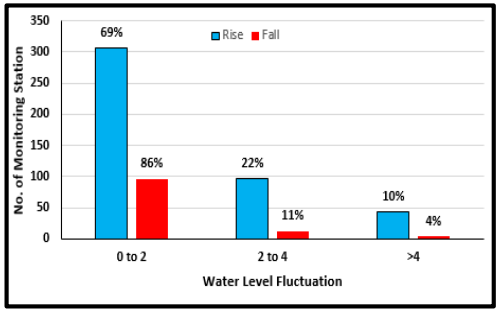

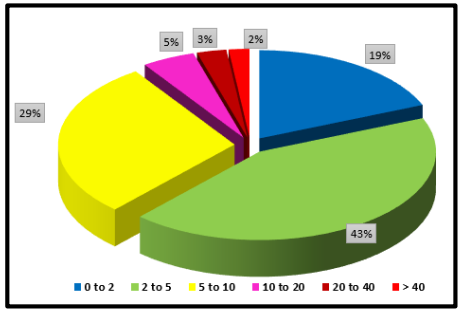

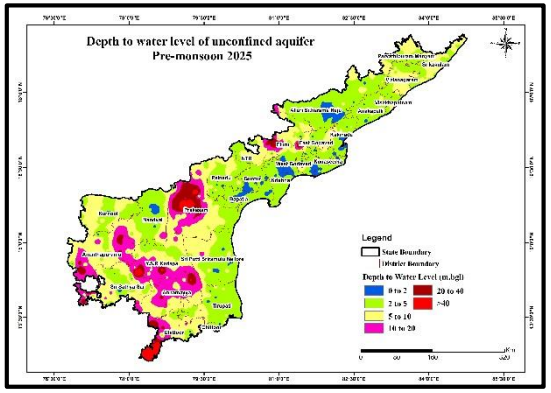

GROUND WATER LEVEL BULLETIN

MAY 2025

ANDHRA PRADESH

ABSTRACT

Ground water level Scenario during May-2025 highlighting the findings, status of ground water level in unconfined aquifer and its annual and decadal comparison.

CGWB, SOUTHERN REGION, HYDERABAD

1.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 attribute of groundwater regime monitoring is 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. A network of 25437 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 30.04.2023, located all over the country is being monitored.

2.0 STUDY AREA

Andhra Pradesh State is the 7th largest state in India covering geographical area of 1,62,975 Km^2. It lies between NL 12° 37' and 19° 09' and EL 76° 45' and 84° 47'. The State is bordered on the east by Bay of Bengal (coastline length ~970 km), south by Tamil Nadu and Karnataka, west by Karnataka and Telangana and north by Telangana, Chhattisgarh and Odisha states. Administratively, the stateis divided into 26 districts and governed by 668 revenue mandals with 28123 revenue villages. Total population of the state (2011 census) is ~8.45 crores (with male-female ratio of 993) of which 66.64% lives in rural area and 33.36% in urban area. The average density of population is 308 persons/km^2. The overall growth in total population during decade is ~9.2 % (2001 to 2011 census).

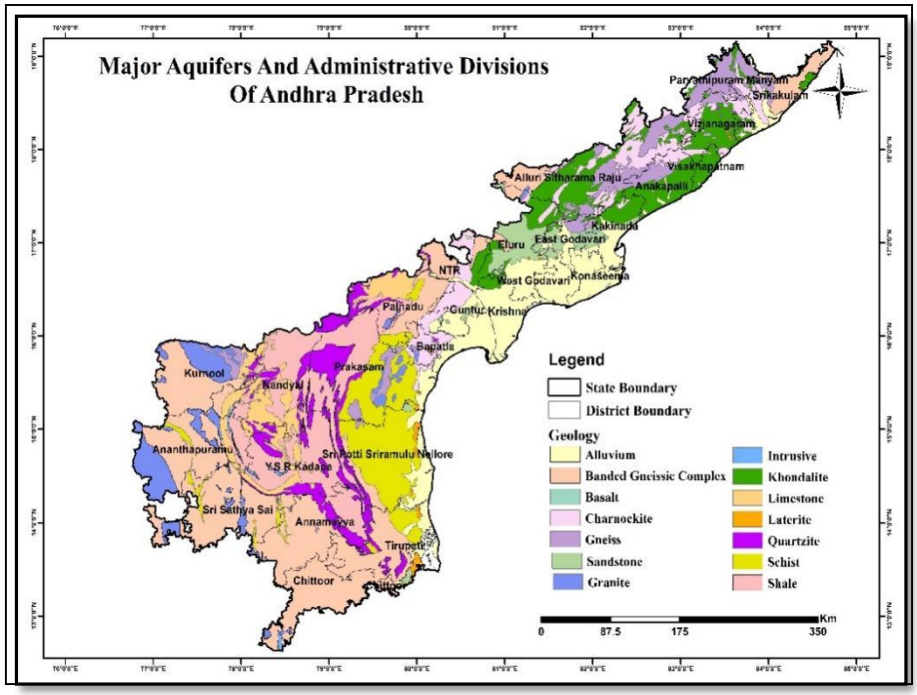

Figure-1: Map showing Major Aquifers and Administrative Divisions of Andhra Pradesh

