CGWB, NORTH CENTRAL CHHATTISGARH REGION, RAIPUR

GROUNDWATER LEVEL BULLETIN CHHATTISGARH

August 2025

ABSTRACT

The hydraulic head scenario of ground water during August-2025 highlighting the findings, status of the fluctuation of hydraulic head in different aquifers and its annual and decadal comparison.

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Maps and Table List

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 hydraulic head through representative monitoring wells. The important attributes of groundwater regime monitoring are measurement of hydraulic head. 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. Hydraulic Head is are being measured by Central Ground Water Board four times a year during January, Aug, August and November. The regime monitoring started in the year 1969 by Central Groundwater Board.

2.0 STUDY AREA

Chhattisgarh, located between North Latitude 17°47’ to 24°06’and East Longitude 80°14’ to 84°24’, is monitored for groundwater dynamics by the Central Ground Water Board's North Central Chhattisgarh Region in Raipur. Covering 1,37,360sq.km, the state is predominantly tribal dominated, encompassing approximately 65.90% of its total area. Groundwater regime monitoring involves a network of observation wells and piezometers. Dug wells represent the shallow phreatic aquifer system, while piezometers gauge the shallow un-confined and deeper semi-confined aquifer systems.

This monitoring forms part of the All-India Network Hydrograph Stations, overseen by various regional offices nationwide. As of Aug 2025, Chhattisgarh's network includes 1250 nos. observation wells (dugwells and purpose-built piezometers) monitored quarterly for ground water hydraulic head and quality. The objective is to assess groundwater behavior across diverse hydrogeological environments, periodically estimating groundwater resources and tracking water quality changes.

3.0 PHYSIOGRAPHY

Chhattisgarh is geographically categorized into three distinct regions. The Bastar Plateau in the southern part of the state includes districts such as Bastar, Kondagaon and Dantewada. Covered mostly by dense evergreen forests and hilly terrain, it features high-level plateaus, structural hills, valleys and pediplains with altitudes ranging from 400 to 600 meters above mean sea level (a msl).

The Chhattisgarh Plain occupies the central part and spans districts like Raipur, Bilaspur and Durg. This region, formed on Proterozoic rocks is characterized by a gently undulating and flat terrain, interspersed with remnants of hills and ridges. Altitudes vary from 284 m amsl in the southeast to 750 m a msl in the northwest.

The Northern Hilly Region covers the northern and north-central parts, encompassing districts like Raigarh and Bilaspur. It forms part of the Maikal and Hazaribagh hill ranges, featuring structural plains, pediplains, denudational plateaus and hills. This area supports various river systems, including tributaries of the Mahanadi and Son rivers. The state's highest point, Tulisi Dongri in Dantewada district reaches1197 mamsl, while its lowest point is 50mamsl at Konta which is also in Dantewada district.

4.0 DRAINAGE

Chhattisgarh is traversed by major rivers including the Mahanadi and its tributaries Seonath, Hasdeo, Mand, and Arpa, impacting several districts. The Indravati River which is a tributary of Godavari, flows through Kanker, Bastar, and Dantewada districts.

5.0 HYDROGEOLOGICAL CONDITIONS

The occurrence and movement of ground water is related to the existing geology of the area. The State is underlained by various rock types belonging to different geological ages from Azoic to Quaternary. Nearly 58%of the State is covered by Crystalline and metamorphic rocks; around 27% of the area is covered by Chhattisgarh Group of rocks. The semi-consolidated Gondwana Supergroup of rocks covers 13 % of the area and the remaining 2 % by Deccan trap, Lameta, Laterite and River Alluvium.

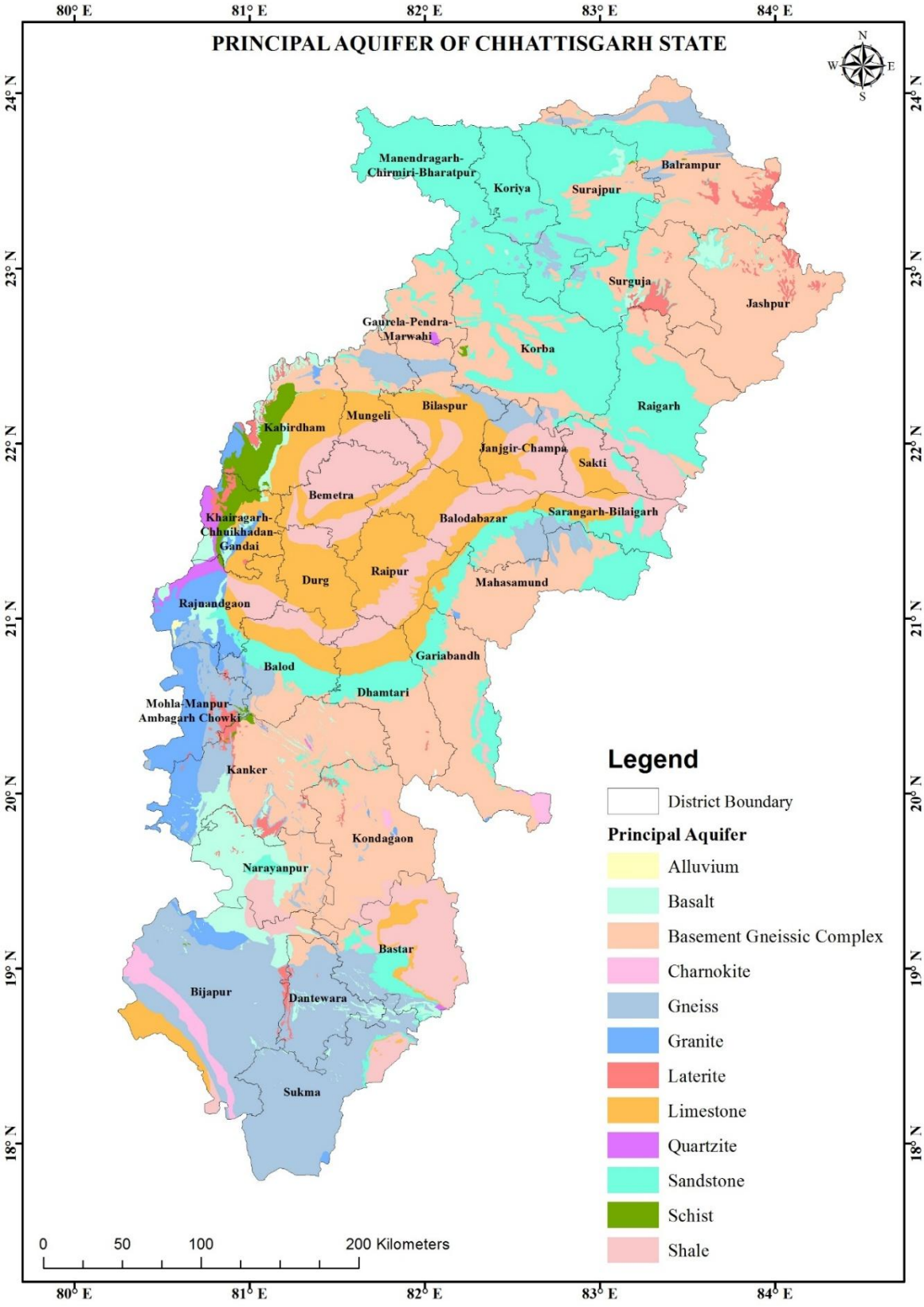

Figure-1: Map showing principal aquifers in the state of Chhattisgarh

6.0 GROUNDHYDRAULIC HEAD MONITORING

The Central Ground Water Board, North Central Chhattisgarh Region, conducts ongoing quarterly monitoring of groundwater regimes in Chhattisgarh state. This involves a network of monitoring stations situated across various hydrogeological and geomorphic units. **As of Aug 2025, there are 1250 operational wells, comprising 1036 dug wells (894 wells monitored) and 214 piezometers (210 piezometers were monitored).** The details of the wells are provided in Table 1. Out of 1250, a total of the data of 1110 wells were monitored. During monitoring it was observed that it was not feasible to measure 136 wells comprising 125 dugwells and 11 piezometers owing to field challenges due to heavy downpour. **As per Aug 2024 a total of 1275 wells were in the NHNS network for Chhattisgarh State. But due to unavailability of data from 25 wells over a period of one year, 25 wells are abandoned.**

Table-1: District-wise distribution of hydraulic head monitoring stations as per Aug 2025

