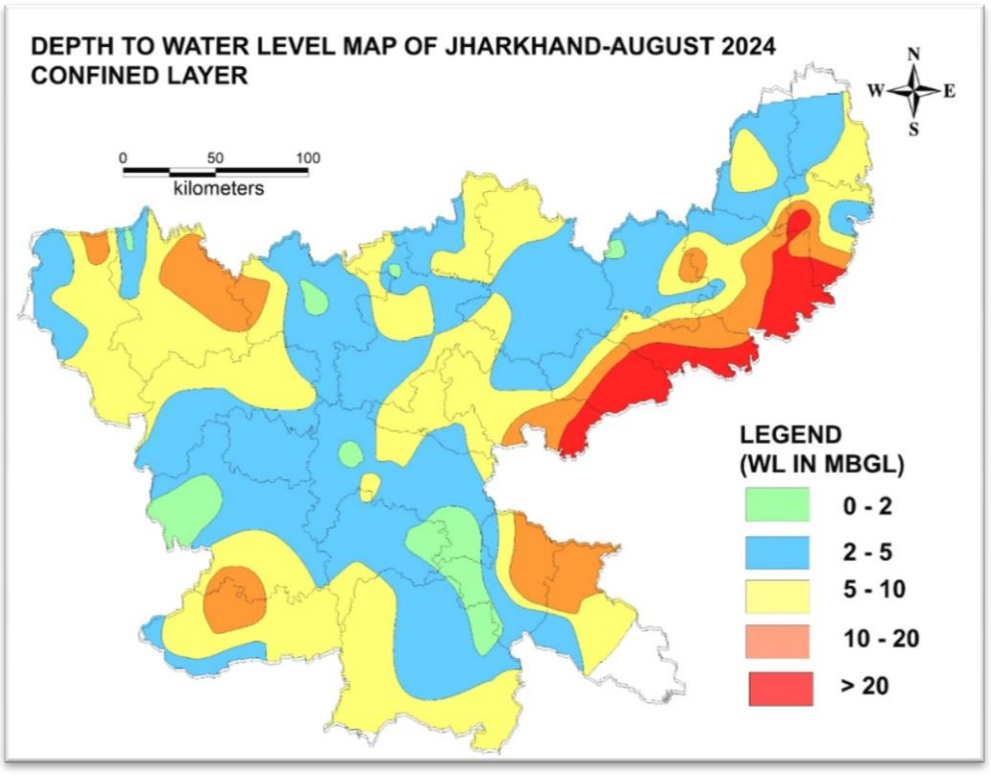

Figure-7: Piezometric head (May-2024) of confined/semi confined aquifer of Jharkhand.

Table 6: District wise well frequency for different ranges of depth to water level of HNS in **August 2024** in Jharkhand state confined aquifer

SN	District	No. of wells analysed	Depth to water level (m bgl)		0-2 m		2-5 m		5-10 m		>10 m	
			Min.	Max.	No.	%	No.	%	No.	%	No.	%
1	Koderma	5	2.14	9.53	0	0	4	80	1	20	0	0
2	Devghar	5	1.8	16.27	1	20	2	40	1	20	1	20
3	Dhanbad	3	1.74	25.49	1	33.3	1	33.3	0	0	1	33.3
4	Dumka	6	2.42	31.89	0	0	2	33.3	0	0	2	33.3
5	Garhwa	6	2.08	13.03	0	0	3	50	1	16.7	2	33.3
6	Giridih	4	2.87	30.1	0	0	1	25	2	50	1	25
7	Godda	2	3.37	7.03	0	0	1	50	1	50	0	0
8	Gumla	1	0.34	0.34	1	100	0	0	0	0	0	0
9	Hazaribag	9	0.8	9.12	1	11.1	4	44.4	4	44.4	0	0
10	Chatra	4	1.72	12.97	1	25	1	25	0	0	2	50
11	Khunti	5	1.77	6.18	1	20	3	60	1	20	0	0
12	Simdega	5	3.58	14.03	0	0	2	40	2	40	1	20
13	Latehar	5	2.67	7.95	0	0	4	80	1	20	0	0
14	Lohardaga	1	3.7	3.7	0	0	1	100	0	0	0	0
15	Palamau	5	1.67	12.28	1	20	1	20	2	40	1	20
16	W Singbhum	2	1.96	8.95	1	50	0	0	1	50	0	0
17	E Singbhum	3	2.16	19.17	0	0	1	33.3	1	33.3	1	33.3
18	Ramgarh	3	2.83	9.13	0	0	2	66.7	1	33.3	0	0
19	Ranchi	10	1.41	8.65	2	20	4	40	4	40	0	0
20	Sahibgani	3	3.59	7.8	0	0	2	66.7	1	33.3	0	0
21	Saraikela	1	1.95	1.95	1	100	0	0	0	0	0	0
22	Jamtara	3	4.59	10.42	0	0	1	33.3	1	33.3	1	33.3
	Total	91	0.34	31.89	11	12.1	40	44	25	27.5	15	16.5

