GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RD & GR
CENTRAL GROUND WATER BOARD

REPORT ON GROUND WATER LEVEL BULLETIN IN JHARKHAND STATE (August 2025)

CENTRAL GROUND WATER BOARD
SUO, RANCHI
September 2025

GROUND WATER LEVEL BULLETIN

August 2025

JHARKHAND

1.0 INTRODUCTION

The Groundwater Bulletin is prepared by the Central Ground Water Board (CGWB) to depict changes in the groundwater regime across the country during different seasons. This effort aims to gather information on groundwater levels through a network of representative monitoring wells. Key attributes of groundwater regime monitoring include groundwater levels.

Natural conditions that affect the groundwater regime include climatic factors such as rainfall and evapotranspiration. In contrast, anthropogenic influences involve activities like aquifer pumpage, recharge from irrigation systems, and practices such as waste disposal. The Central Ground Water Board measures groundwater levels four times a year: in January, March/April/May, August, and November. Groundwater regime monitoring has been conducted since 1969, and as of April 30, 2024, a network of 25437 observation wells, known as National Hydrograph Network Stations (NHNS), is being monitored throughout the country.

2.0 STUDY AREA

Jharkhand, a state created on November 15, 2000, consists of districts located on the Chotanagpur Plateau, which was part of the erstwhile Bihar. This date also commemorates the birthday of the legendary tribal freedom fighter, Birsa Munda. Currently, Jharkhand is comprised of 24 districts and 264 administrative blocks. The capital of the state is Ranchi. The state covers an area of 79714 square kilometers and is situated between latitudes 21º 55' 00" and 25º 15' 00", and longitudes 83º 15' 00" and 87º 55' 00". Jharkhand is bordered by Bihar to the north and West Bengal to the east. To the west and south, it is bounded by the states of Chhattisgarh and Odisha, respectively. ***(Figure.1).***

According to the 2011 census, the state's population is 3.30 crore (33 million). The population density is 414 people per square kilometer. The urban population consists of approximately 7.912 million, while the rural population is about 25.05 million. Tribals make up about 28% of the total population. The state is moderately urbanized, with Ranchi serving as its capital city. Approximately 24% of the total population lives in urban areas.

Important urban centers in the state include Jamshedpur, Dhanbad, Hazaribagh, Daltonganj, Dumka, and Deoghar.

***Figure 1*: Administrative Map of Jharkhand**

3.0 GROUND WATER LEVEL MONITORING

The Central Ground Water Board, State Unit Office Ranchi, is continuously monitoring changes in the groundwater regime in Jharkhand on a quarterly basis. This monitoring is supported by a network of stations located across various hydrogeological and geomorphic units in the state. As of August 2025, there were 678 operational wells, comprising 550 dug wells and 128 piezometers. In August 2025, a total of 645 wells were monitored (534 dug wells and 111 piezometers). 33 wells (16 dug wells and 17 piezometers) could not be monitored due to reasons such as inaccessibility, being filled up, the installation of pump units, damaged roads, locked gates, and other factors. 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 as on August 2025.

SN	District	Dug Well	Bore Well	Total	DWLR installed
1	Bokaro	21	2	23	1
2	Chatra	22	4	26	1
3	Deoghar	16	5	21	1
4	Dhanbad	24	3	27	
5	Dumka	22	5	27	
6	E. Singhbhum	38	3	41	1
7	Garhwa	27	7	34	
8	Giridih	22	3	25	
9	Godda	20	3	23	
10	Gumla	23	1	24	1
11	Hazaribagh	30	11	41	
12	Jamtara	16	4	20	
13	Khunti	16	4	20	1
14	Koderma	11	5	16	
15	Latehar	18	4	22	
16	Lohardaga	16	1	17	
17	Pakur	13	4	17	
18	Palamu	28	15	43	1
19	Ramgarh	20	6	26	3
20	Ranchi	59	21	80	9
21	Sahibganj	26	3	29	
22	Saraikela	16	1	17	
23	Simdega	20	7	27	
24	W Singhbhum	26	6	32	1
Total		**550**	**128**	**678**	**20**

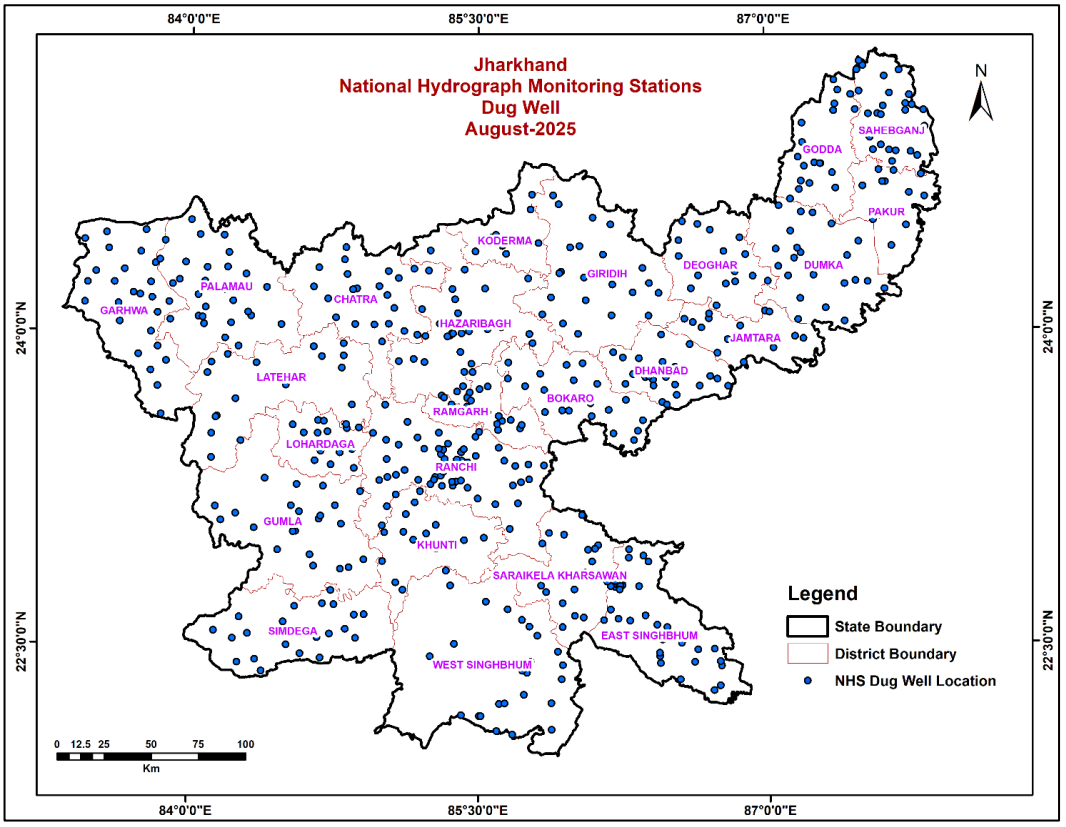

***Figure-2*: Location Map National Hydrograph Monitoring Stations (Dug Well) of Jharkhand**

4.0 RAINFALL

The amount and distribution of rainfall significantly impact the state's economy, as agricultural activities primarily rely on rainfall. Additionally, rainfall serves as the main source for groundwater recharge throughout the state. The average annual rainfall for the state is 1,301 mm, with district-level variations ranging from 1,528 mm in Pakur to 1,084.1 mm in Godda. The distribution of normal annual rainfall by district is presented in Table 2.