Physiographically, Andhra Pradesh State can be divided into three distinct zones, viz., Coastal plains, Eastern Ghats and Western pediplains. The first two zones stretch from north-east to south-west in a narrow strip while 3rd zone occupy rest of the area. The elevation ranges from 0 to > 600 m above mean sea level (a.msl). Godavari and Krishna rivers and their tributaries drainthe northern and central part while Pennar river drains southern part of state before joining Bay of Bengal. There are 3 major basins and 11 medium river basins in the state.

The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. 85% of the State is underlain by hard rock formations like Archaeans, Pre-Cambrians, Cuddapahs, Kurnools and Deccan traps. The remaining 20% is underlain by soft rocks including Gondwanas, Rajahmundry sandstone and Recent Alluvium.

3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board, Southern Region, is monitoring changes in groundwater regime in Andhra Pradesh 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 May 2025 was 1446 which include 656 dug wells and 790 piezometers. In May 2025, 1446 wells monitored (1331 water level recorded and 22 wells were dry), while 93 wells could not be monitored due to various reasons like inaccessibility, filled-up, installation of pump units, road damaged, gate locked, etc. The number of operational wells after completion of January 2025 monitoring stands at 1446 which include 656 dug wells and 790 Bore wells. The district-wise breakup of the water level monitoring stations is given in **Table-1**.

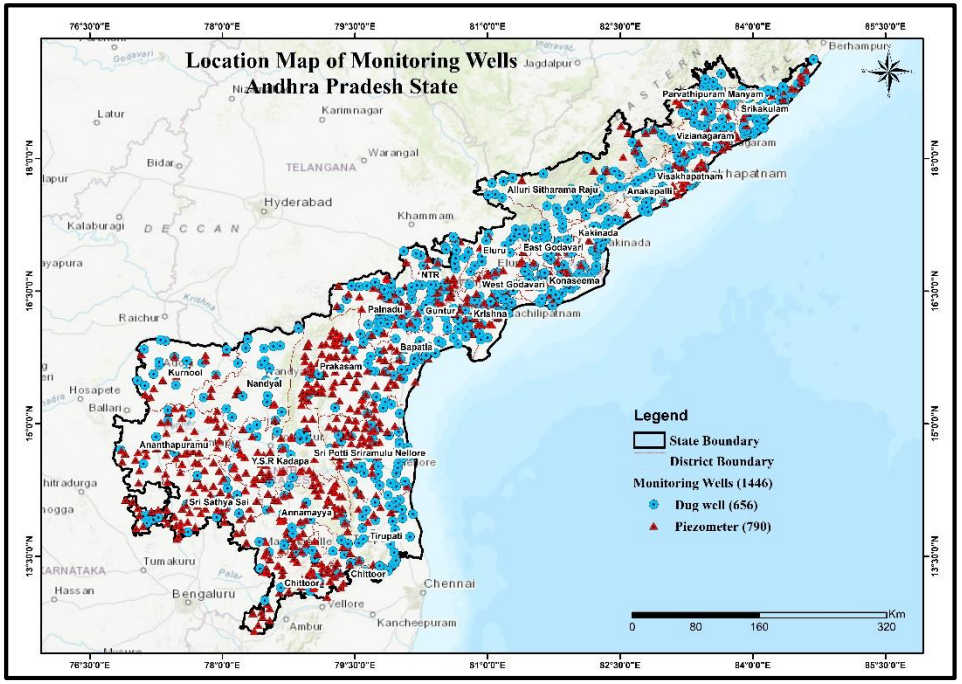

Figure- 2: Map showing locations of monitoring wells (GWMWS) in Andhra Pradesh state