5.2.2 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Seasonal Fluctuation of Piezometric Level in Confined/ Semi-Confined Aquifer (May 2024 to August 2024)

74 wells used for analysis for seasonal fluctuation (May 2024 to August 2024 in confined/semi confined aquifer. 71 wells found to be rising and 3 wells falling.

Rise in Piezometric Levels:

Out of 71 wells that have registered rise, piezometric level of less than 2 m is recorded in 16% wells, 32% well recorded in 2 to 4 m and 47% of the wells is being recorded in more than 4 m. Piezometric level rise of less than 2 m is seen in Garhwa, Hazaribagh, Jamtara, Khunti, Koderma, Palamu, Sahebganj districts. Piezometric level rise of 2 m to 4m is seen in Chatra, Hazaribagh, Godda, Koderma, Khunti, Sahebganj districts. Piezometric level rise of more than 4 m is significantly observed in Ramgarh, Wesat Singhbhum, Simdega, Ranchi, Giridih, Latehar, Garhwa districts.

Fall in Piezometric Levels:

Out of 74 wells that have registered, 3 wells situated in Hazaribagh, E Singhbhum and Dhanbad shows fall in piezometric levels.

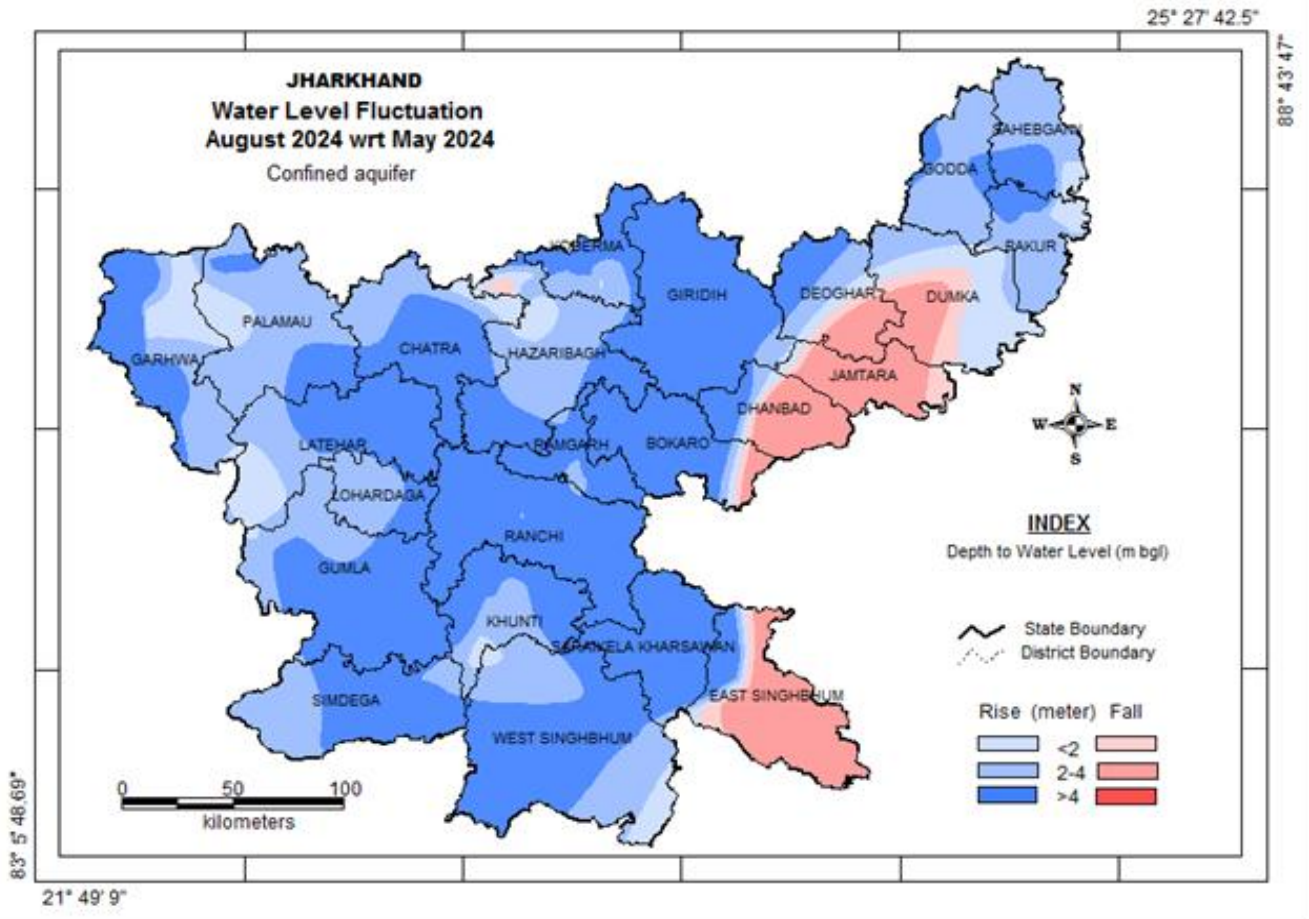

Figure 8: Seasonal water level fluctuation in confined/semi-confined Aquifer (May 2024 to August 2024)