Sl no	State	District	DW	PZ	Total
1	Chhattisgarh	Balod	48	6	54
2	Chhattisgarh	Balodabazar	32	9	41
3	Chhattisgarh	Balrampur	16	7	23
4	Chhattisgarh	Bastar	15	11	26
5	Chhattisgarh	Bemetara	42	7	49
6	Chhattisgarh	Bijapur	0	0	0
7	Chhattisgarh	Bilaspur	55	7	62
8	Chhattisgarh	Dantewada	0	0	0
9	Chhattisgarh	Dhamtari	27	8	35
10	Chhattisgarh	Durg	52	8	60
11	Chhattisgarh	Gariaband	23	2	25
12	Chhattisgarh	Janjgir	44	7	51
13	Chhattisgarh	Jashpur	85	10	95
14	Chhattisgarh	Kabirdham	11	8	19
15	Chhattisgarh	Kanker	11	2	13
16	Chhattisgarh	Kondagaon	12	1	13
17	Chhattisgarh	Korba	85	25	110
18	Chhattisgarh	Koriya	30	3	33
19	Chhattisgarh	Mahasamund	32	24	56
20	Chhattisgarh	Mungeli	31	6	37
21	Chhattisgarh	Narayanpur	0	0	0
22	Chhattisgarh	Raigarh	93	10	103
23	Chhattisgarh	Raipur	37	15	52
24	Chhattisgarh	Rajnandgaon	52	10	62
25	Chhattisgarh	Sukma	0	0	0
26	Chhattisgarh	Surajpur	62	6	68
27	Chhattisgarh	Surguja	47	5	52
28	Chhattisgarh	Gaurela-Pendra-Marwahi	27	3	30
29	Chhattisgarh	Sakti	9	4	13
30	Chhattisgarh	Khairagarh-Chhuikhadan-Gandai	6	4	10
31	Chhattisgarh	Mohla-Manpur-Ambagarh Chowki	2	1	3
32	Chhattisgarh	Sarangarh-Bilaigarh	18	2	20
33	Chhattisgarh	ManendragarhChirimiriBharatpur	32	3	35
Total			**1036**	**214**	**1250**

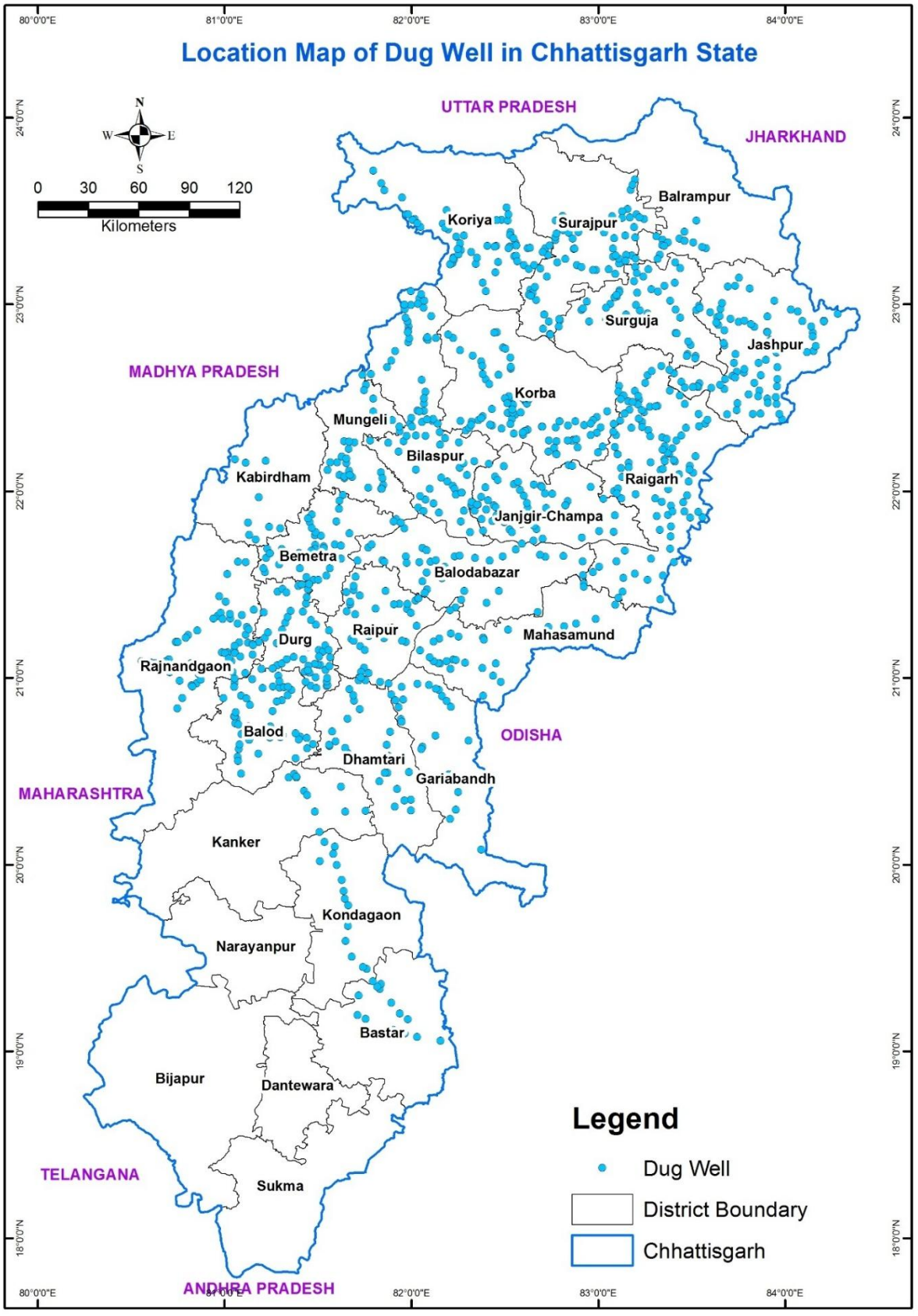

Figure-2: Map showing locations of monitoring Dug Wells (NHNS) in Chhattisgarh state