An analysis of isohyets depicting mean annual rainfall shows that most areas of the state receive between 1,200 and 1,400 mm of rain each year. The majority of this annual precipitation comes from the southwestern monsoon, which typically begins in the second week of June. This monsoon rainfall accounts for approximately 83% of the state's total annual rainfall. The percentage of monsoon rainfall by district varies, ranging from 79.13% in Dumka to as high as 87.98% in Chatra. The Annual Normal Rainfall (in cm) for Jharkhand State is illustrated in Figure 3.

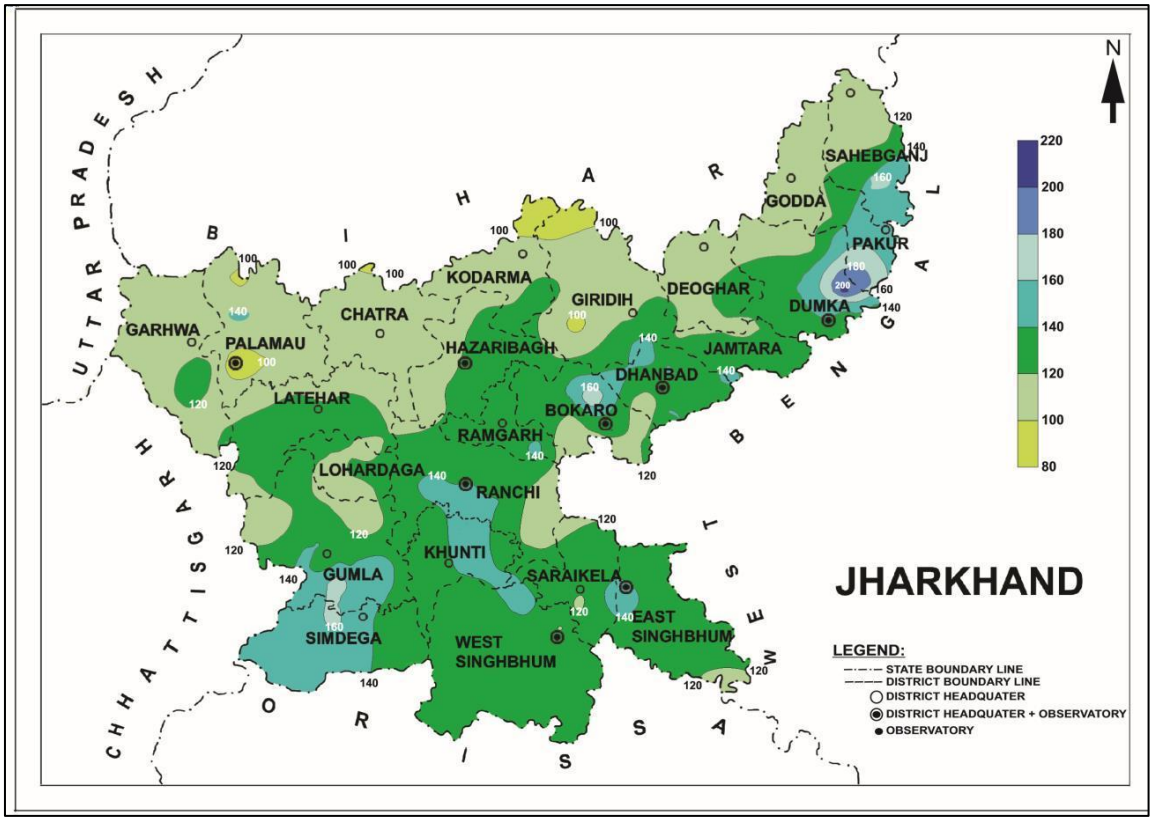

Figure-3: **Annual Normal Rainfall (cm) of Jharkhand State**

***Table-2*: District-wise Normal Rainfall of Jharkhand State**

Sl. No.	Name of the Districts	Normal Annual Rainfall (mm)	Normal Monsoon Rainfall (mm)
1.	Bokaro	1259.6	1040.2
2.	Chatra	1206.3	1061.3
3.	Deoghar	1220.7	993.3
4.	Dhanbad	1295.6	1074.7
5.	Dumka	1422.5	1125.6
6.	East Singhbhum	1403.4	1136.4
7.	Garhwa	1210.3	1047.7
8.	Giridih	1215.6	1024.2
9.	Godda	1084.1	883.6
10.	Gumla	1460.9	1208.5
11.	Hazaribagh	1251.2	1040.5
12.	Jamtara	1447.4	1182.5
13.	Khunti	1323.2	1086.4
14.	Koderma	1115.9	940.7
15.	Latehar	1237.2	1061.3
16.	Lohardaga	1194.3	985.3
17.	Pakur	1528.0	1215.3
18.	Palamau	1169.4	1014.5
19.	Ramgarh	1251.2	1040.5
20.	Ranchi	1323.2	1086.4
21.	Sahebganj	1410.6	1153.9
22.	Saraikela	1307.6	1068.7
23.	Simdega	1506.5	1317.0
24.	West Singhbhum	1351.6	

5.0 GROUND WATER LEVEL SCENARIO

5.1 UNCONFINED AQUIFER

5.1.1 Depth to Water Level August 2025

Depth to Water Level in Unconfined Aquifer (August 2025)

The analysis was conducted on the depth to water level data from 534 wells. The findings indicate that the water levels vary between 0.04 meters (in Pakur district) to 10.35 meters below ground level (bgl) (in Palamu district). 63% NHS monitoring stations show depth to water level within range of 0 to 2 m bgl. The map of depth to water level as of August 2025 **(Figure 4)** shows that areas with a depth to water level between 0-2 meters covering 60% area of State, primarily found in parts of Khunti, Saraikela Kharsawan, E Singhbhum, W Singhbhum, Simdega, Ranchi, Lohardga, Gumla, Giridh, Hazaribagh,Latehar and patches within Pakur,Jamtara & Garhwa district.

