CGWB, NORTH CENTRAL CHHATTISGARH REGION, RAIPUR

GROUNDWATER LEVEL BULLETIN CHHATTISGARH

May 2025

ABSTRACT

Ground water level scenario during May-2025 highlighting the findings, status of ground water level in different aquifers and its annual and decadal comparison.

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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, May, 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 May 2025, Chhattisgarh's network includes 1250 nos. observation wells (dugwells and purpose-built piezometers) monitored quarterly for groundwater levels 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.

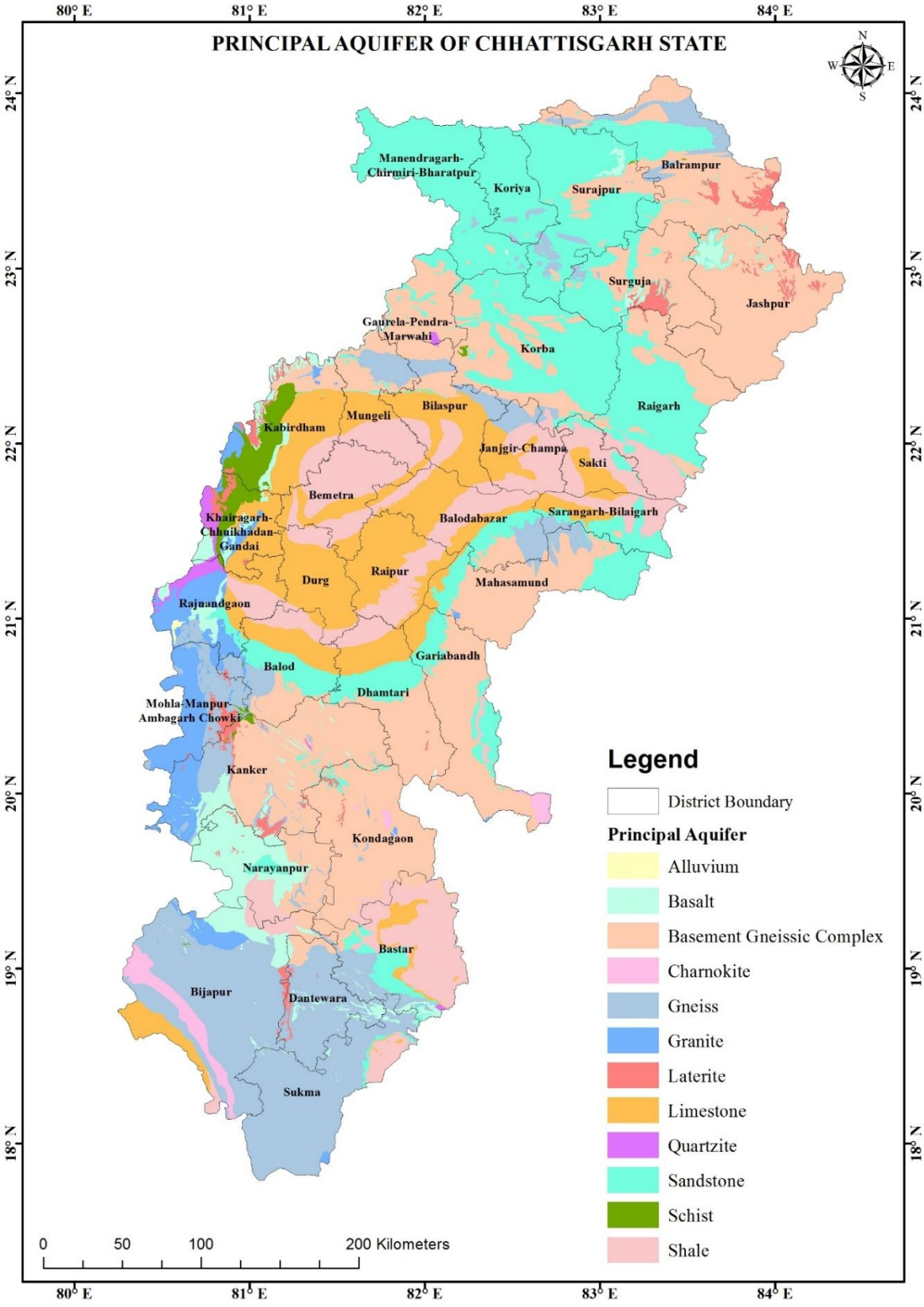

Figure-1: Map showing principal aquifers in the state of Chhattisgarh

6.0 GROUNDWATER LEVEL 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 May 2025, there are 1250 operational wells, comprising 1036 dug wells (876 wells monitored) and 214 piezometers (201 piezometers were monitored).** The details of the wells are provided in Table 1. Out of 1250, a total of the data of 1211 wells were monitored. during monitoring it was observed that 134 wells were dry and 39 wells could not be monitored due to field issues. **As per May 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 water level monitoring stations as per May 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**