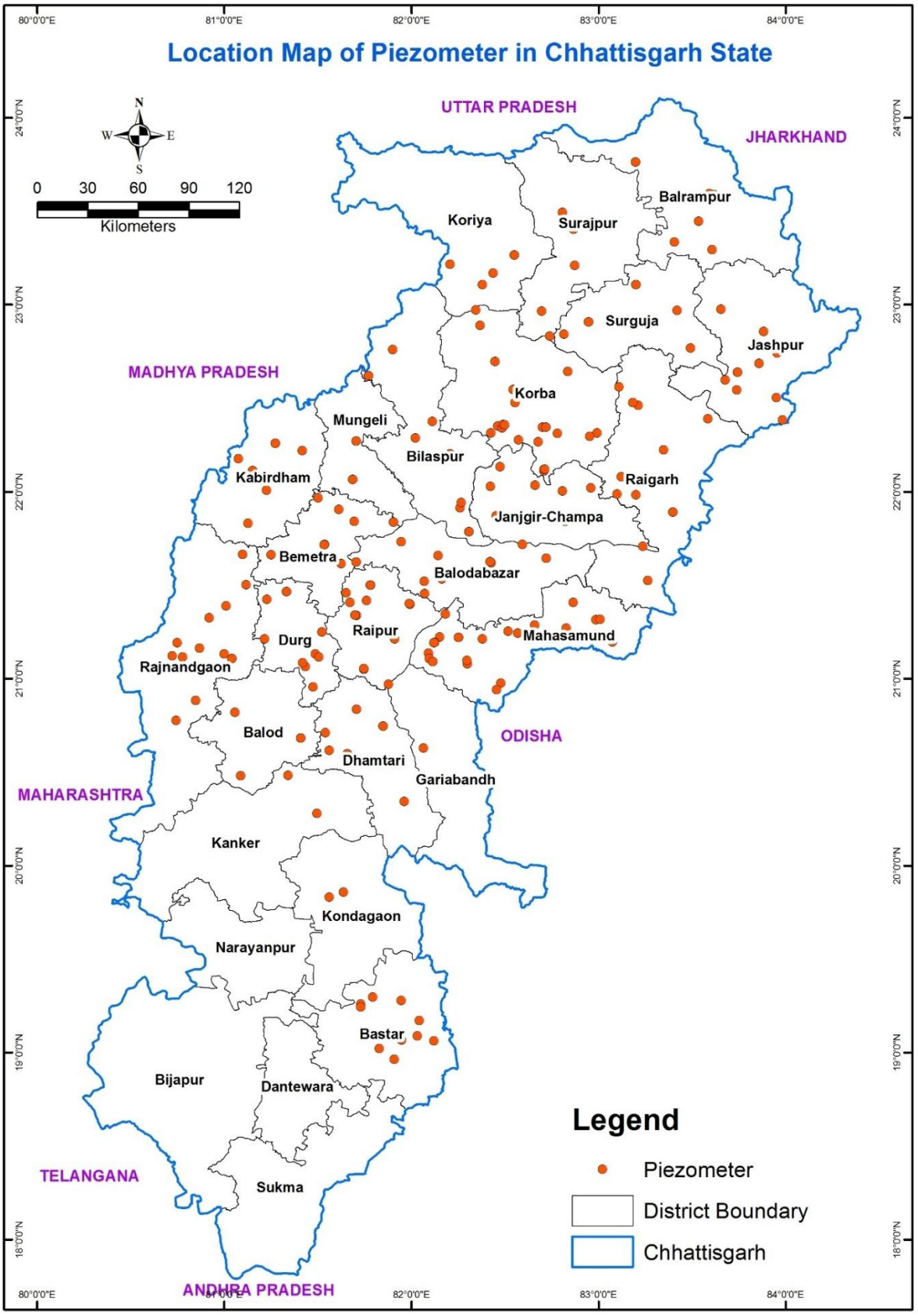

Figure-3: Map showing locations of Piezometers (NHNS)in Chhattisgarh state

7.0 RAINFALL

The region experiences a subtropical monsoon climate with distinct summer, monsoon, and winter seasons. The southwest monsoon prevails from June to mid-September, providing about 90% of the annual rainfall. Winter spans from October to February, while summer lasts from March to mid-June. Rainfall primarily recharges groundwater, with the Indian Meteorological Department (IMD), state departments, and agricultural universities maintaining over 200 rain gauge stations across the state. The average annual rainfall in the region is 1089.9 mm, varying across districts from a high of 2286.5 mm in Bijapur to a low of 560 mm in Bemetara.

Table 2: District wise distribution of Rainfall with deviation given in colour code August 2025

Sl. No	District	Actual	Normal	% Dep.	Category
1	Balod	1091.7	1000.8	9%	Normal
2	Baloda Bazar	758.7	901.7	-16%	Normal
3	Balrampur	1473.7	968.3	52%	Excess
4	Bastar	1439	1135.2	27%	Excess
5	Bemetara	495.1	1017.3	-51%	Deficient
6	Bijapur	1438.8	1343.2	7%	Normal
7	Bilaspur	1086.9	1028.1	6%	Normal
8	Dantewada	1401.6	1261.5	11%	Normal
9	Dhamtari	950.6	1036.6	-8%	Normal
10	Durg	861.7	956.7	-10%	Normal
11	Gariaband	935.3	1033	-9%	Normal
12	Gaurela-Pendra-Marwahi	1070	1070.5	0%	Normal
13	Janjgir-Champa	1253.1	1071.2	17%	Normal
14	Jashpur	1013	1306.1	-22%	Deficient
15	Kabirdham	769.3	840.9	-9%	Normal
16	Kanker	1124.2	1287.7	-13%	Normal
17	Khairagarh-Chhuikhadan-	790.8	714	11%	Normal
18	Kondagaon	972.8	1145.7	-15%	Normal
19	Korba	1067.3	1231.4	-13%	Normal
20	Korea	1162.3	1076.4	8%	Normal
21	Mahasamund	767.5	1041.3	-26%	Deficient
22	Manendragarh-Chirmiri-Bharatpur	1054.3	1076.2	-2%	Normal
23	Mohala-Manpur-Chowki	1263.9	1003.2	26%	Excess
24	Mungeli	1073.3	920.1	17%	Normal
25	Narayanpur	1262.9	1204.1	5%	Normal
26	Raigarh	1284	1159.6	11%	Normal
27	Raipur	904	989.3	-9%	Normal
28	Rajnandgaon	885.4	1002.4	-12%	Normal
29	Sakti	1155.4	1093.6	6%	Normal
30	Sarangarh-Bilaigarh	922.4	906.8	2%	Normal
31	Sukma	1119.5	1172.6	-5%	Normal
32	Surajpur	1100.3	1161.5	-5%	Normal
33	Surguja	801.6	1135.5	-29%	Deficient

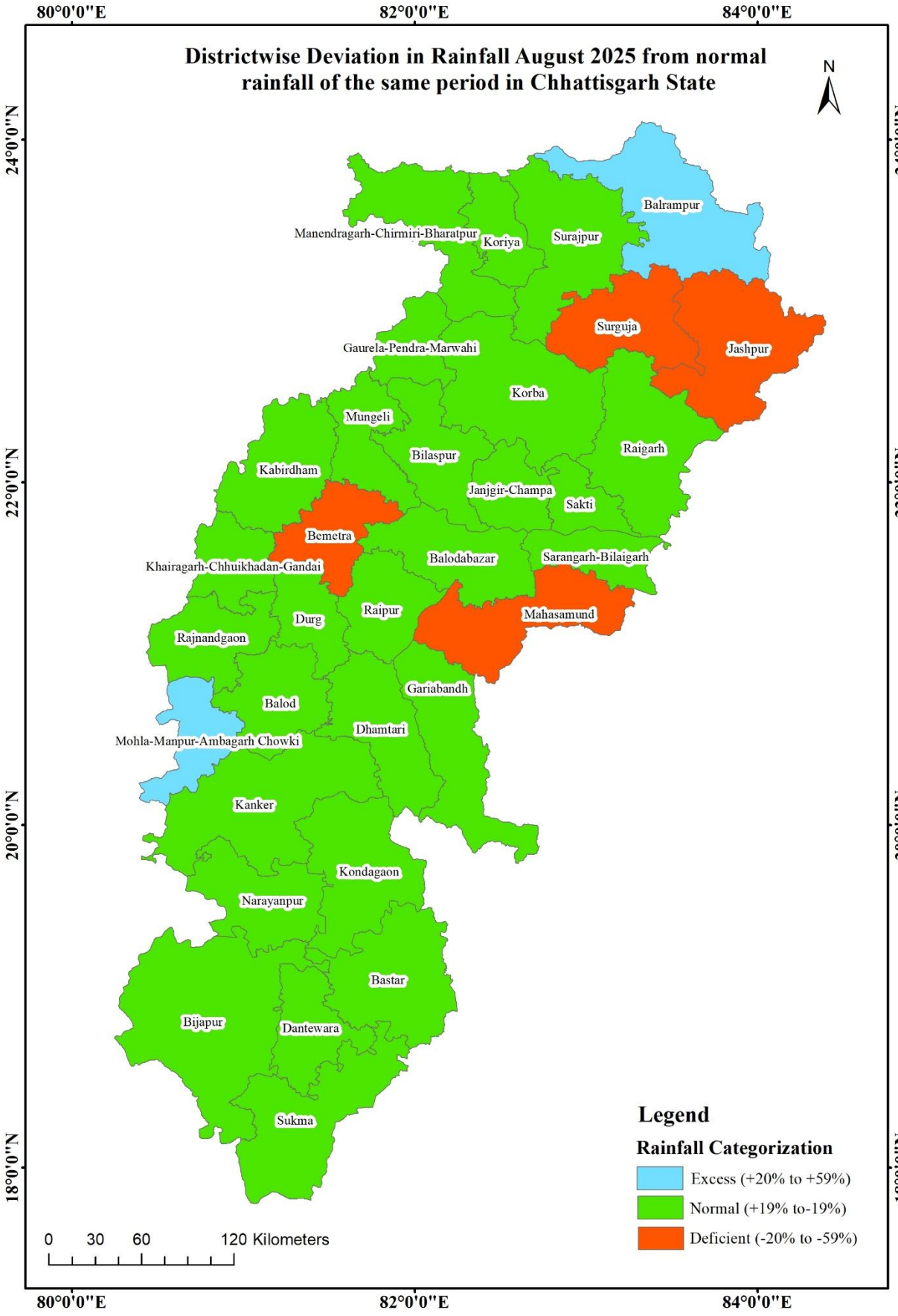

Figure-4: Rainfall Deviation Map for Chhattisgarh State in the month of August 2025

8.0 GROUND WATER SCENARIO (Aug 2025)

8.1 Shallow Aquifer (Unconfined)

8.1.1 Depth to Hydraulic Head (Aug 2025 Weathered Aquifer)

The depth to hydraulic head of 893 wells is used for analysis across the state of Chhattisgarh. The hydraulic head ranges from shallowest of 0.1 m bgl in Rajnandgaon while to the deepest of 12.52 m bgl in Korba. Hydraulic head of less than 2 m is recored in 54% of wells. Between 2 to 5 m in 37% of wells, between 5 to 10 m bgl in 8% of wells, between 10 to 20 mbgl in 1% of wells. And hydraulic head below 20 m bgl is registered in no wells.