Table 7: District wise categorization of fluctuation and their frequency of water levels of HNS of August. 2024 w.r.t. May 2024 confined aquifer

SN	District	No. of HNS	No. of Wells / Percentage showing fluctuation												Total	
			Fall						Rise							
			<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Fall	Rise
1	Chatra	3	0	0	0	0	0	0	0	0	2	67	1	33	0	3
2	Devghar	4	0	0	0	0	0	0	2	50	1	25	1	25	0	4
3	Dhanbad	2	0	0	0	0	1	50	0	0	0	0	1	50	1	1
4	Dumka	6	0	0	0	0	0	0	1	17	3	50	2	33	0	6
5	Garhwa	3	0	0	0	0	0	0	1	33	0	0	2	67	0	3
6	Giridih	3	0	0	0	0	0	0	0	0	0	0	3	100	0	3
7	Godda	2	0	0	0	0	0	0	0	0	2	100	0	0	0	2
8	Gumla	1	0	0	0	0	0	0	0	0	0	0	1	100	0	1
9	Hazaribag	6	1	17	0	0	0	0	1	17	4	67	0	0	1	5
10	Jamtara	3	0	0	0	0	0	0	1	33	1	33	1	33	0	3
11	Khunti	4	0	0	0	0	0	0	1	25	2	50	1	25	0	4
12	Koderma	5	0	0	0	0	0	0	1	20	2	40	2	40	0	5
13	Latehar	4	0	0	0	0	0	0	1	25	0	0	3	75	0	4
14	Lohardaga	1	0	0	0	0	0	0	0	0	1	100	0	0	0	1
15	Palamau	4	0	0	0	0	0	0	2	50	1	25	1	25	0	4
16	W Singbhum	1	0	0	0	0	0	0	0	0	0	0	1	100	0	1
17	E Singbhum	3	0	0	1	33	0	0	0	0	0	0	2	67	1	2
18	Ramgarh	2	0	0	0	0	0	0	0	0	1	50	1	50	0	2
19	Ranchi	8	0	0	0	0	0	0	0	0	1	13	7	88	0	8
20	Sahibgani	3	0	0	0	0	0	0	1	33	2	67	0	0	0	3
21	Saraikela	1	0	0	0	0	0	0	0	0	0	0	1	100	0	1
22	Simdega	5	0	0	0	0	0	0	0	0	1	20	4	80	0	5
	Total	74	1	1.4	1	1	1	1	12	16	24	32	35	47	3	71