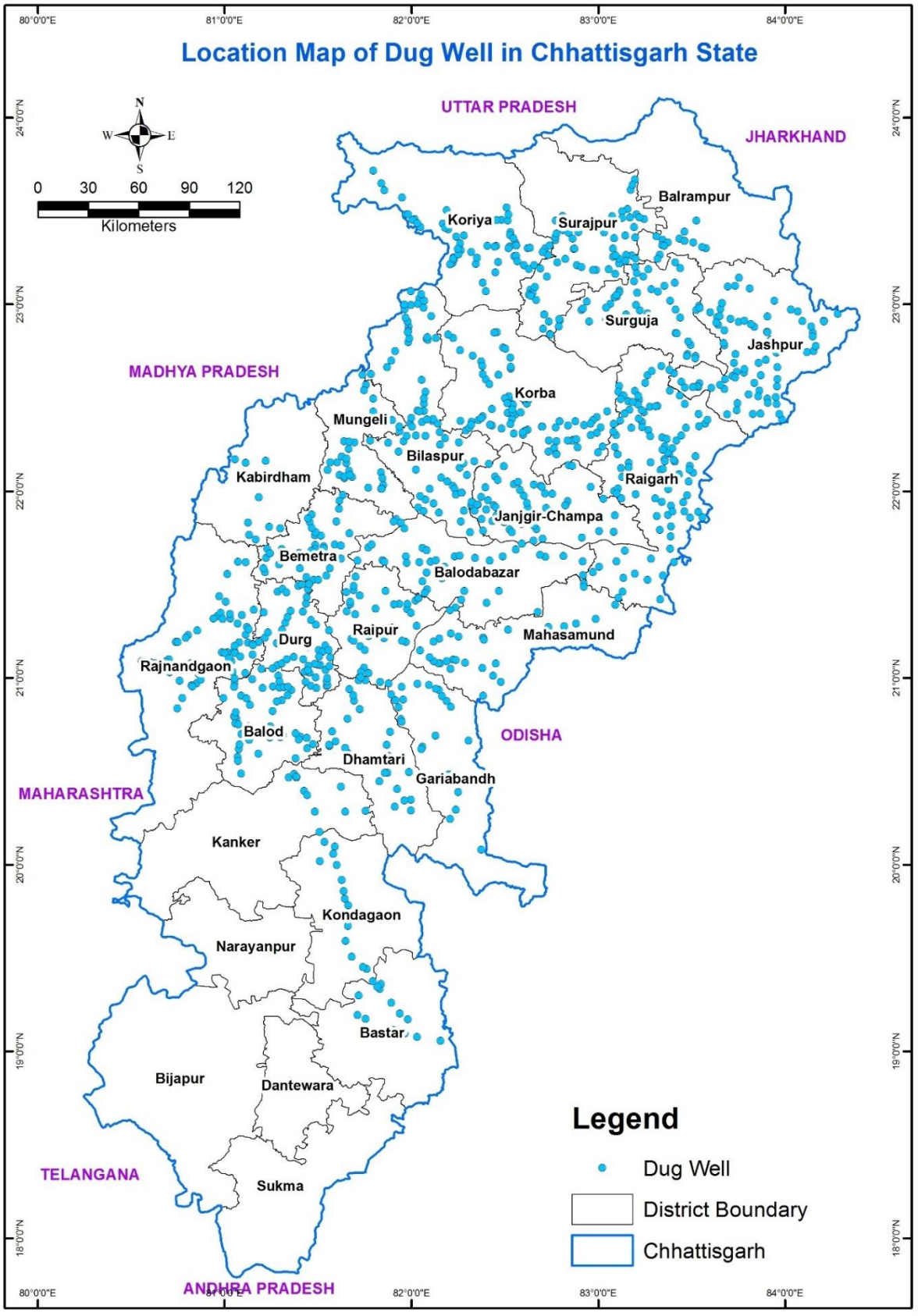

Figure-2: Map showing locations of monitoring Dug Wells (NHNS) in Chhattisgarh state

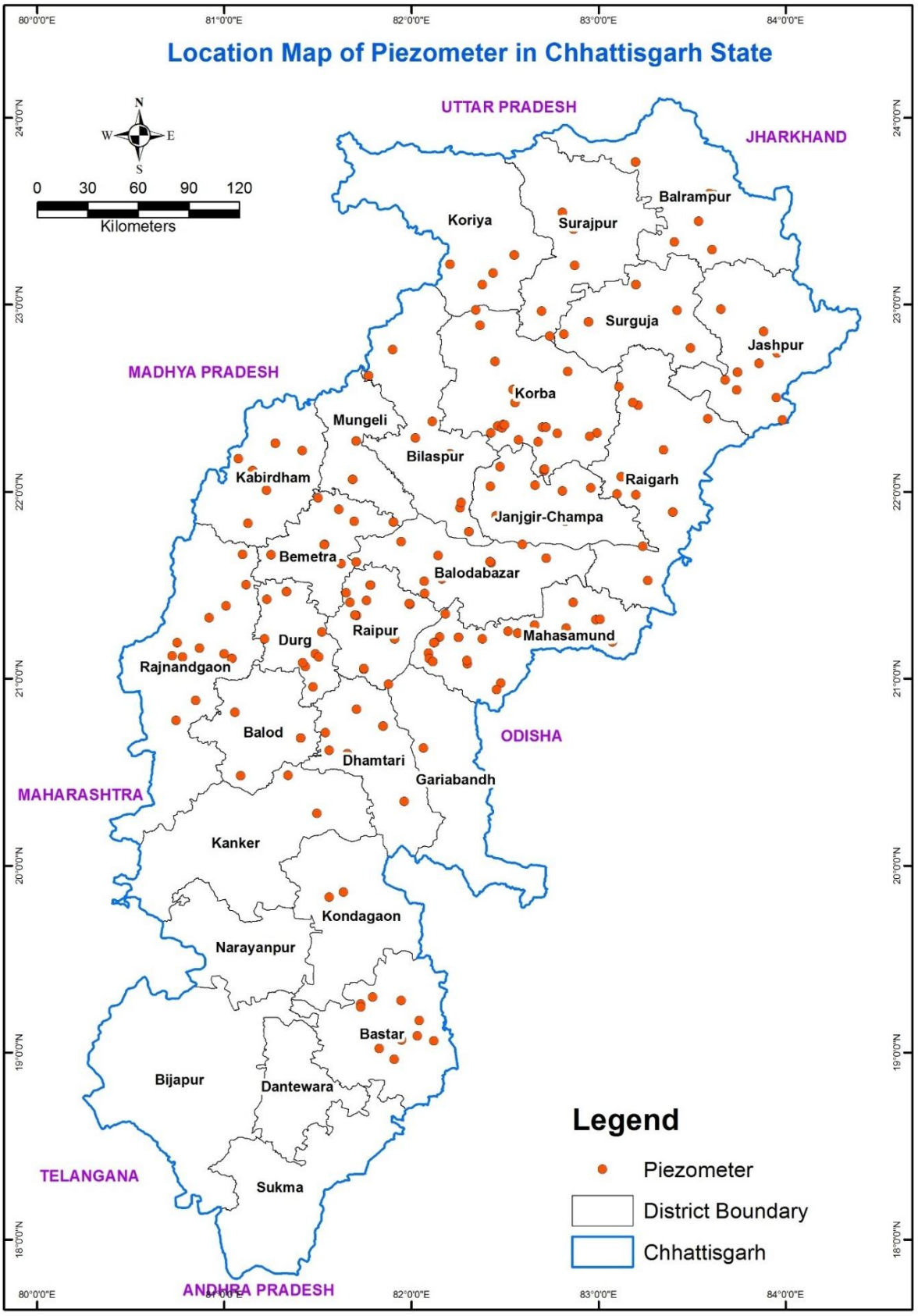

Figure-3: Map showing locations of Piezometers (NHNS)in Chhattisgarh state

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.