Shallow hydraulic head is less than 2 m bgl is observed in all the districts with greater number of wells of this range in areas of Durg, Raigarh, Rajnandgaon, Surajpur, Surguja, Korba, Jashpur and Balod. Hydraulic head in ranges of 2 to 5 m bgl is mostly recorded in Balodabazar, Bemetara, Bilapur, Janjgir-Champa, Jashpur, Korba, Raigarh, and Raipur. In the range of 5 to 10 m wells are observed in areas of Bemetara, Bilaspur, Dhamtari, Gaurela Pendra Marwahi, Korba, Mungeli and Raigarh. Hydraulic head of 10 to 20 m bgl is recorded in areas of Bemetara, Dhamtari, Gariyaband, Korba, and Raigarh.

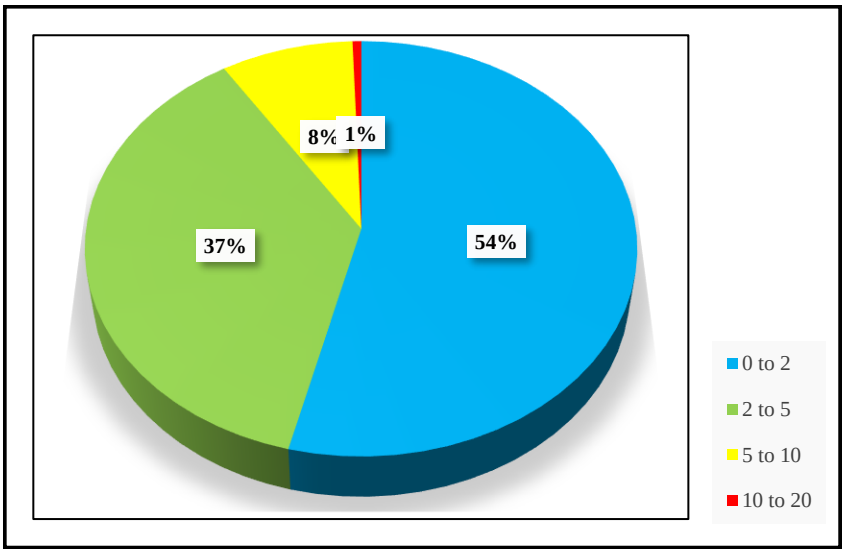

Figure-5: Percentage of wells in different hydraulic head range in unconfined aquifer (in mbgl)

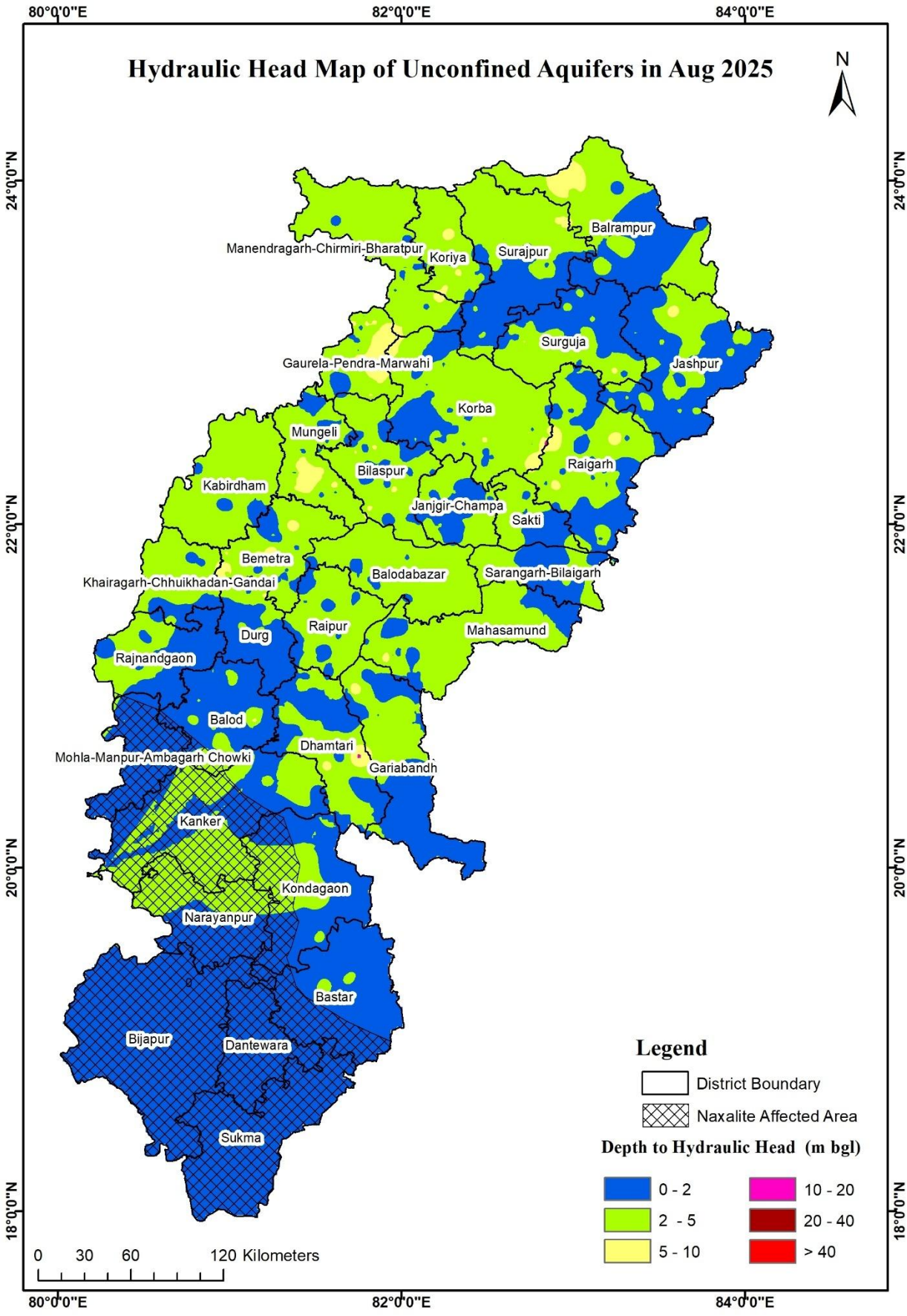

Figure-6: Depth to Hydraulic head Map of Unconfined Aquifers in Aug 2025

8.1.2 Seasonal Fluctuation in Hydraulic Head

8.1.2.1 Seasonal Fluctuation in Hydraulic head in Unconfined Aquifer (May 2025 vs Aug 2025)

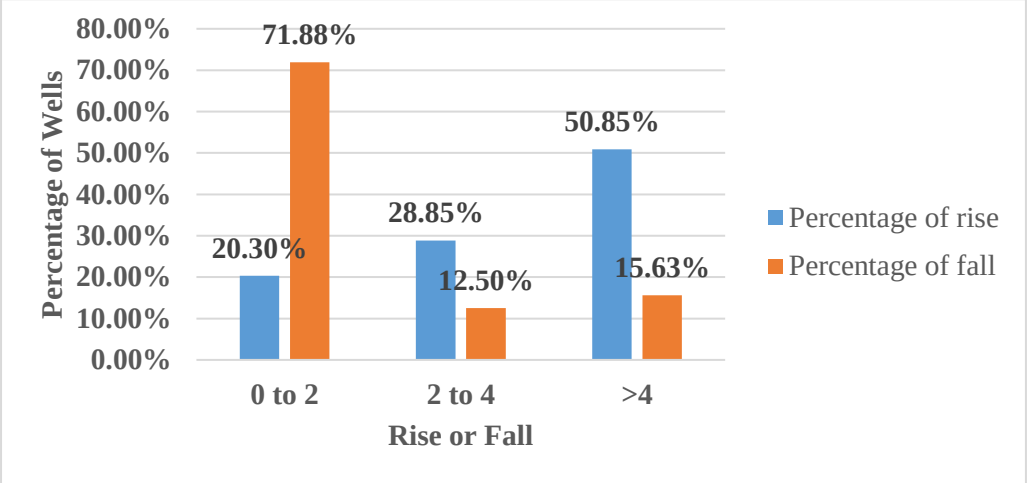

Figure-7: Percentage of wells showing rise and fall in hydraulic head in unconfined aquifer (May 2025 vs Aug 2025)