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

SR. No.	District	Number of Water Level Monitoring Stations				
		2023	2024	2025		
		Total	Total	DW	PZ	Total
1	Alluri Sita Rama Raju	56	57	40	13	53
2	Anakapalli	23	28	24	4	28
3	Ananthapuramu	67	66	8	58	66
4	Annamayya	79	83	18	63	81
5	Bapatla	35	36	24	12	36
6	Chittoor	84	85	13	70	83
7	East Godavari	26	42	29	12	41
8	Eluru	51	25	20	4	24
9	Guntur	35	55	33	21	54
10	Kakinada	29	41	23	18	41
11	Konaseema	39	30	23	7	30
12	Krishna	81	85	27	55	82
13	Kurnool	29	32	17	15	32
14	Nandyal	24	27	22	5	27
15	NTR	29	39	19	19	38
16	Palnadu	67	74	45	28	73
17	Parvathipuram Manyam	27	28	22	6	28
18	Prakasam	116	122	23	98	121
19	Sirkalulam	51	111	44	64	108
20	SPS Nellore	128	91	16	72	88
21	Sri Sathya Sai	43	80	51	29	80
22	Tirupati	48	50	34	15	49
23	Visakhapatnam	20	32	15	16	31
24	Vizianagaram	44	45	30	14	44
25	West Godavari	33	36	21	14	35
26	YSR Kadapa	70	73	15	58	73
	Total	**1334**	**1473**	**656**	**790**	**1446**

4.0 RAIN FALL

The rainfall data collected and compiled from weekly and monthly weather reports from Andhra Pradesh Water Resources Information and Management System (APWRIMS) were used to analyze the rainfall for the period June 2024 – May 2025. Table-2 gives the district-wise rainfall data for the period June-May 2024-2025 & June-May 2023-2024, Normal and the departure of June-May 2025 rainfall with other periods.

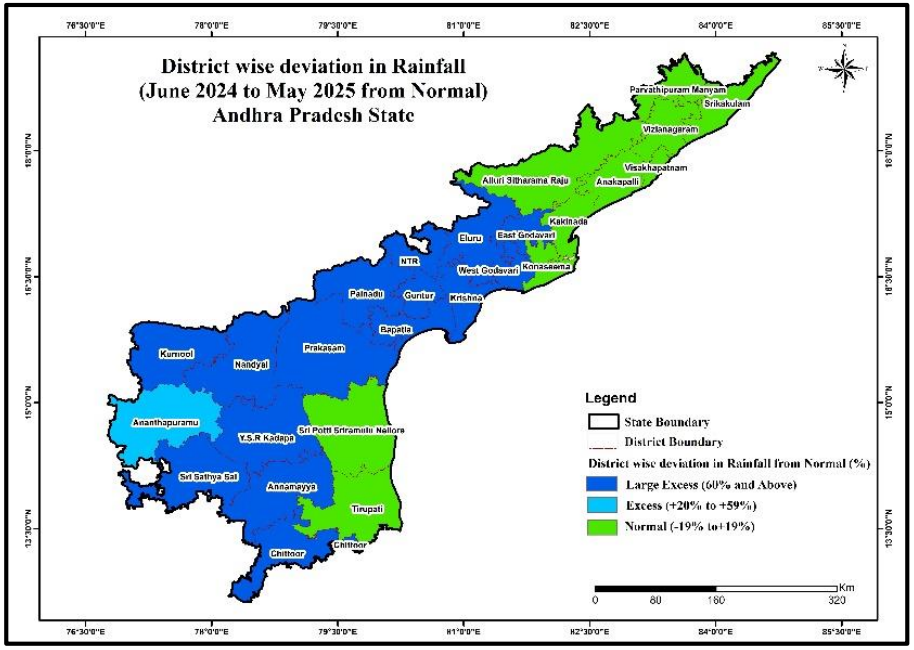

Figure-3: Rainfall deviation (June 2024 –May 2025) from normal rainfall

Table-2: District-wise variability of rainfall in Andhra Pradesh (2024 to 2025)

S. No	District	Rainfall (June 2024 to May 2025)	Rainfall (June 2023 to May 2024)	Normal Rainfall	Departure from 2023-24 (%)	Departure from Normal (%)	Status
1	Alluri Sitharama Raju	1445.01	1170.21	1274.04	23%	13%	Normal
2	Anakapalli	1352.25	960.08	1162.69	41%	16%	Normal
3	Ananthapuramu	850.19	446.13	509.37	91%	67%	L. Excess
4	Annamayya	1061.54	709.67	737.33	50%	44%	Excess
5	Bapatla	1221.34	1131.62	922.39	8%	32%	Excess
6	Chittoor	1282.05	932.97	903.97	37%	42%	Excess
7	East Godavari	1377.04	982.13	1136.06	40%	21%	Excess
8	Eluru	1558.41	1078.77	1057.72	44%	47%	Excess
9	Guntur	1371.47	1119.06	892.37	23%	54%	Excess
10	Kakinada	1284.44	883.44	1130.69	45%	14%	Normal
11	Konaseema	1460.54	923.86	1290.32	58%	13%	Normal
12	Krishna	1345.15	1200.9	1042.29	12%	29%	Excess
13	Kurnool	773.98	476.3	606.3	62%	28%	Excess
14	Nandyal	933.62	527.94	717.02	77%	30%	Excess
15	NTR	1522.96	1001.51	1030.53	52%	48%	Excess
16	Palnadu	1099.01	849.11	773.09	29%	42%	Excess
17	P. Manyam	1270.09	1067.56	1155.89	19%	10%	Normal
18	Prakasam	1015.42	677.56	835.95	50%	21%	Excess
19	SPS Nellore	1190.37	813.92	1045.32	46%	14%	Normal
20	Sri Sathya Sai	925.66	480.21	586.04	93%	58%	Excess
21	Srikakulam	1247.11	852.56	1156.02	46%	8%	Normal
22	Tirupati	1304.35	1018.86	1118.8	28%	17%	Normal
23	Visakhapatnam	1195.87	855.5	1107.35	40%	8%	Normal
24	Vizianagaram	1272.3	937.91	1098.32	36%	16%	Normal
25	West Godavari	1485.92	1088.89	1221.43	36%	22%	Excess
26	Y.S.R Kadapa	883.92	554.14	679.05	60%	30%	Excess
	Total	**1220**	**875**	**969**	**44%**	**29%**	**Excess**