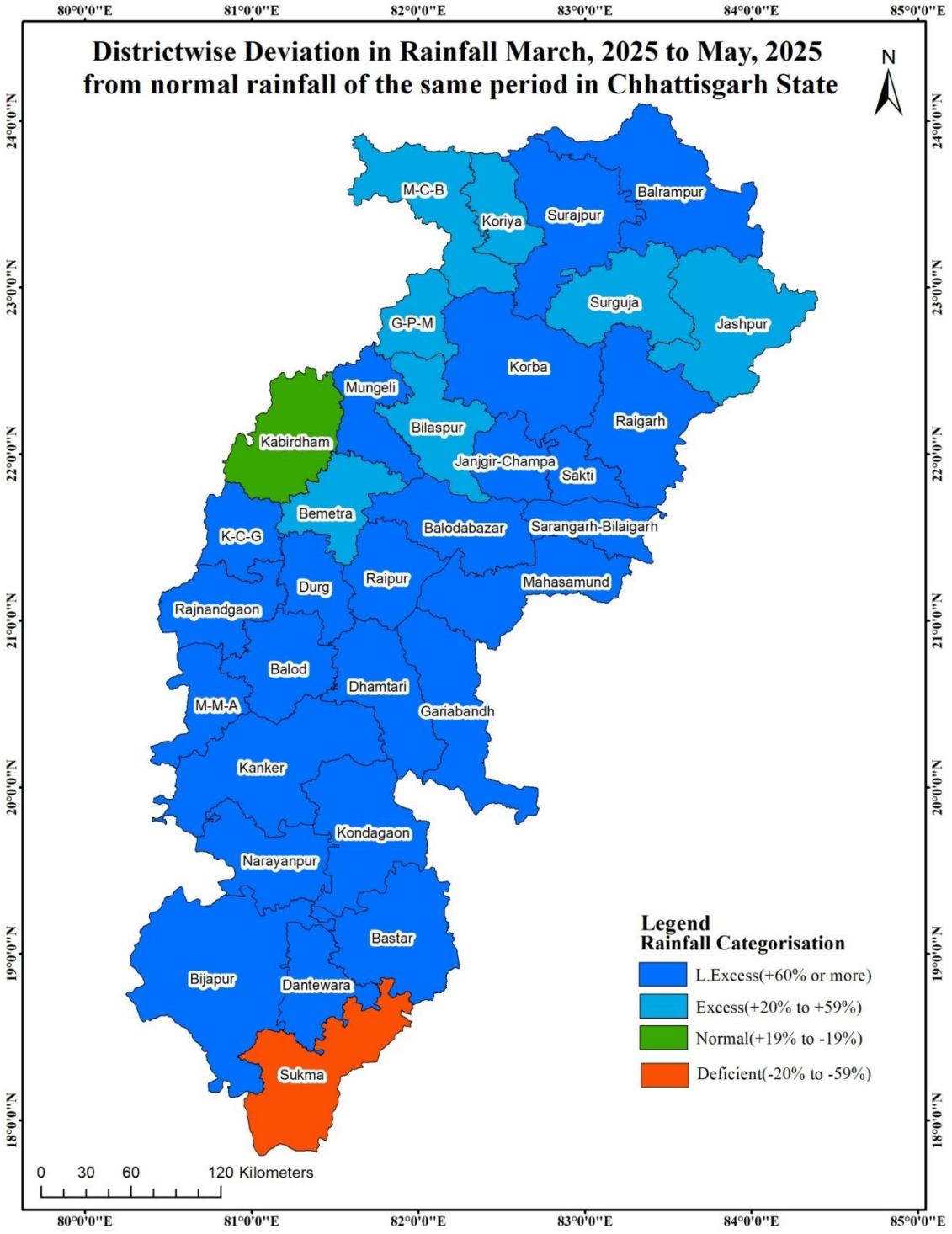

Figure-4: Rainfall Deviation (March, 2025 to May, 2025) from normal rainfall

Table 2: District wise distribution of Rainfall with deviation given in colour code for March, 2025 to May 2025

Sl. No	District	Actual	Normal	% Dep.	Category
1	Balod	109.6	23.5	367%	LE
2	Baloda Bazar	96.9	17.6	451%	LE
3	Balrampur	59.7	17.9	233%	LE
4	Bastar	229.6	111.1	107%	LE
5	Bemetara	56.9	36.5	56%	E
6	Bijapur	300.7	33.7	792%	LE
7	Bilaspur	55.2	35.5	55%	E
8	Dantewada	106.9	11.7	813%	LE
9	Dhamtari	139.7	33.6	316%	LE
10	Durg	92.3	20.8	344%	LE
11	Gariaband	200.5	23	772%	LE
12	Gaurela-Pendra-Marwahi	112.8	91.2	24%	E
13	Janjgir-Champa	64.9	31.2	108%	LE
14	Jashpur	98.7	79	25%	E
15	Kabirdham	52	51.9	0%	N
16	Kanker	142.5	27.2	424%	LE
17	Khairagarh-Chhuikhadan-	60.9	15.1	303%	LE
18	Kondagaon	93.1	35.6	162%	LE
19	Korba	47.5	20.9	127%	LE
20	Korea	28.9	23.1	25%	E
21	Mahasamund	83.9	25.8	225%	LE
22	Manendragarh-Chirmiri-B	29.2	22.9	28%	E
23	Mohala-Manpur-Chowki	121.1	23.9	407%	LE
24	Mungeli	60.6	31.5	92%	LE
25	Narayanpur	193.1	41.7	363%	LE
26	Raigarh	88.6	50.4	76%	LE
27	Raipur	84.6	37.7	124%	LE
28	Rajnandgaon	66.9	28.5	135%	LE
29	Sakti	62.7	24.1	160%	LE
30	Sarangarh-Bilaigarh	86.3	36.9	134%	LE
31	Sukma	28.2	35	-20%	D
32	Surajpur	86	18.9	355%	LE
33	Surguja	66.6	44.7	49%	E

8.0 GROUND WATER LEVEL SCENARIO(May 2025)

8.1 SHALLOW AQUIFER (UNCONFINED)

8.1.1 DEPTH TO WATER LEVEL (May 2025 Weathered Aquifer)

The depth to water level of 876 wells is used for analysis across the state of Chhattisgarh. The water level ranges from shallowest of 0.65 m bgl in Janjgir Champa while to the deepest of 18.5 m bgl in Durg. Water levels of less than 2 m is recored in3.3 % of wells. Between 2 to 5 m in31.05% of wells, between 5 to 10 m bgl in55.2% of wells, between 10 to 20 mbgl in10.3% of wells. And water level below 20 m bgl is registered in no wells.