Rise: Out of 936 wells, hydraulic head rise of less than 2 m is recorded in 20.30% of wells. 2 to 4 m in 28.85 % of wells and more than 4 m in 50.85 % of wells. Hydraulic head rise of less than 2 m is seen in all the districts, significantly in Balod, Bilaspur, Dhamtari, Balodabazar, Durg, Janjgir-Champa, Korba, Mahasamund, Mungeli Rajnandgaon, and Raipur. Hydraulic head rise of 2 to 4 m is observed mainly in districts of Balod, Bilaspur, Janjgir-Champa, Jashpur, Kanker, Korba, Kore, Mahasamund, Manendragarh Chirmiri Bharatpur, Raigarh and Surajpur. Rise of more than 4 m is significantly observed in Balod, Balodabazar-Bhatapara, Balrampur, Bastar, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Janjgir-Champa, Jashpur, Kabeerdham, Korba, Korea, Mahasamund Mungeli, Raigarh, Raipur Surajpur and Surguja districts.

Fall: Out of 32 wells that have registered fall in hydraulic head, 71.88 % have recorded less than 2 m while 12.5 % in the range of 2 to 4 m and remaining 15.63 % of wells registered hydraulic head fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Bemetara, Bilaspur, Dhamtari, Janjgir Champa, Jashpur, Korba, Korea, Raipur, Mungeli, Raigarh, Surajpur Rajnandgaon, Sakti, Surajpur and Surguja districts. Fall of 2 to 4 m is observed mainly in Bastar, Raigarh and Korea districts. And more than 4 m is observed in Gariyaband, Mahasamund, Mungeli and Raigarh.

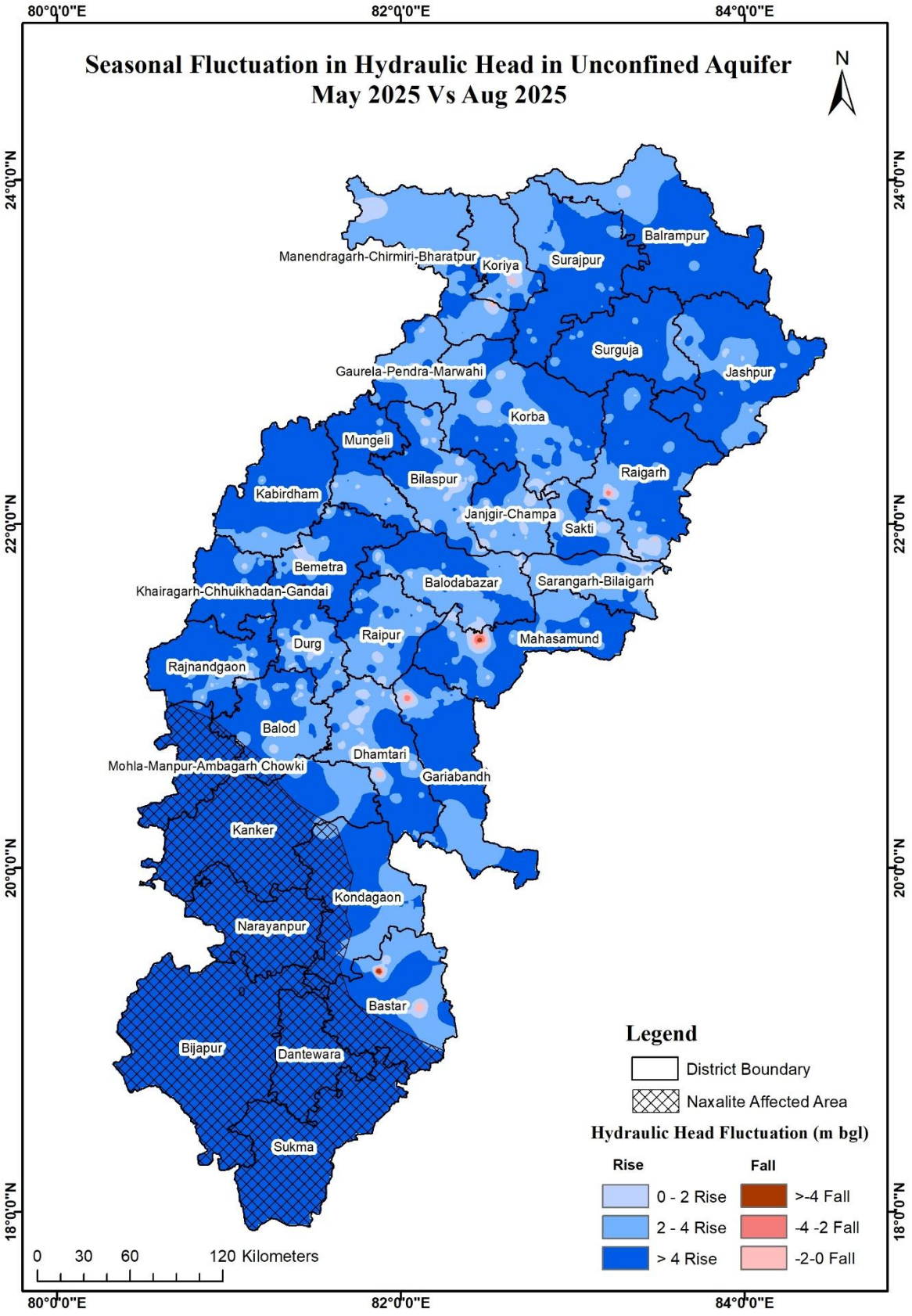

Figure-8: Seasonal Fluctuation in hydraulic head in unconfined aquifer (May 2025 vs Aug 2025)

8.1.3 Annual Fluctuation in Hydraulic Head

8.1.3.1 Annual Fluctuation in Hydraulic head in Unconfined Aquifer (Aug 2024 vs Aug 2025)

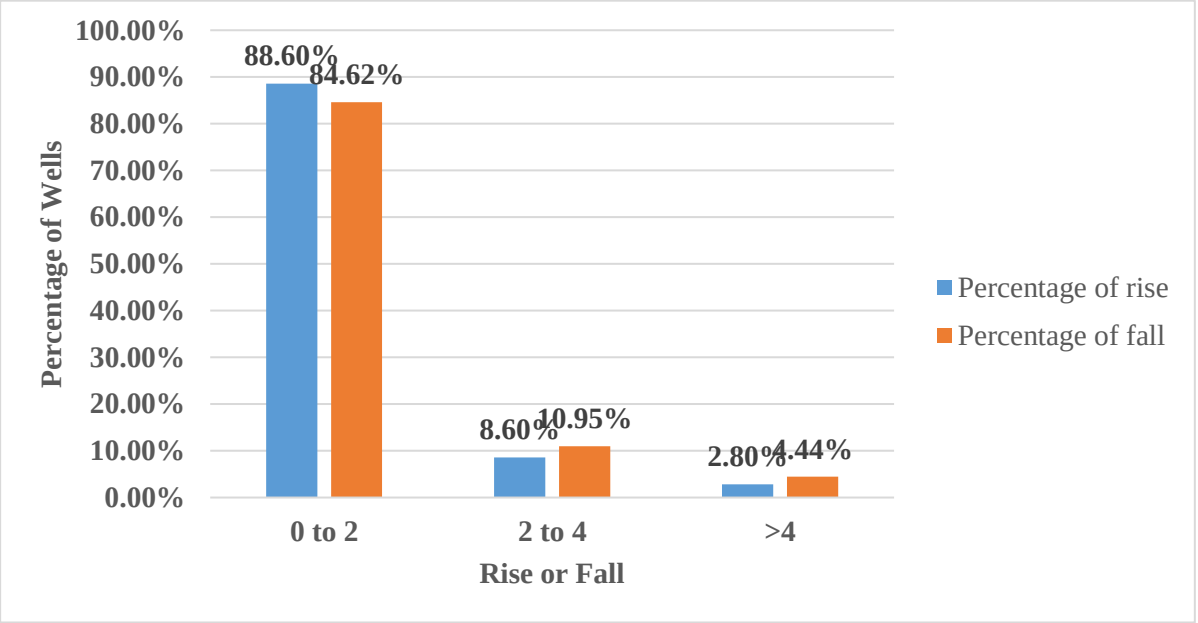

Figure-9: Percentage of wells showing rise and fall in hydraulic head in unconfined aquifer (Aug 2024 vs Aug 2025)