In contrast, 37% of the area is observed to have a depth to water level ranging from 2-5 meters, which includes parts of Garhwa, Palamu, Chatra, Latehar, Koderma, Bokaro, Dhanbad, Deoghar, Dumka, Godda, Sahibganj and Pakur districts. This range of water level observed in 33% of total NHS monitoring stations.

Additionally, 3% of the state demonstrates a depth to water level in the range of 5-10 meters, reflecting 4% of NHS wells covering parts in Dumka, Sahibganj, Deoghar Palamu, Garhwa, Chatra, and Bokaro districts.

The large percentage of NHS station reflecting shallow water level covering major part of the state is due to heavy and consistent rainfall through all over the state. Only one well in Pakur district recorded water level >10 m bgl.

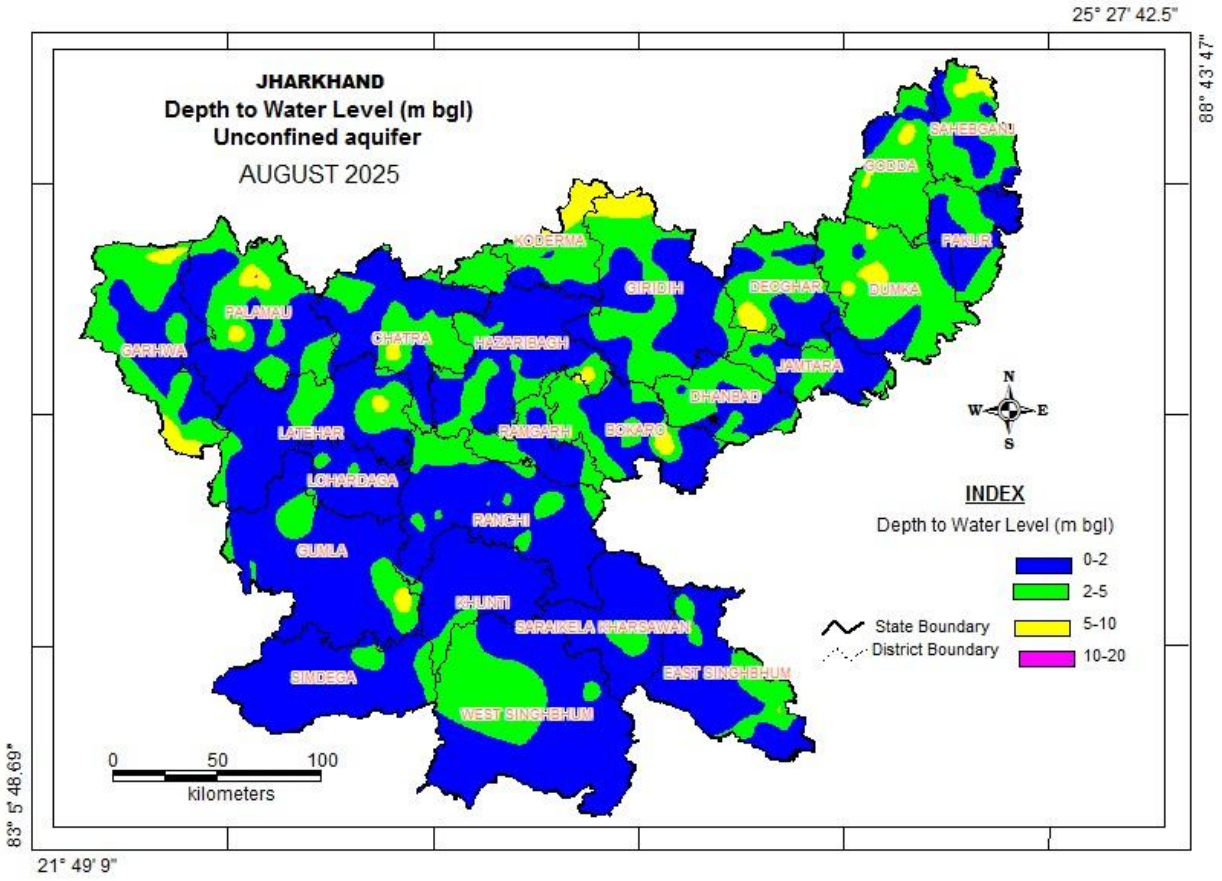

***Figure: 4*- Depth to water level map of Jharkhand (August-2025)**

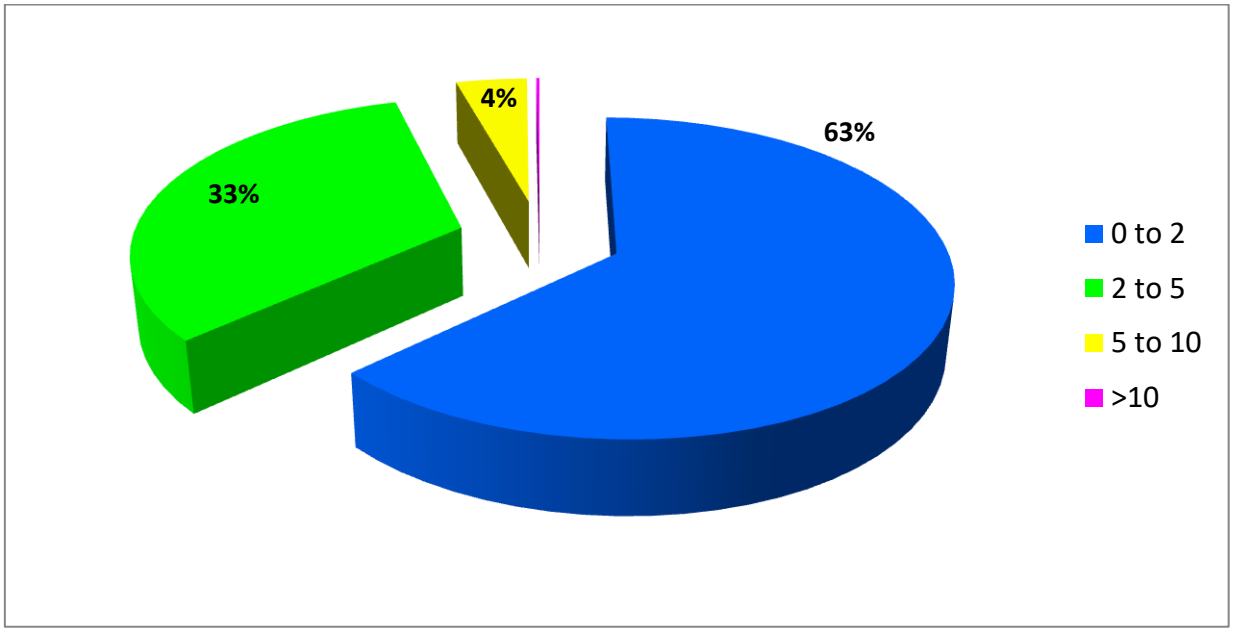

***Figure: 5*- percentage of wells in different water level ranges in unconfined aquifer**

5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

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

Out of 395 wells analyzed for annual fluctuations in water levels, a rise in water level was observed in 314 wells, a fall was noted in 81 wells.