Shallow water level is less than 2 m bgl is observed in Balod, Balodabazar, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Gaurela Pendra Marwahi, Jangir Champa, Korba, Mahasamund, Mungeli Raipur and Rajnandgaon. Water level in ranges of 2 to 5 m bgl is recorded in Raigarh, Balod, Bilaspur Jangir Champa, Korba, Rajnandgaon, Manendragarh-Chirimiri-Bharatpur, Jashpur, Bastar, Balodabazar, Surajpur and Sarangarh Bilaigarh. In the range of 5 to 10 m wells are observed in areas of Balod, Balodabazar, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Gaurela Pendra Marwahi, Jangir Champa, Korba, Mahasamund, Mungeli Raipur, Rajnandgaon Surajpur and Surguja. Water level of 10 to 20 m bgl is recorded in areas of Balod, Balrampur, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Gaurela Pendra Marwahi, Jangir Champa, Jashpur, Korba, Korea Mahasamund, Mungeli, Raigarh Raipur, Rajnandgaon, Sakti Surajpur and Surguja.

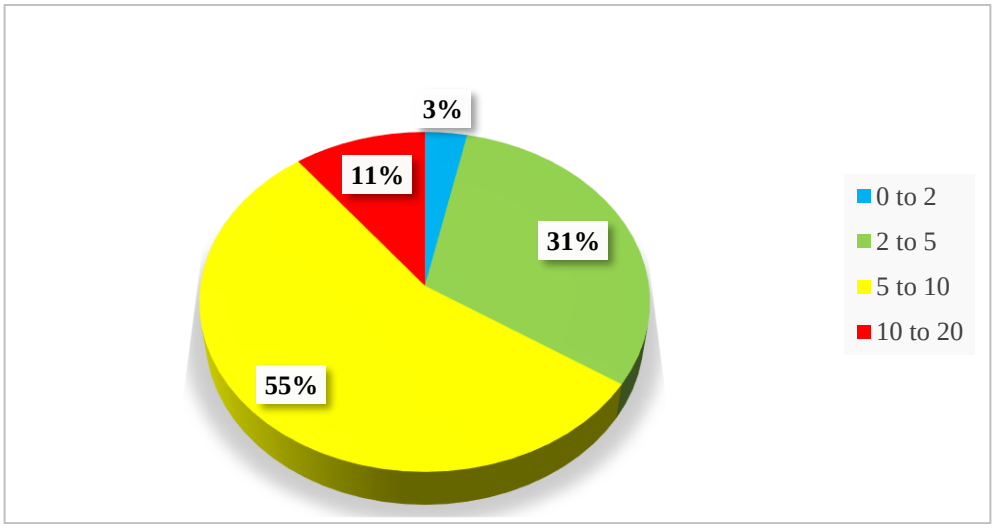

Figure-5: Percentage of wells in different water level range in unconfined aquifer (in mbgl)