Rise: Out of 465 wells, hydraulic head rise of less than 2 m is recorded in 88.6 % of wells. 2 to 4 m in 8.6 % of wells and more than 4 m in 2.8 % of wells. Hydraulic head rise of less than 2 m is seen in all the districts, significantly in Balod, Balodabazar, Durg, Jashpur, Korba, Mahasamund, Rajnandgaon, Raipur, Surajpur and Surguja. Hydraulic head rise of 2 to 4 m is observed mainly in districts of Bastar, Bilaspur, Dhamtari, Jashpur, Kanker, Korba, Raigarh, Rajnandgaon, Raipur, Sakti Surajpur and Surguja. Rise of more than 4 m is significantly observed in Gariyaband, Jashpur, Kondagaon and Raigarh districts.

Fall: Out of 338 wells that have registered fall in hydraulic head, 84.62 % have recorded less than 2 m while 10.95 % in the range of 2 to 4 m and remaining 4.44 % of wells registered hydraulic head fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Bemetara, Bilaspur, Durg, Janjgir Champa, Jashpur, Korba, Korea, Manendragarh Chirmiri Bharatpur, Mungeli, Raigarh, Surajpur and Surguja districts. Fall of 2 to 4 m is observed mainly in Bemetara, Bilaspur, Dhamtari,Gaurella Pendra Marwahi, Janjgir Champa, Korba and Manendragarh Chirmiri Bharatpur. And more than 4 m is observed in Dhamtari, Gaurella Pendra Marwahi and Raigarh.

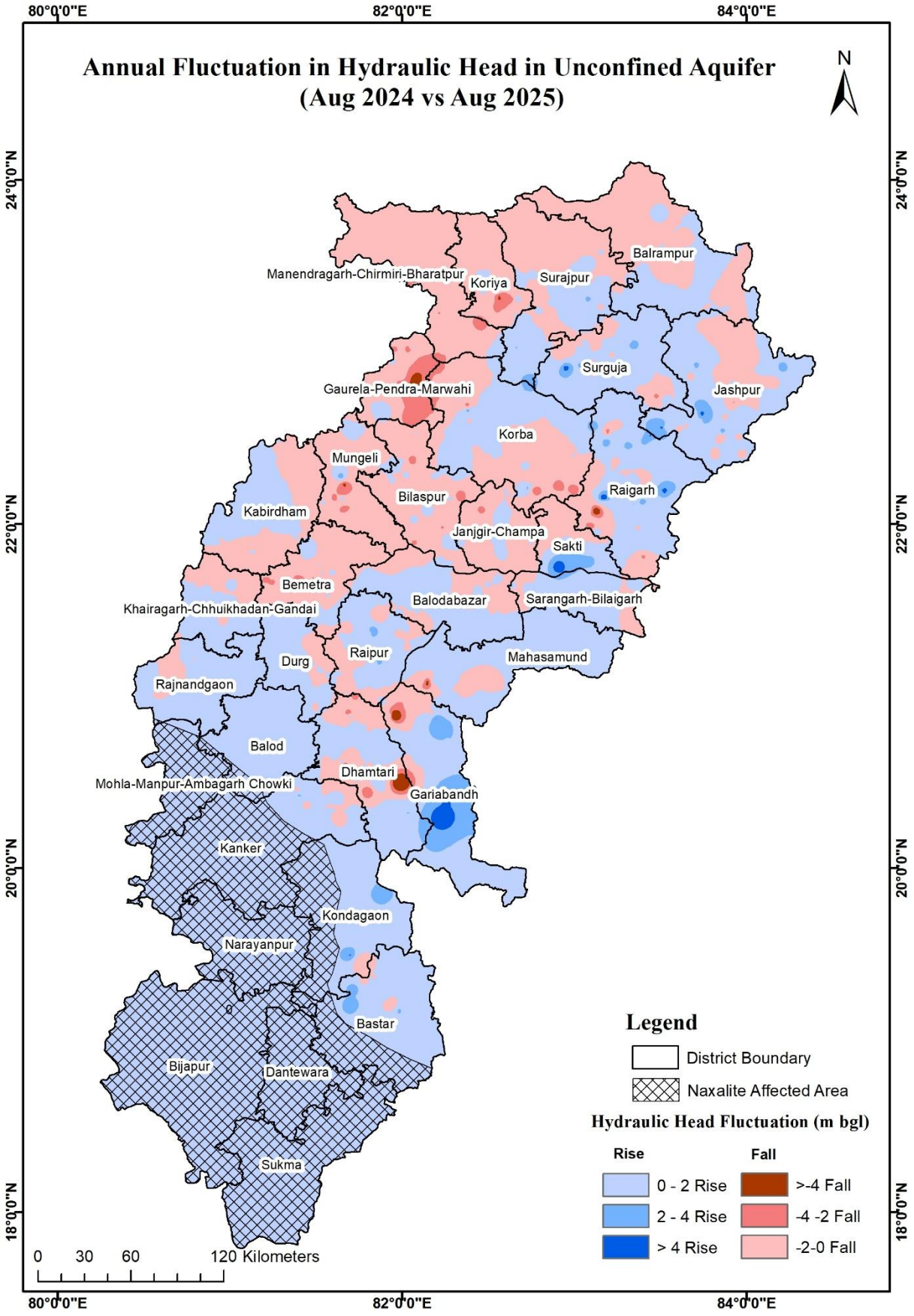

Figure-10: Annual Fluctuation in hydraulic head in unconfined aquifer (Aug 2024 vs Aug 2025)

8.1.3.2 Annual Fluctuation in Hydraulic head in Unconfined Aquifer (Aug 2023 vs Aug 2025)

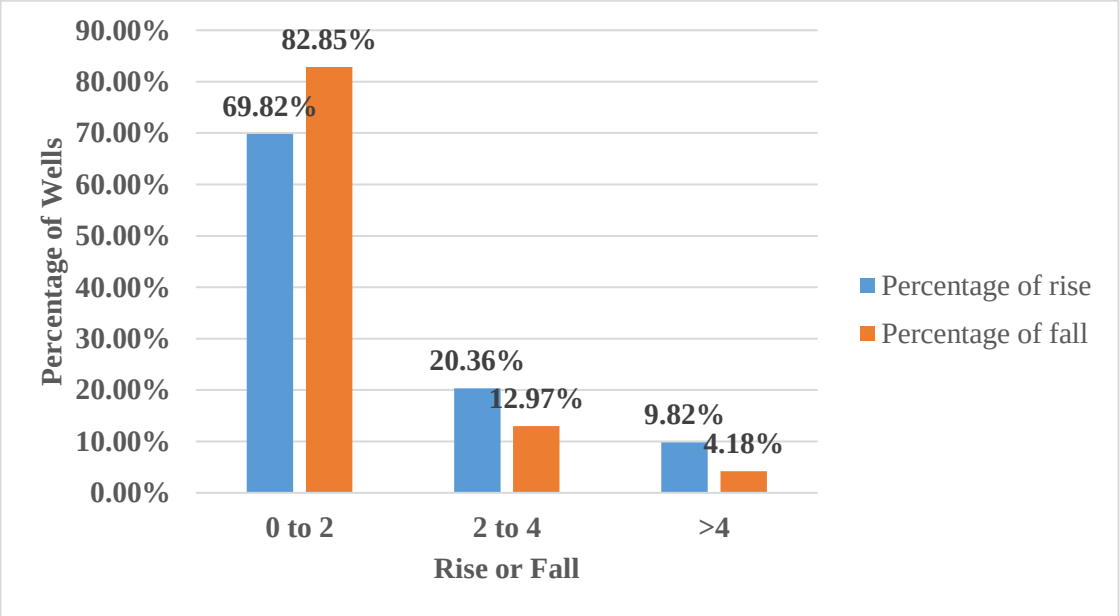

Figure-11: Percentage of wells showing rise and fall in HYDRAULIC HEAD in unconfined aquifer (Aug 2023 vs Aug 2025)

Rise: Out of 560 wells, hydraulic head rise of less than 2 m is recorded in 69.82 % of wells. 2 to 4 m in 20.36 % of wells and more than 4 m in 9.82 % of wells. Hydraulic head rise of less than 2 m is seen in all the districts, significantly in Balod, Balodabazar, Bilaspur, Durg, Gariyaband, Jashpur, Korba, Manendragarh Chirmiri Bharatpur, Raigarh, Rajnandgaon, Surajpur and Surguja. Hydraulic head rise of 2 to 4 m is observed mainly in districts of Balod, Bemetara, Bilaspur, Jashpur, Korba, Raigarh, Surajpur and Surguja. Rise of more than 4 m is significantly observed in Balod, Balrampur, Jashpur, Bilaspur, Korba, Korea, Raigarh, Rajnandgaon, Surajpur and Surguja districts.