Rise in Water Levels:

Water level rise within the range of 0 to 2 meters has been observed in 63% of NHS wells, covering 70% of the area in the districts of Giridih, Koderma, Deoghar, Dhanbad, Bokaro, Khunti, East Singhbhum, Latehar, Palamu, Ranchi, Garhwa, and parts of West Singhbhum, Simdega, Chatra, Lohardaga, Godda, Gumla, Pakur, Sahebganj, Ramgarh, and Saraikela. A water level rise in the range of 2 to 4 meters has been recorded in 12% of NHS wells, covering 13% of the area in parts of Hazaribagh, Bokaro, deoghar, Palamu, Chatra, Lohardaga, Simdega, Khunti, East Singhbhum, West Singhbhum and Saraikela Kharsawan districts. Additionally, a water level rise of more than 4 meters has been observed in only 5% of NHS wells, which represents a very small part of the Chatra, Garhwa, Palamu, Lohardaga, East Singhbhum, West Singhbhum and Saraikela Kharsawan districts, covering only 1% of the state's total area. (***Figure 6),*** (***Figure 7)***

Fall in Water Levels:

A water level decline of between 0 and 2 metres has been observed in 28.4% of NHS wells, which covers 33% of the state's total area. This decline includes major parts of the Gumla, Simdega, West Singhbhum, and Ramgarh districts. Additionally, a decline of 2 to 4 metres has been recorded in small regions of the Pakur, Sahebganj, Jamtara, Chatra, Gumla, Saraikela, Simdega, and West Singhbhum districts, covering 4% of the area. Furthermore, only 1.2% of NHS wells have shown a decrease of more than 4 metres, which has occurred in parts of the Saraikela, Jamtara, and Pakur districts, accounting for 1% of the state area. (***Figure 6),*** (***Figure 7)***

Rise of water level in major part of the state represents the adequate rainfall before and during the month compared to previous years which as a result elevated the water level in unconfined aquifer.

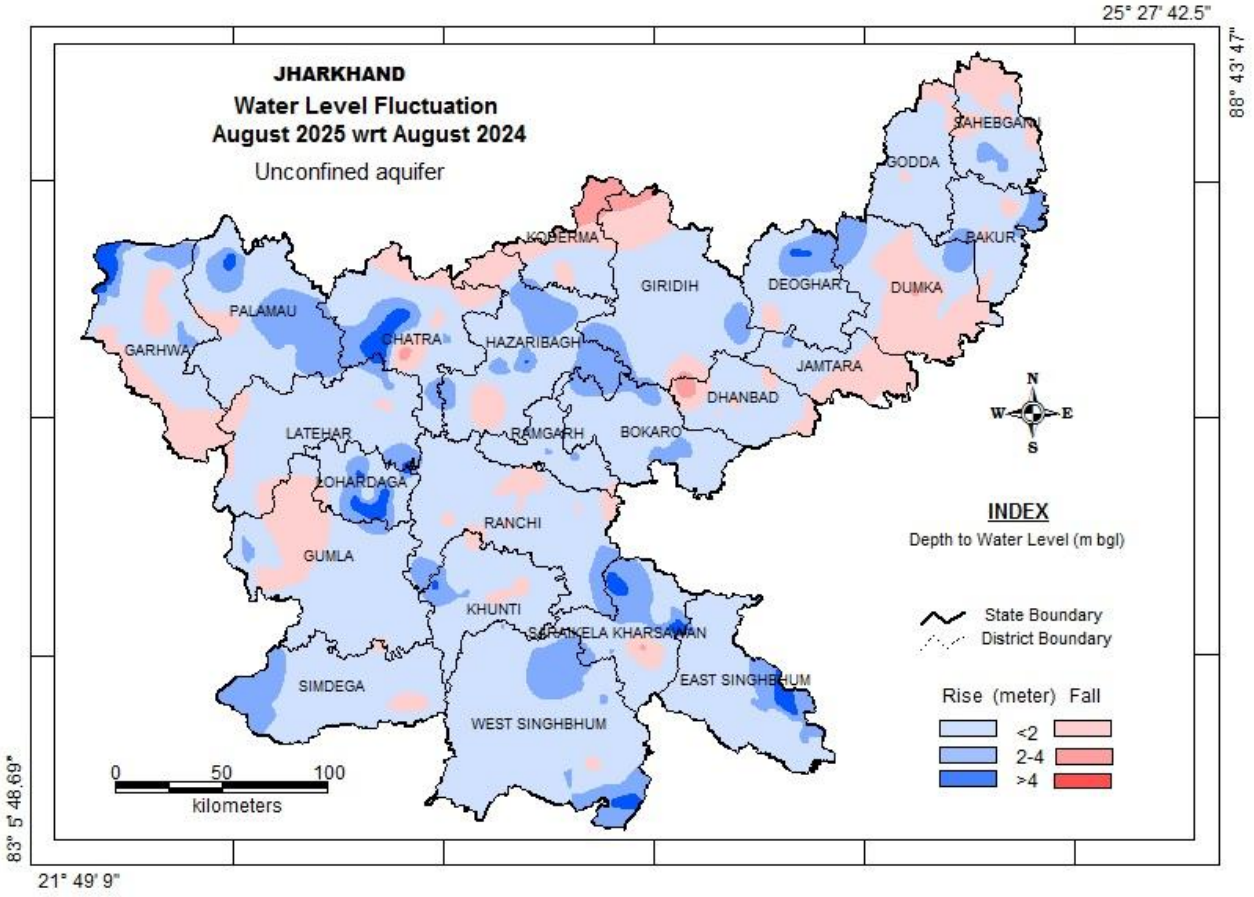

Figure 6: Annual water level fluctuation in unconfined aquifer (August 2025 to August 2024)