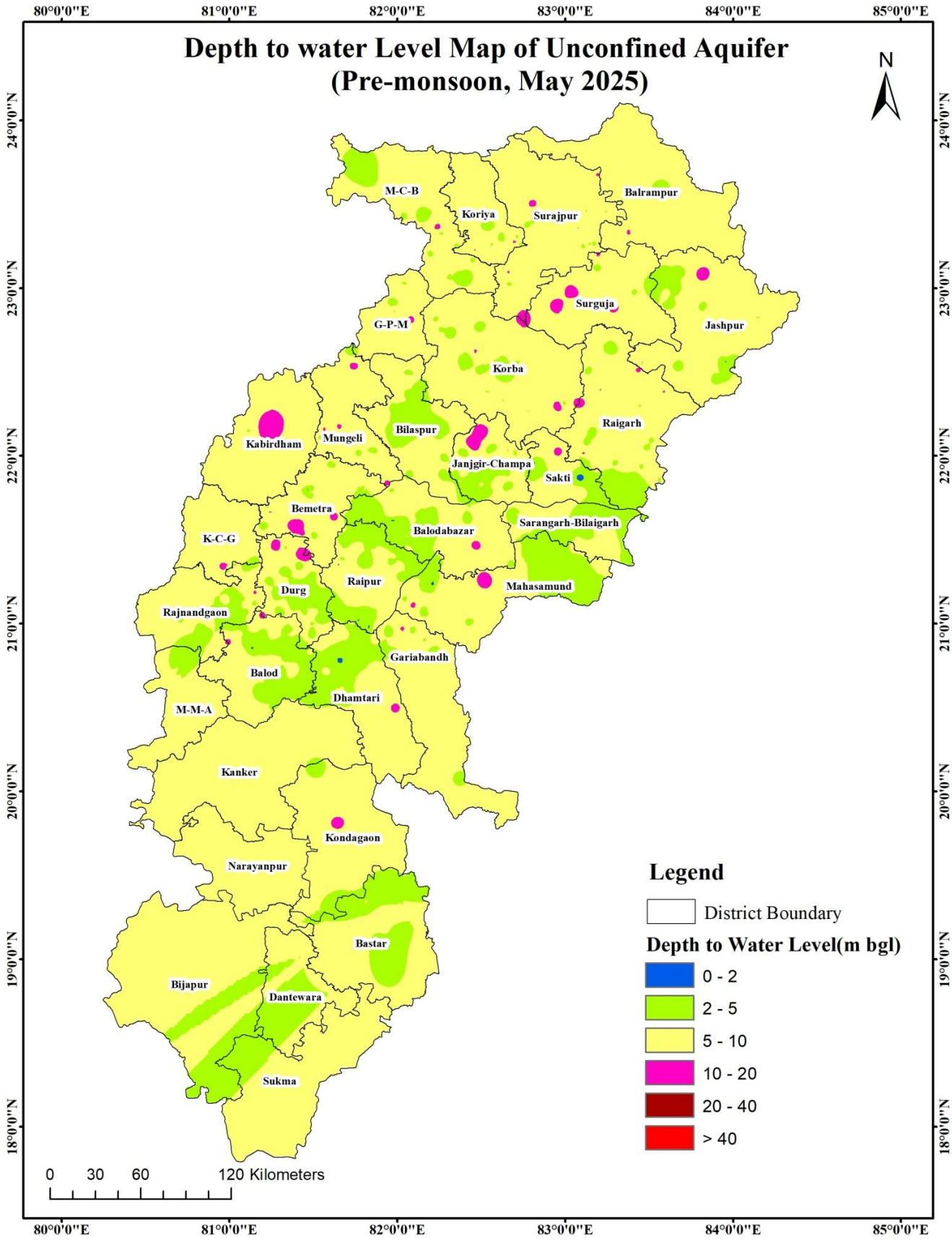

Figure-6: Depth to Water Level Map of Unconfined Aquifers in May 2025

8.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

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

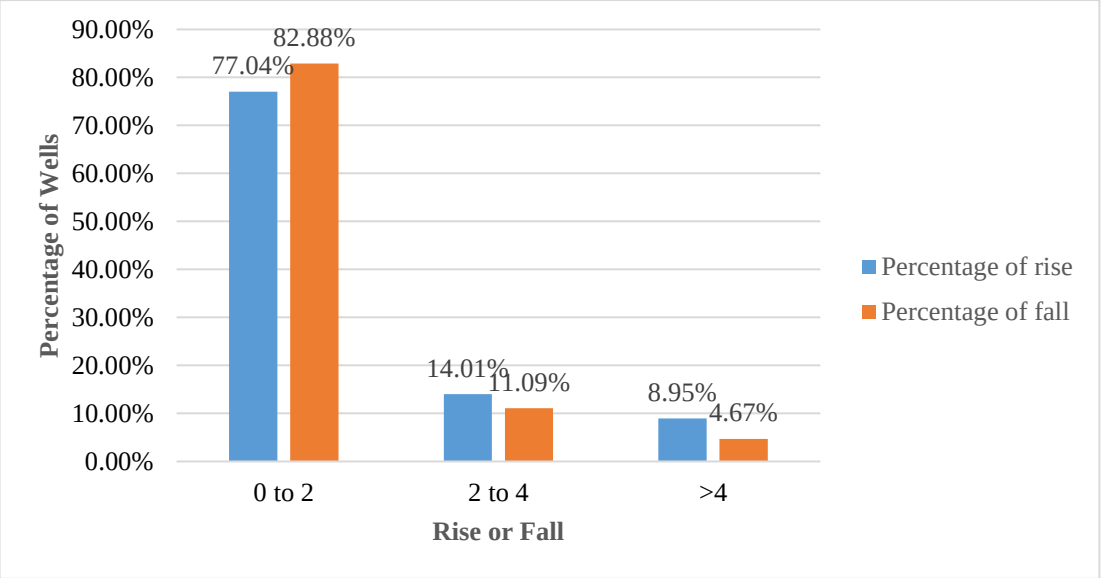

Figure-7: Percentage of wells showing rise and fall in WL in unconfined aquifer (May 2024 vs May 2025)

Rise: Out of 514 wells, water level rise of less than 2 m is recorded in 77.04 % of wells. 2 to 4 m in 14.01 % of wells and more than 4 m in 8.95 % of wells. Water level rise of less than 2 m is seen in all the districts, significantly in Balod, Bilaspur, Durg, Jashpur, Korba, Raigarh, Rajnandgaon, Surajpur and Surguja. Water level rise of 2 to 4 m is observed mainly in districts of Balod, Balodabazar, Bilaspur, Durg, Jashpur, Korba, Korea Mahasamund, Raipur, Surajpur and Surguja. Rise of more than 4 m is significantly observed in Balod, Bilaspur, Korba, Mahasamund, Raigarh and Rajnandgaon districts.

Fall: Out of 507 wells that have registered fall in water levels, 82.88 % have recorded less than 2 m while 11.09 % in the range of 2 to 4 m and remaining 4.67 % of wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Bemetara, Bilaspur, Dhamtari, Durg, Janjgir Champa, Jashpur, Korba, Raigarh, Rajanandgaon, Surajpur and Surguja districts. Fall of 2 to 4 m is observed mainly in Balodabazar, Durg, Balrampur, Jashpur, KabeerdhamRaigarh, Raipur, Mungeli Surajpur, Surguja and Uttar Bastar Kanker and more than 4 m is observed in Balod, Korea, Mungeli, Raigarh and Rajnandgaon.