Fall: Out of 239 wells that have registered fall in hydraulic head, 82.85 % have recorded less than 2 m while 12.97 % in the range of 2 to 4 m and remaining 4.18 % of wells registered hydraulic head fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Balod, Balodabazar, Bemetara, Bilaspur, Durg, Janjgir Champa, Korba, Mahasamund, Raipur and Rajanandgaon districts. Fall of 2 to 4 m is observed mainly in Balodabazar, Dhamtari, Gaurella Pendra Marwahi, Korba, Raigarh, and Mungeli and more than 4 m is observed in Bemetara, Bilaspur, Dhamtari, Gaurella Pendra Marwahi, Mahasamund and Manendragarh Chirmiri Bharatpur.

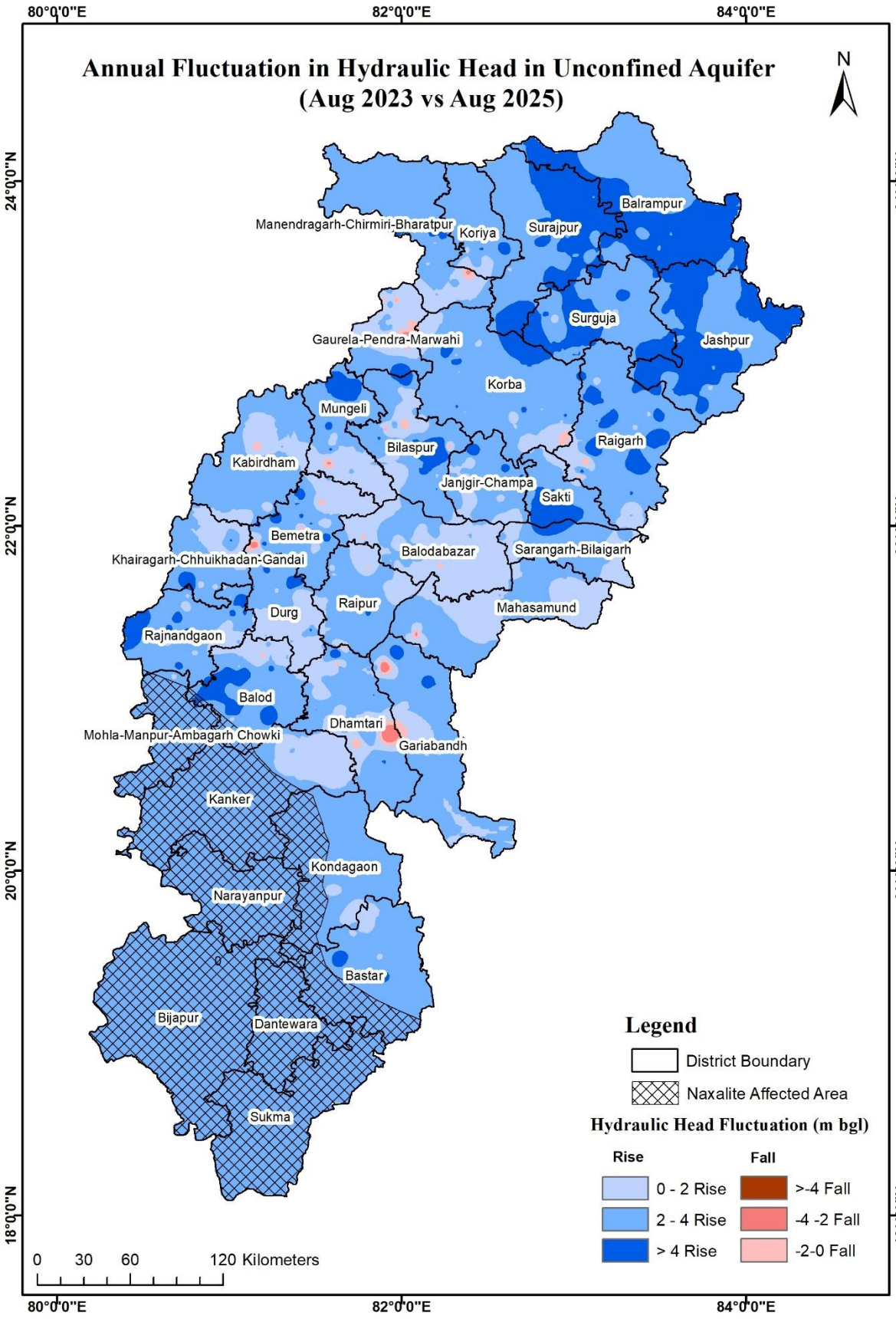

Figure-12: Annual Fluctuation in hydraulic head in unconfined aquifer (Aug 2023 vs Aug 2025)

8.1.4 Decadal Fluctuation in Hydraulic Head

8.1.4.1 Decadal Fluctuation in Hydraulic Head in Unconfined Aquifer Aug (2015-2024) vs Aug 2025

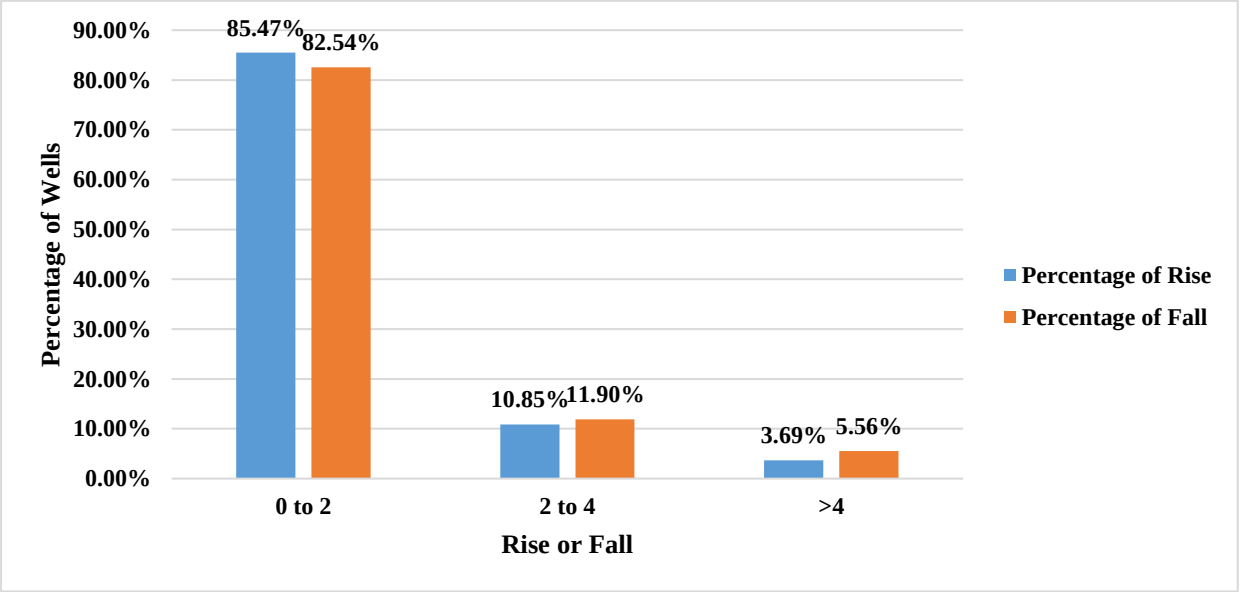

Figure-13: Percentage of wells showing rise and fall in hydraulic head in unconfined aquifer (Decadal Aug (2015-2024) vs Aug 2025)

Rise: Out of 461 wells, hydraulic head rise of less than 2 m is recorded in 85.47% of wells, 2 to 4 m in 10.85 % of wells and more than 4 m in 3.69 % of wells. Hydraulic head rise of less than 2 m is seen in all the districts, significantly in Balod, Bemetara, Bilaspur, Durg, Dhamtari, Jashpur, Korba, Raigarh, Raipur, Rajnandgaon, Surajpur and Surguja. Hydraulic head rise of 2 to 4 m is observed mainly in districts of Balod, Bilaspur, Bemetara, Jashpur, Korba, Mahasamund, Raigarh, Rajnandgaon and Surajpur. Rise of more than 4 m is significantly observed in Jashpur, Korba, Mungeli, Raigarh, Rajnandgaon and Surajpur districts.