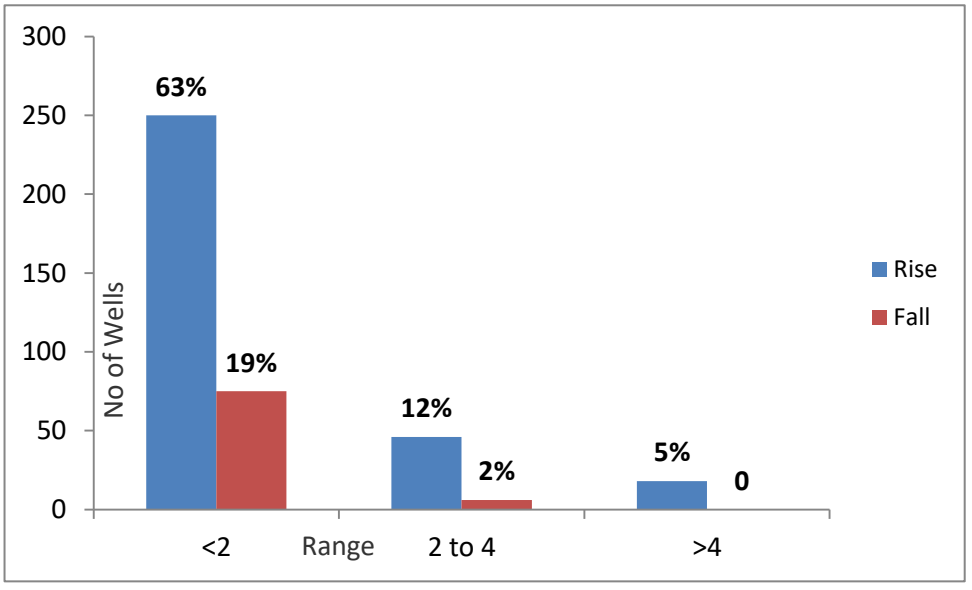

Figure 7: Percentage of wells showing rise and fall in water level in unconfined aquifer (August 2025 to August 2024)

5.1.3 ANNUAL FLUCTUATION IN WATER LEVEL

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

Out of 368 wells analyzed for annual fluctuations in water levels, a rise in water level was observed in 309 wells, a fall was noted in 53 wells and 6 wells shows no change in water level.

Rise in Water Levels:

Water level rise within the range of 0 to 2 meters has been observed in 50% of NHS wells, covering 51% of the area in the districts of Giridih, Koderma, Dumka, Pakur, Dhanbad, Bokaro, Garhwa, Gumla, Simdega, West Singhbhum, and some other small parts of the state. A water level rise in the range of 2 to 4 meters has been recorded in 14% of NHS wells, covering 34% of the area in parts of Hazaribagh, Bokaro, Palamu, Latehar, Lohardaga Simdega, Gumla, Garhwa districts and some other parts of the state. Additionally, a water level rise of more than 4 meters has been observed in 14% of NHS wells, which represents major part of Lohardaga and Ranchi district a very small part of the Hazaribagh, Ramgarh, Dhanbad, Jamtara Deoghar, Palamu and Latehar district and some other small parts covering only 7% of the state's total area. (***Figure 8),*** (***Figure 9)***

Fall in Water Levels:

A water level decline of between 0 and 2 meters has been observed in 14% of NHS wells, which covers 8% of the state's total area. This decline includes major parts of the Sahebganj district and parts of Godda, Giridih, Koderma, West Singhbhum , Palamu and Gumla district. Additionally, a decline of 2 to 4 meters has been recorded in very small regions of the Godda and Sahebganj district. Furthermore, no NHS well have shown a decrease of more than 4 meters. (***Figure 8),*** (***Figure 9)***

Rise of water level in major part of the state represents the adequate rainfall before and during the month compared to previous years which as a result elevated the water level in unconfined aquifer.

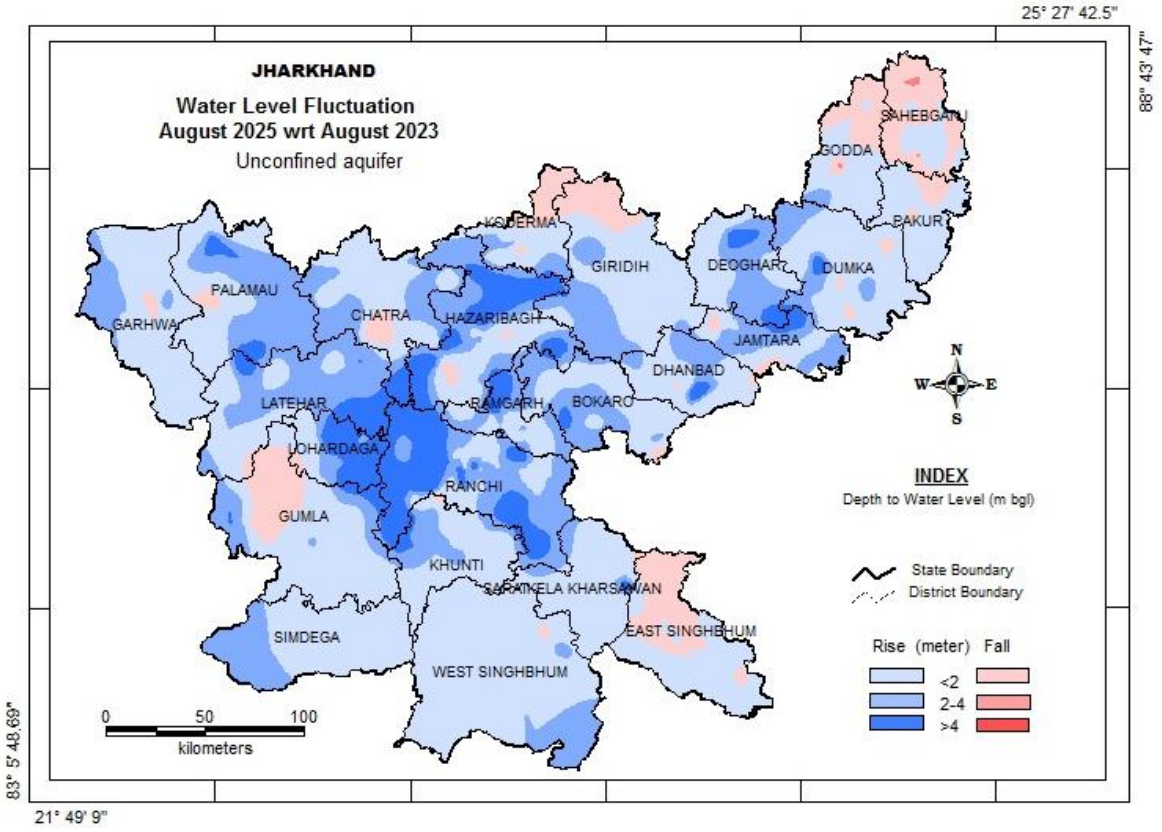

Figure 8: Annual water level fluctuation in unconfined aquifer (August 2025 to August 2023)