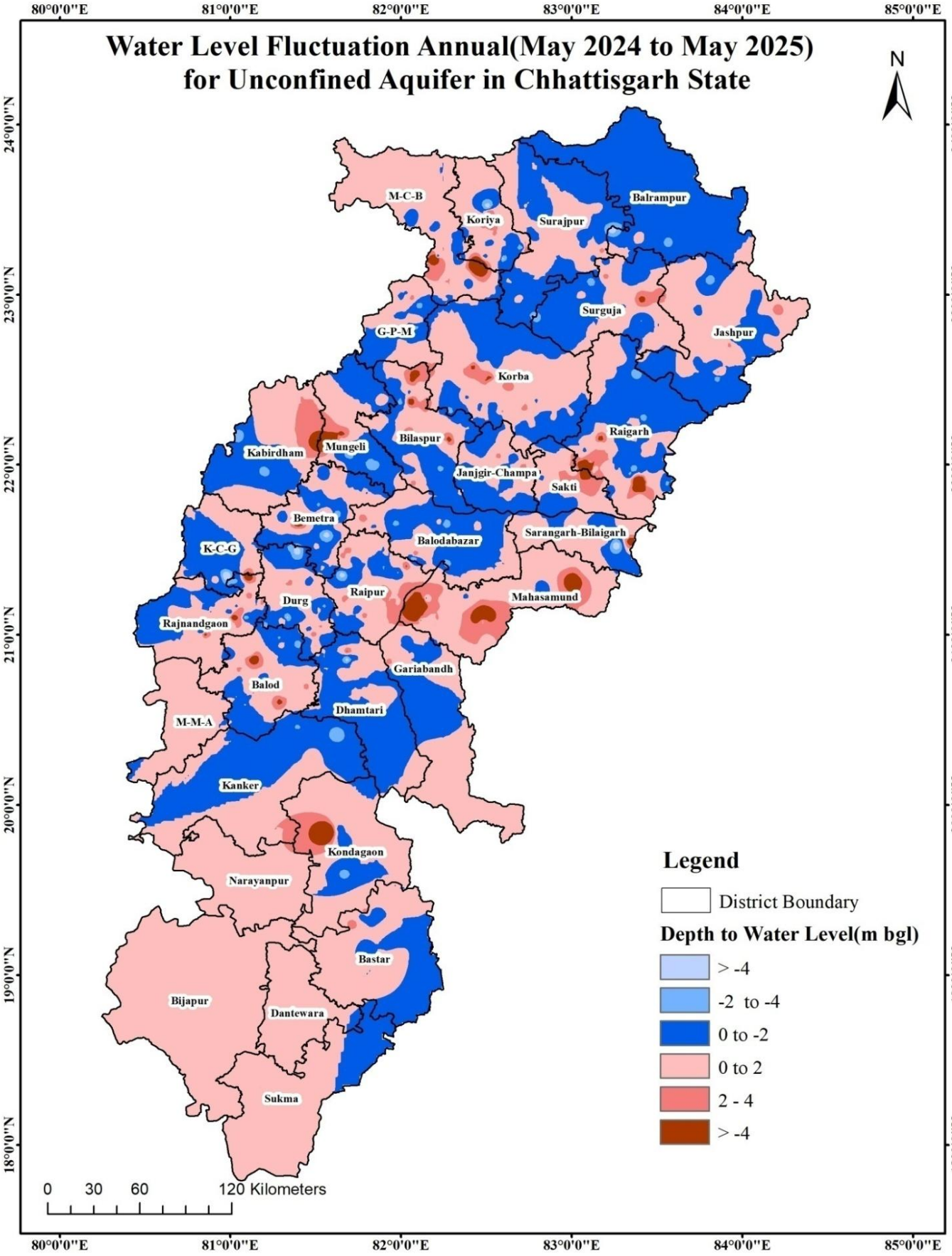

Figure-8: Annual Fluctuation in water level in unconfined aquifer (May 2024 vs May 2025)

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

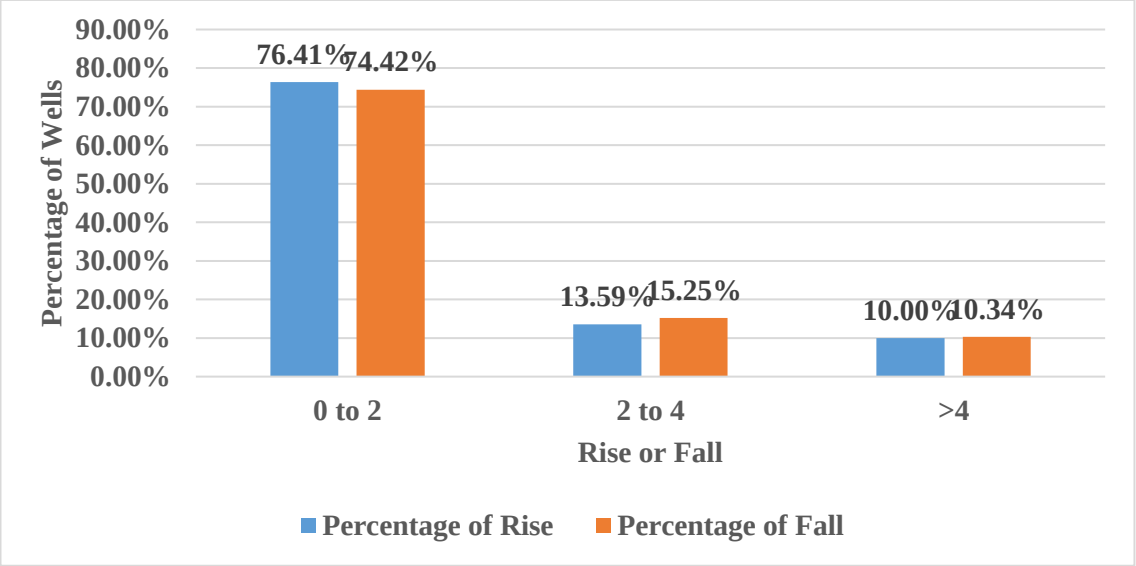

Figure-9: Percentage of wells showing rise and fall in WL in unconfined aquifer (May 2023 vs May 2025)

Rise: Out of 390 wells, water level rise of less than 2 m is recorded in 76.41 % of wells. 2 to 4 m in 13.59 % of wells and more than 4 m in 10.00 % of wells. Water level rise of less than 2 m is seen in all the districts, significantly in Balod, Bilaspur, Durg, Jashpur, Korba, Manendragarh-Chirmiri-Bharatpur, , Raigarh, Rajnandgaon, Surajpur and Surguja. Water level rise of 2 to 4 m is observed mainly in districts of Balod, Bemetara, Raigarh, Balodabazar, Bilaspur, Durg, Jashpur, Korba, Korea Mahasamund, Raipur, Surajpur and Surguja. Rise of more than 4 m is significantly observed in Balod, Bemetara, Durg, Jashpur,Bilaspur, Korba, Korea, Mahasamund, Raigarh and Rajnandgaon districts.

Fall: Out of 387 wells that have registered fall in water levels, 74.42 % have recorded less than 2 m while 15.25 % in the range of 2 to 4 m and remaining 10.34 % of wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Balod, Bemetara, Bilaspur, Dhamtari, Durg, Janjgir Champa, Jashpur, Korba, Manendragarh – Chirmiri - Bharatpur, Raigarh, Raipur, Rajanandgaon, Surajpur and Surguja districts. Fall of 2 to 4 m is observed mainly in Balodabazar, Dhamtari, Durg, Balrampur, Jashpur, Kabeerdham, Raigarh, Raipur, Mungeli Surajpur, Surguja and Uttar Bastar Kanker and more than 4 m is observed in Balod, Balodabazar-Bhatapara, Bemetara, Durg, Korba, Korea, Mungeli, Raipur, Raigarh and Rajnandgaon.