Fall: Out of 252 wells that have registered fall in hydraulic head, 82.54 % have recorded less than 2 m while 11.90% in the range of 2 to 4 m and remaining 5.56% of wells registered hydraulic head fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Balodabazar, Bemetara, Bilaspur, Dhamtari, Durg, Janjgir Champa, Korba, Korea, Mahasamund, Manendragarh Chirmiri Bharatpur, Raigarh, and Raipur districts. Fall of 2 to 4 m is observed mainly in Balodabazar, Bemetara, Bilaspur, Gaurella Pendra Marwahi, Korba, Mungeli and Raigarh while more than 4 m is observed in Dhamtari, Gaurella Pendra Marwahi and Raigarh districts.

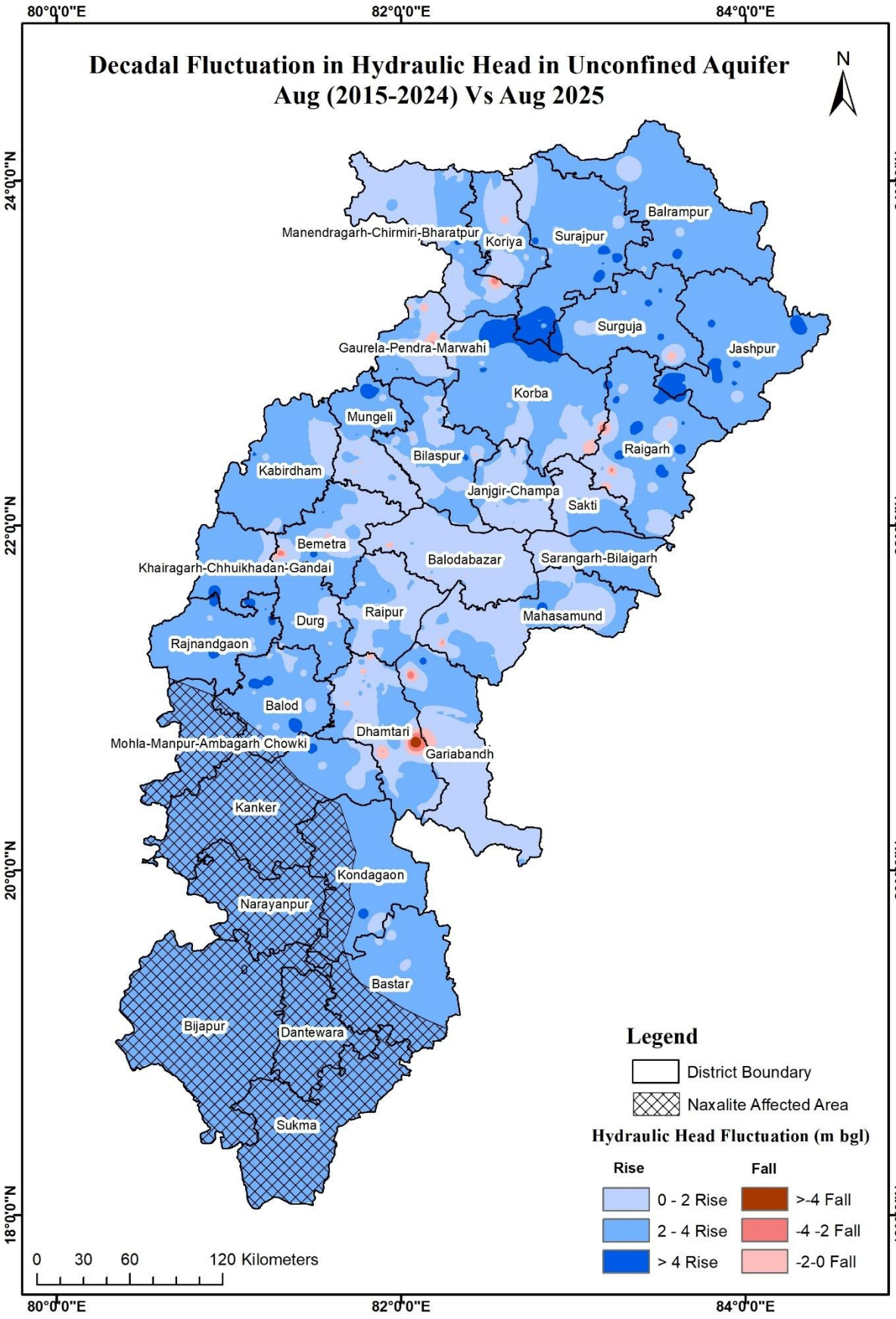

Figure-14: Decadal fluctuation in hydraulic head in unconfined aquifer Aug (2015-2024) vs Aug 2025)

9.0 SUMMARY

As part of the National Hydrograph Network Stations (NHNS), 1250 wells have been identified in Chhattisgarh. During the pre-monsoon period, hydraulic head were recorded from 897 out of 1036 dug wells, and 213 out of 216 piezometers were monitored. In Aug, the state received 1078.7 mm of rainfall, which is slightly lower than the normal rainfall of 1102.5 mm—showing a departure of -2 %.

In the dug wells that represent shallow aquifers, 331 wells had hydraulic head between 2 to 5 m while 481 wells had levels between 0 to 2 m. These two ranges account for the majority of the wells. Deeper hydraulic head between 5 to 10 m were found in 76 wells scattered mostly in the districts of Bemetara, Bilaspur, Dhamtari, Gaurela Pendra Marwahi, Korba, Mungeli and Raigarh.

The annual hydraulic head fluctuation in these wells shows that about 72.35% of the state's geographical area has undergone a rise in hydraulic head of up to 2 m whereas 15.45% of the area saw a fall in the range of 0-2 m as compared to Aug 2023 while area under 64.82 % shows rise of 0 to 2 m while 31.55 % shows fall in 0 to 2 m as compared to Aug 2024. The decadal comparison with Aug 2025 indicates that about 73.99% of the state has shown an overall rise in hydraulic head.

10.0 Recommendations

Recommendations

The key observations and recommendations are outlined below:

1. Areas with Shallow Hydraulic head (< 2 mbgl):

Districts like Durg, Raigarh, Rajnandgaon, Surajpur, Surguja, Korba, Jashpur and Balod

Recommendations:

- Excess of watering the crop in root zone must be avoided to prevent further rise in the water table and water logging.
- Use of drip and sprinkler irrigation can help in efficient use of water.
- Crop Rotation Techniques can be taken up. Rice and Sugarcane cultivation requires huge quantity of water which can be replaced by some less water-intensive crops.

2. Areas with Moderate Hydraulic head (2 to 5 mbgl):

Balodabazar, Bemetara, Bilapur, Janjgir-Champa, Jashpur, Korba, Raigarh and Raipur

Recommendations:

- Install rainwater harvesting systems in residential, industrial, and agricultural areas.
- Construct recharge wells and percolation tanks to boost groundhydraulic head.
- Build check dams to slow runoff and enhance infiltration.
- Promote drip and sprinkler irrigation to conserve water in agriculture.
- Encourage crop diversification with less water-intensive crops like millets instead of paddy and sugarcane.

3. Areas with Deep Hydraulic head (5 to 20 mbgl):

Areas of Bemetara, Bilaspur, Dhamtari, Gariyaband, Gaurela Pendra Marwahi, Korba, Mungeli and Raigarh.

Recommendations:

- Regulate groundwater extraction to prevent depletion.
- Build artificial recharge structures and install rainwater harvesting systems.
- Promote crop diversification with less water-intensive crops to maintain groundwater balance.

Implementing these recommendations will enhance groundwater availability and ensure long-term water security.