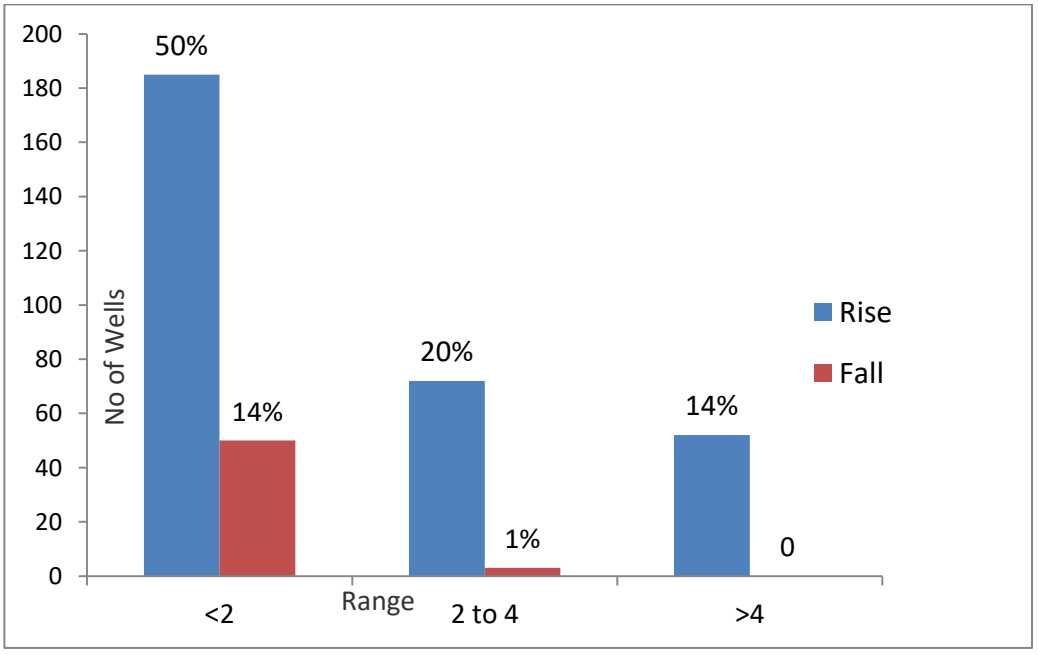

Figure 9: Percentage of wells showing rise and fall in water level in unconfined aquifer (August 2025 to August 2023)

5.1.4 SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water Level in Unconfined Aquifer (August 2025 to May 2025)

In Jharkhand state, entire area shows rise in water level, when comparing the water levels of August 2025 with respect to May 2025. ***(Figure-10, Figure-11).***

Rise in Water Levels:

Water level rise have been observed throughout entire state. Water level rise >4 m has been observed in 59% of total NHS wells which covers 66% of the state area. Except parts of Pakur, Dumka, Sahebganj, Dhanbad, Palamu, Chatra, Gumla, West Singhbhum and East Singhbhum almost entire part of the state showing water level rise more than 4m. 2 to 4 m rise of water level has been observed in 29% of total monitoring wells which covers parts of Sahebganj, Gooda, Pakur, Dumka, Palamu, Garhwa, Latehar, Lohardaga, East Singhbhum, West Singhbhum, Saraikela Kharsawan and some other parts covering 29% of state's total area. Water level rise within 2 m has been observed in only 4% area of state which includes part of Dumka, Deoghar, Ranchi, Gumla, East Singhbhum and Saraikela Kharsawan district and some other small parts of the state. Only 12% of total NHS wells has recorded water level rise within 2m. No well have shown fall in water level.

Due to heavy rainfall during the month the high percentage of area showing water level rise >4m when compared to pre-monsoon 2025.