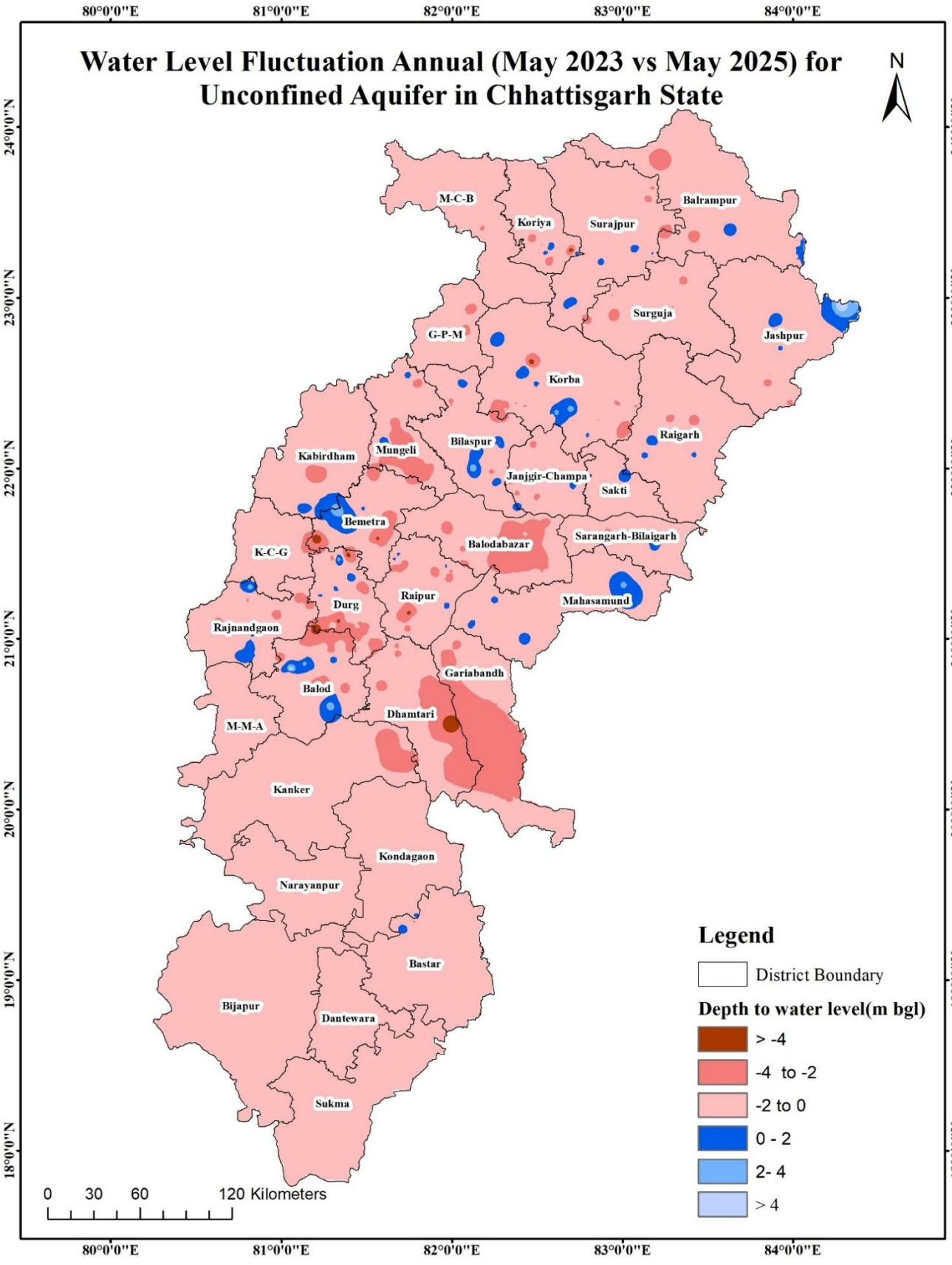

Figure-10: Annual Fluctuation in water level in unconfined aquifer (May 2023 vs May 2025)

8.1.3 Decadal Fluctuation in water level

8.1.3.1 Decadal Fluctuation in water level in Unconfined Aquifer May (2015-2024) vs May 2025

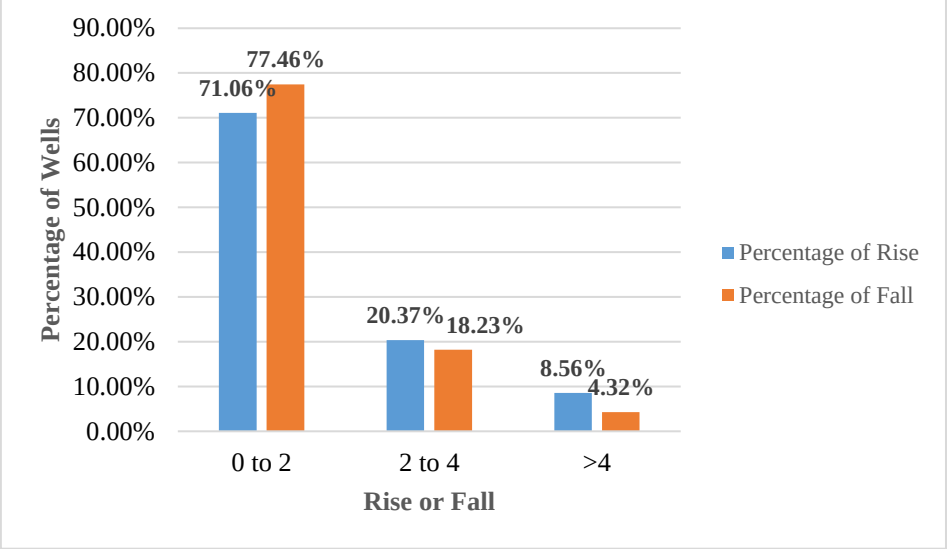

Figure-11: Percentage of wells showing rise and fall in WL in unconfined aquifer (Decadal May (2015-2024) vs May 2025)

Rise: Out of 432 wells, water level rise of less than 2 m is recorded in 71.06 % of wells, 2 to 4 m in 20.37 % of wells and more than 4 m in 8.56 % of wells. Water level rise of less than 2 m is seen in all the districts, significantly in Balod, Bemetara, Bilaspur, Durg, Dhamtari, Jashpur, Korba, Korea, Raigarh, Rajnandgaon, Surajpur and Surguja. Water level rise of 2 to 4 m is observed mainly in districts of Balod, Balodabazar, Bilaspur, Durg, Janjgir Champa, Jashpur, Korba, Korea Mahasamund, Raigarh, Raipur, Surajpur and Surguja. Rise of more than 4 m is significantly observed in Bemetara, Bilaspur, Korba, Raigarh, Rajnandgaon and Surajpur districts.