5.2.3 ANNUAL FLUCTUATION IN PIEZOMETRIC LEVEL

Annual Fluctuation of Piezometric Level in Confined /Semi- confined Aquifer (August 2023 to August 2024)

78 wells used for analysis for annual fluctuation (August 2024 to August 2023 in confined/semi confined aquifer. 50 wells found to be rising and 28 wells falling.

Rise in piezometric levels:

Out of 50 wells, piezometric level rise of less than 2 m is recorded in 40% wells, 2 to 4 m in 13% wells and more than 4 m in 12% of the wells. Piezometric level rise of less than 2

m is seen in almost all the districts. Piezometric level rise of 2 to 4 m is observed mainly in Chatra, Deogarh, Dhanbad Giridih, Godda, Hazaribagh, Latehar, Ramgarh, Ranchi, Sahebganj districts. Rise of more than 4 m is significantly observed in Ranchi, Hazaribagh, Ramgarh, Khunti districts.

Fall in Piezometric Levels:

Out of 28 wells that have registered fall in piezometric levels, 24% have recorded less than 2 m while 3.8% in the range of 2 to 4 m and remaining 8% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in Pakur, Palamu, East Singhbhum, Koderma, West Singhbhum, Dumka, districts. Fall of 2 to 4 m is observed mainly in Giridih, Dumka, Garhwa, districts while fall of beyond 4 m is observed in Dhanbad, Jamtara, Dumka, Pakur, East Singhbhum, Simdega districts.