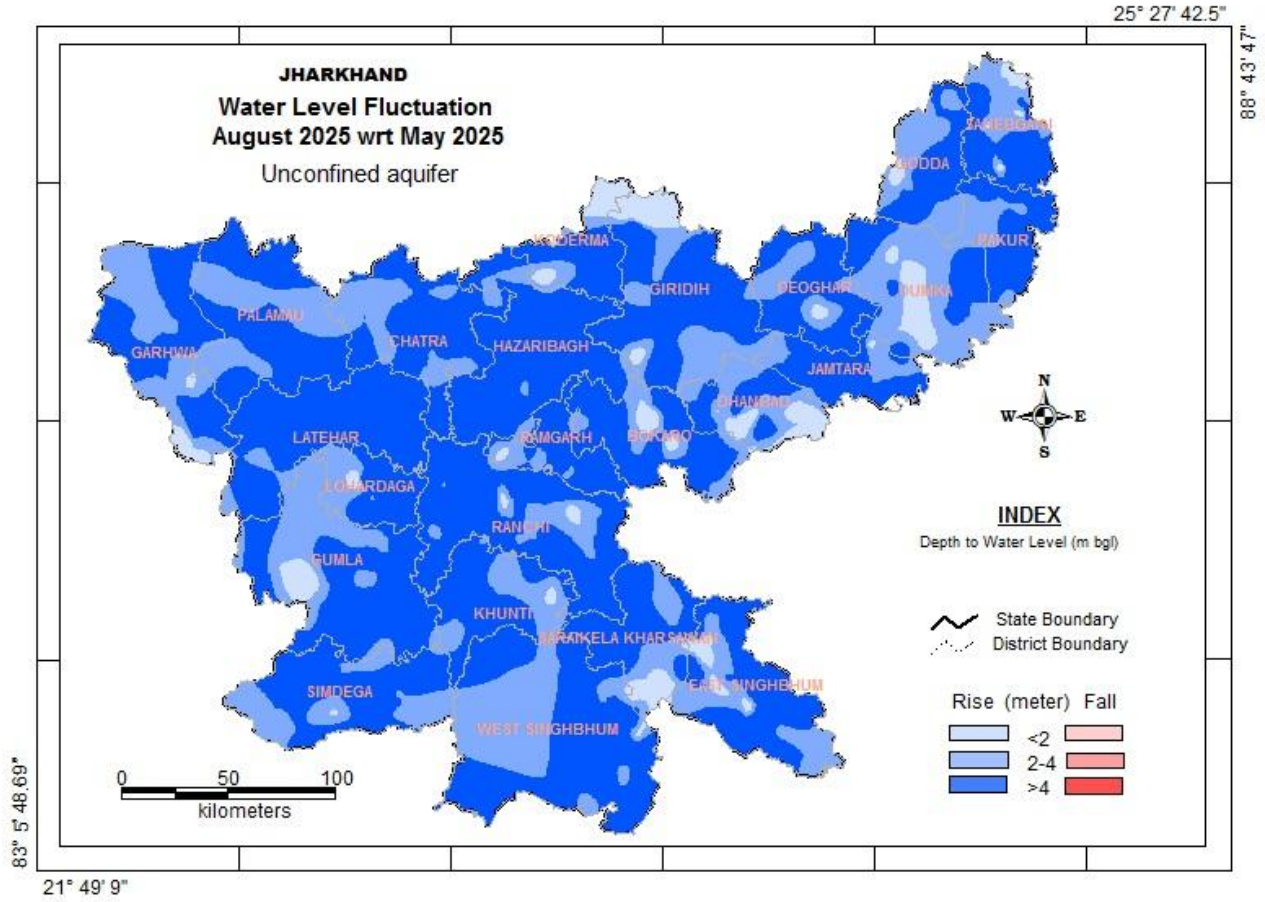

Figure 10: Water level fluctuation in unconfined Aquifer (August 2025 to May 2025)

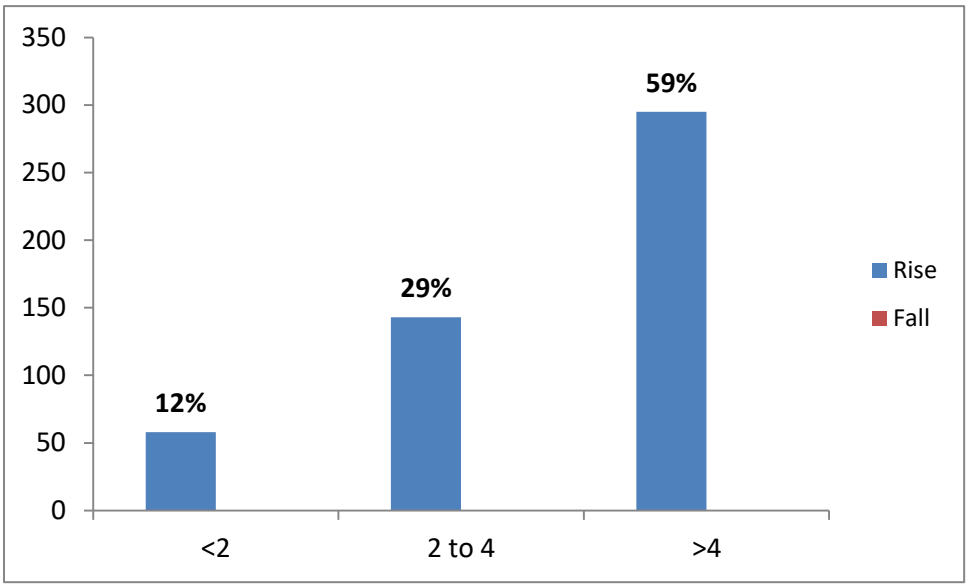

Figure 11: Percentage of wells showing rise and fall in water level in unconfined aquifer (August 2025 to May 2025)

5.1.5 DECADAL FLUCTUATION IN WATER LEVEL

Decadal Fluctuation of Water Level in Unconfined Aquifer August 2025 to Decadal Mean (August 2015-2024)

In Jharkhand, 93% of the total area has experienced a rise in water level, while only 7% has seen a decline when August 2025 compared to the decadal mean from August 2015 to August 2024. ***(Figure-12, Figure-13).***

Rise in Water Levels:

Water level rise between 0 and 2 meters have been observed in 65% of NHS wells, which encompass major parts of Dhanbad, Bokaro, Koderma, East Singhbhum, Palamu, Simdega, and certain areas in Dumka, Godda, Pakur, Ranchi, Khunti, Hazaribagh, Koderma, East Singhbhum, West Singhbhum and Saraikela Kharsawan districts. This represents about 71% of the total area of the state. Additionally, rises in water level ranging from 2 to 4 meters have been recorded in 23% of NHS wells, while an increase of more than 4 meters has been noted in 2% wells only. A 2 to 4 meter rise has been observed in 21% of the area, particularly in parts of Lohardaga, Latehar, Gumla, Deoghar, Jamtara, Giridih, Hazaribagh, East Singhbhum, West Singhbhum and Saraikela Kharsawan districts along with other regions of the state. Areas where water levels have risen by more than 4 meters are limited to small sections of Hazaribagh, West Singhbhum districts, covering only 1% of the total area of the state.

Fall in Water Levels:

Water level decline within the range of 0-2 meters have been observed in 10% of NHS wells. This primarily covers the parts of Sahebganj, Godda, Dumka, Giridih, Koderma, Palamu, Gumla, E Singhbhum and Simdega and some other small parts covering 7% of state's total area. Only 1 well in Sahebganj district shown water level fall in 2 to 4 m range and no well shown water level fall > 4m.

Heavy rainfall in current year reflected as raised ground water level throughout the state when compared to last decade.