Fall: Out of 417 wells that have registered fall in water levels, 77.46 % have recorded less than 2 m while 18.23% in the range of 2 to 4 m and remaining 4.32% of wells registered water level 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, Jashpur, Korba, Raigarh, Rajanandgaon, Surajpur and Surguja districts. Fall of 2 to 4 m is observed mainly in Balod, Balodabazar, Bemetara, Bilaspur, Durg, Janjgir Champa, Jashpur, Korba, Korea, Raigarh, Raipur, Surajpur, Surguja and more than 4 m is observed in Bemetara, Durg and Rajnandgaon

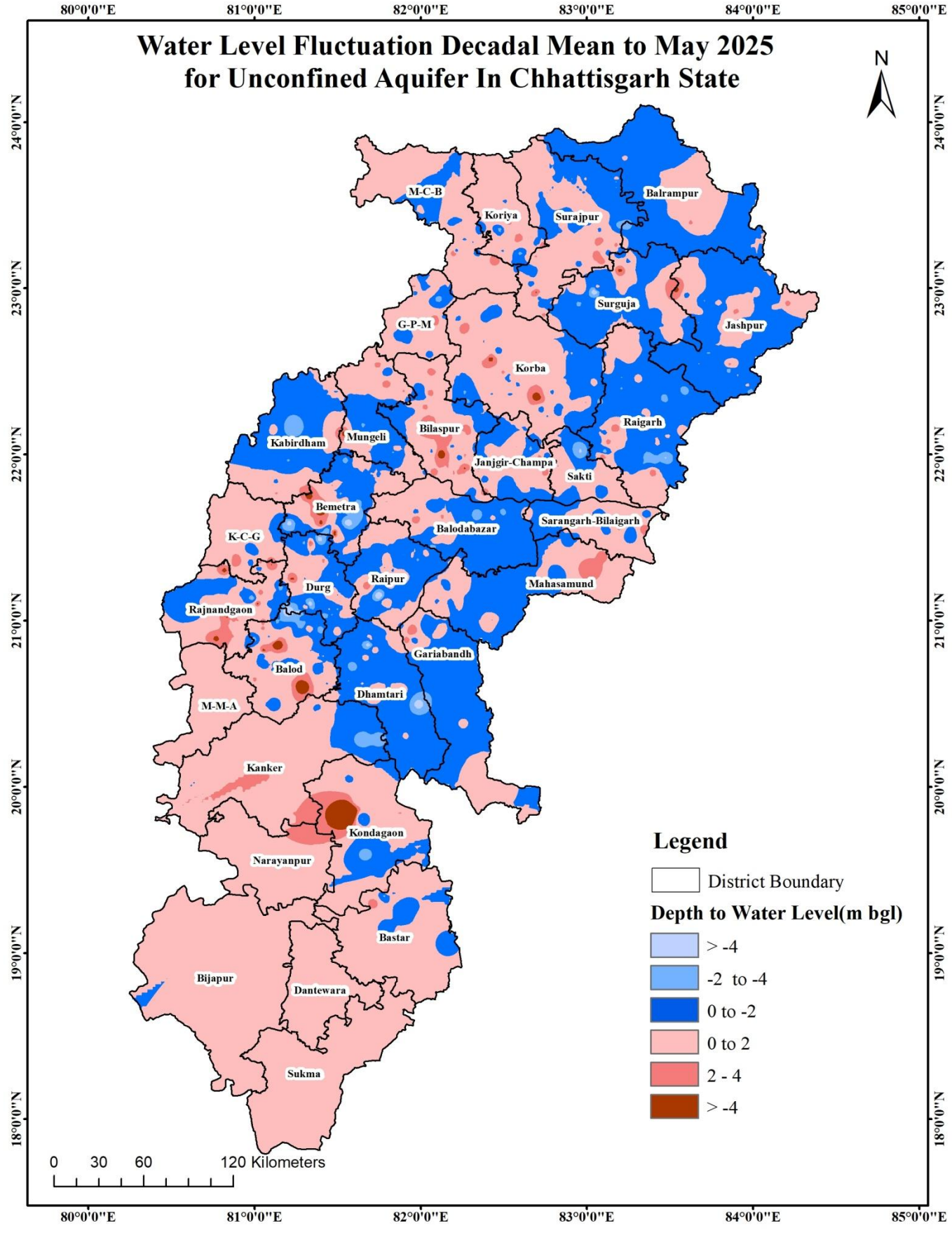

Figure-12: Annual water level fluctuation in unconfined aquifer (May (2015-2024) vs May 2025)

9.0 SUMMARY

As part of the National Hydrograph Network Stations (NHNS), 1250 wells have been identified in Chhattisgarh. During the pre-monsoon period, water levels were recorded from 1121 out of 1036 dug wells, and 201 out of 214 piezometers were monitored. In May, the state received 77.5 mm of rainfall, which is significantly higher than the normal rainfall of 16.4 mm—showing a departure of 373%.

In the dug wells that represent shallow aquifers, 484 wells had water levels between 5 to 10 m while 272 wells had levels between 2 to 5 m. These two ranges account for the majority of the wells. Deeper water levels between 10 to 20 m were found in 91 wells scttered mostly in the districts of Bemetara, Durg, Korba, Raigarh, Surajpur, and Surguja covering around 82.67% of the state area.
The annual water level fluctuation in these wells shows that about 40% of the state's geographical area has undergone a rise in water levels of up to 2 m whereas 17% of the area saw a fall of more than 4 m. The decadal comparison with May 2025 indicates that about 60% of the state has shown an overall rise in groundwater levels.

The piezometers representing peizometric head of deeper aquifers shows that 62 wells recorded peizometric levels in the 5 to 10 m range, representing about 10% of the state area. Additionally, 17 wells had levels between 2 to 5 m while 64 wells showed deeper levels of 10 to 20 m spread across approximately 57.54% of the geographical area. Deeper peizometric levels ranging from 20 to 40 m were observed in 45 wells located in the districts of Balodabazar, Bastar, Kabirdham, and Mahasamund representing around 82.67% of the state.

The annual water level fluctuation for the deeper aquifers shows that 41% of the area showed a rise in levels up to 2 m while 20% showed a fall of more than 4 m. The decadal comparison of piezometric levels indicates that 26% of the area showed a rise, while 44% showed a decline in groundwater levels.

10.0 Recommendations

Groundwater Level and Recommendations

The key observations and recommendations are outlined below:

1. Areas with Shallow Water Level (< 2 mbgl):

Districts like Balod, Balodabazar, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Gaurela Pendra Marwahi, Jangir Champa, Korba, Mahasamund, Mungeli Raipur and Rajnandgaon -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 Water Level (2 to 5 mbgl):

Raigarh, Balod, Bilaspur Jangir Champa, Korba, Rajnandgaon, Manendragarh-Chirimiri-Bharatpur, Jashpur, Bastar, Balodabazar, Surajpur and Sarangarh Bilaigarh.
Recommendations:

- Install rainwater harvesting systems in residential, industrial, and agricultural areas.
- Construct recharge wells and percolation tanks to boost groundwater levels.
- 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 Water Level (5 to 20 mbgl):

Areas of Balod, Balodabazar, Bemetara, Bilaspur, Dhamtari, Durg, Gariyaband, Gaurela Pendra Marwahi, Jangir Champa, Korba, Mahasamund, Mungeli Raipur, Rajnandgaon Surajpur and Surguja. 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.