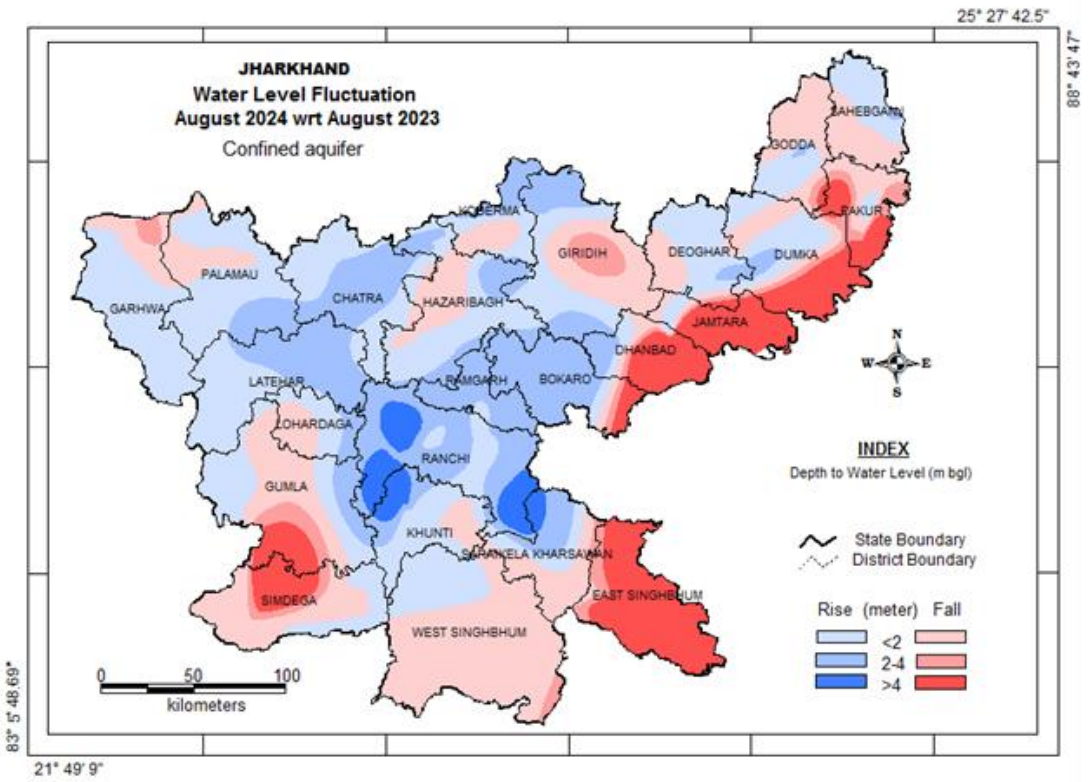

Figure 9: Annuall water level fluctuation in confined/semi-confined Aquifer (August 2024 to August 2023)

Table 8: District wise categorization of fluctuation and their frequency of water levels of HNS of August. 2024 w.r.t. August 2023 confined aquifer																
SN	District	No. of HNS	No. of Wells / Percentage showing fluctuation												Total	
			Fall						Rise							
			<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Fall	Rise
1	Chatra	4	0	0	0	0	0	0	3	75	1	25	0	0	0	4
2	Devghar	5	2	40	0	0	0	0	3	60	0	0	0	0	2	3
3	Dhanbad	3	0	0	0	0	1	33	1	33	0	0	1	33	1	2
4	Dumka	6	1	17	1	17	1	17	2	33	1	17	0	0	3	3
5	Garhwa	4	1	25	0	0	0	0	3	75	0	0	0	0	1	3
6	Giridih	4	0	0	1	25	1	25	1	25	1	25	0	0	2	2
7	Godda	2	1	50	0	0	0	0	0	0	1	50	0	0	1	1
8	Gumla	1	0	0	0	0	0	0	1	100	0	0	0	0	0	1
9	Hazaribag	7	1	14	0	0	1	14	3	43	1	14	1	14	2	5
10	Jamtara	3	3	100	0	0	0	0	0	0	0	0	0	0	3	0
11	Khunti	4	1	25	0	0	0	0	2	50	0	0	1	25	1	3
12	Koderma	3	2	67	1	33	0	0	0	0	0	0	0	0	3	0
13	Latehar	5	0	0	0	0	0	0	3	60	1	20	1	20	0	5
14	Lohardaga	1	1	100	0	0	0	0	0	0	0	0	0	0	1	0
15	Palamau	5	2	40	0	0	0	0	3	60	0	0	0	0	2	3
16	Purba Singbhum	2	1	50	0	0	1	50	0	0	0	0	0	0	2	0
17	Ramgarh	3	0	0	0	0	0	0	1	33	1	33	1	33	0	3
18	Ranchi	8	0	0	0	0	0	0	2	25	2	25	4	50	0	8
19	Sahibgani	3	1	33	0	0	0	0	1	33	1	33	0	0	1	2
20	Saraikela	1	1	100	0	0	0	0	0	0	0	0	0	0	1	0
21	Simdega	4	1	25	0	0	1	25	2	50	0	0	0	0	2	2
	Total	78	19	24	3	3.8	6	8	31	40	10	13	9	12	28	50

6.0 SUMMARY

As a component of the National Ground Water Monitoring Programme, the CGWB, SUO Ranchi conducts monitoring of the ground water conditions on a quarterly basis: in January, pre-monsoon May, post- monsoon August, and November. As of May 30, 2024, the CGWB SUO Ranchi supervises 460 dug wells and 122 piezometers. This comprehensive effort aims to portray the variations in the state's ground water conditions across different aquifers.

In August 2024, around 98% of the well exhibited a depth to water level within 10 meters below ground level in unconfined aquifer. In case of Piezometric water level 84% of the well exhibited a depth to water level within 10 meters below ground level.

In unconfined aquifer, annual water level comparison with previous year August 2023 to August 2024 has shown that about 57.6% well experienced rise in annual water level fluctuation because of rainfall in 2023 monsoon. 42.4% of the well experienced fall of water level. In decadal mean water level fluctuation of 2014-2023 with respect to August 2024, 54.7% of the well experienced rise and 40.8% shows fall of water level and 10 wells show no change in water level.