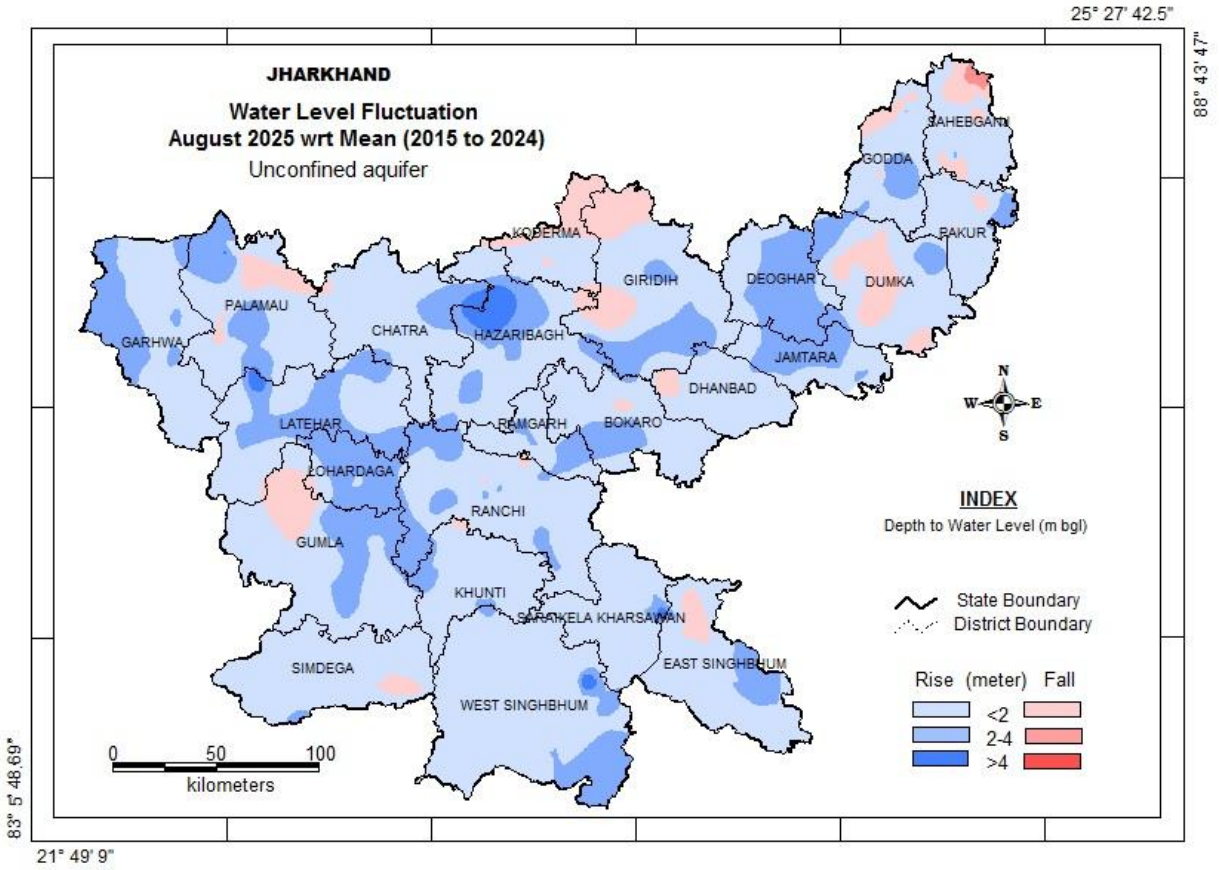

Figure 12: Decadal water level fluctuation in unconfined Aquifer (August 2025 to Decadal Mean August (2015-2024)

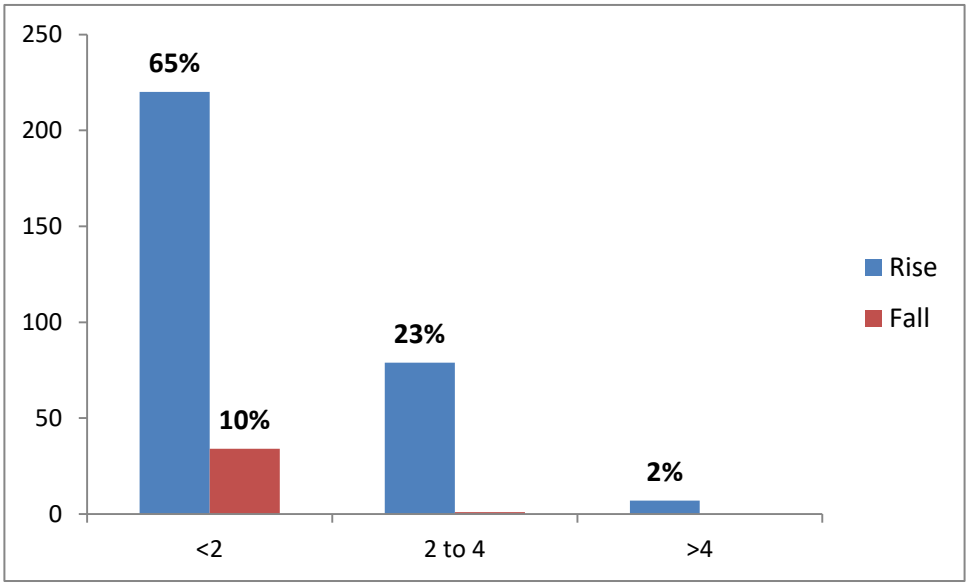

Figure 13: Percentage of wells showing rise and fall in water level in unconfined aquifer (August 2025 wrt mean August (2015 -2024)

6.0 SUMMARY

As part of the National Ground Water Monitoring Programme, the Central Ground Water Board, State Unit Office, Ranchi conduct quarterly monitoring for studying the groundwater conditions in Jharkhand. This monitoring takes place in January (recession period of WL), pre-monsoon in May, for monsoon period in August, and post-monsoon in November.

The groundwater regime monitoring for August 2025, which included 678 (550 dug well and 128 bore well) National Hydrograph Stations (NHS) across Jharkhand, revealed that 63% of the NHS wells in unconfined aquifers recorded water levels between 0 to 2 meters below ground level (bgl). This range covers a significant portion of the state, with exceptions in some northern parts and parts of East and West Singhbhum district. Additionally, 33% of the NHS wells showed water levels between 2 to 5 meters bgl, while 4% recorded levels 5 to 10 m. and only 1 well shows water level greater than 10 meters.

The annual fluctuation data indicates that 79% of the NHS wells show a rise in water levels, covering 83% of the total area of the state. In contrast, 21% of the NHS wells exhibit a decrease in water levels, covering 16% of the total area. These rise in water level compared to previous monsoon season reflects the heavier rainfall compared to previous year, except some parts like parts of Sahebganj, Dumka, Jamtara, Giridih, Koderma, Hazaribagh, Chatra Garhwa, Palamu and Gumla district and some other small parts.

In August 2025, an analysis of seasonal fluctuations with respect to May 2025 revealed that 12%, 29% and 59% of total NHS wells shows water level rise within range of 0 to 2 m, 2 to 4 m, and > 4 m respectively covering entire area of state. No decline in water level shows the sufficient amount of rainfall recharged the aquifer resulting the elevation of water level in unconfined aquifer. Depending on the amount of rainfall and geology and other factors, the different area of the state shows different range of water level rise.

Regarding decadal fluctuations, 93% of the total area indicates a rise in water levels, while only 7% reflects a decline. The majority of the areas (71%) reporting an increase in water levels ranging from 0 to 2 meters. The analysis shows that during the monsoon period 2025, major part of the state experienced heavy rainfall compared to last decade.

7.0 RECOMMENDATIONS

All the analytical data and maps indicate that during monsoon season 2025, the aquifer of entire Jharkhand state has experienced sufficient recharge as an effect of heavy rainfall and other factors. This recharge is reflected in seasonal fluctuation also.

Water conservation is recommended for Jharkhand in suitable areas. Proper water conservation plans should be developed in consultation with line departments. Appropriate local recharge structures should be constructed to store the run-off water during the monsoon season, to utilize water during lean period.