Category was defined based on the departures from normal values:
Normal: -19% to 19%; **Excess**: 20% to 59%; **L. Excess**: > 60%; **Deficit**: -20% to -59%

5.0 GROUND WATER LEVEL SCENARIO (MAY 2025)

5.1 SHALLOW AQUIFER (UNCONFINED)

5.1.1 DEPTH TO WATER LEVEL

Depth to Water Level in Unconfined Aquifer (May 2025)

Analysis of depth to water level data of 738 wells shows water levels vary between 0.05 m bgl (Bapatla district) to 79.49 m bgl (Chittoor district). Water level of less than 2 mbgl is recorded in 19% of wells, between 2 to 5 mbgl in 43% of wells, between 5 to 10 mbgl in 29% of wells, between 10 to 20 mbgl in 5% of wells, between 20-40 m bgl in 3% of wells and water level more than 40 m bgl is registered in 2% of wells. (Figure-4)

Depth to water level map of May 2025 (Figure-5) for unconfined aquifer shows that shallow water level of less than 2 m bgl is mainly seen in parts of ASR, Kakinada, Konaseema, Anakapalli, Nandyal, East Godavari, West Godavari, SPS Nellore, Tirupati and Bapatla districts covering an area of 4% of state. Water level of 2 to 5 m bgl is observed throughout the state in all the districts covering an area of 46% of the state. Depth to water level of 5 to 10 m bgl is observed mainly in Rayalseema area covering Kurnool, Ananthpuramu, Sri Sathya Sai, Chittoor, Prakasam, Annamayya, Palnadu Tirupati and also in Vizianagaram, Srikakulam, P Manyam, Eluru and NTR districts covering 33% of the area of state. Water level of 10 to 20 m bgl is mainly observed in Rayalseema area in YSR Kadapa, Annamayya, Prakasam, Eluru, Chittoor, Nandyal and Ananthpuramu districts covering 12% area of state. Deeper water levels of more than 20 m occur as isolated pockets covering mainly Prakasam, YSR Kadapa, Ananthpuramu, Chittoor, Eluru and small part of NTR & East Godavari districts covering only 4% area of state.

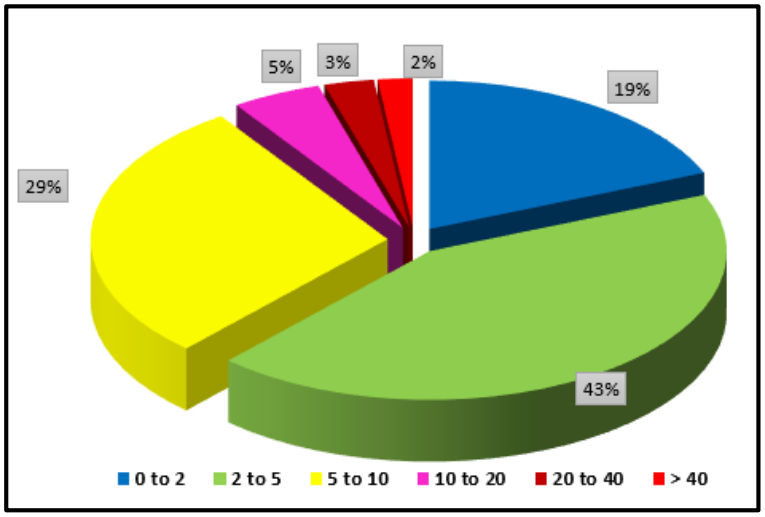

Figure 4: Percentage of wells in different water level ranges in an unconfined aquifer

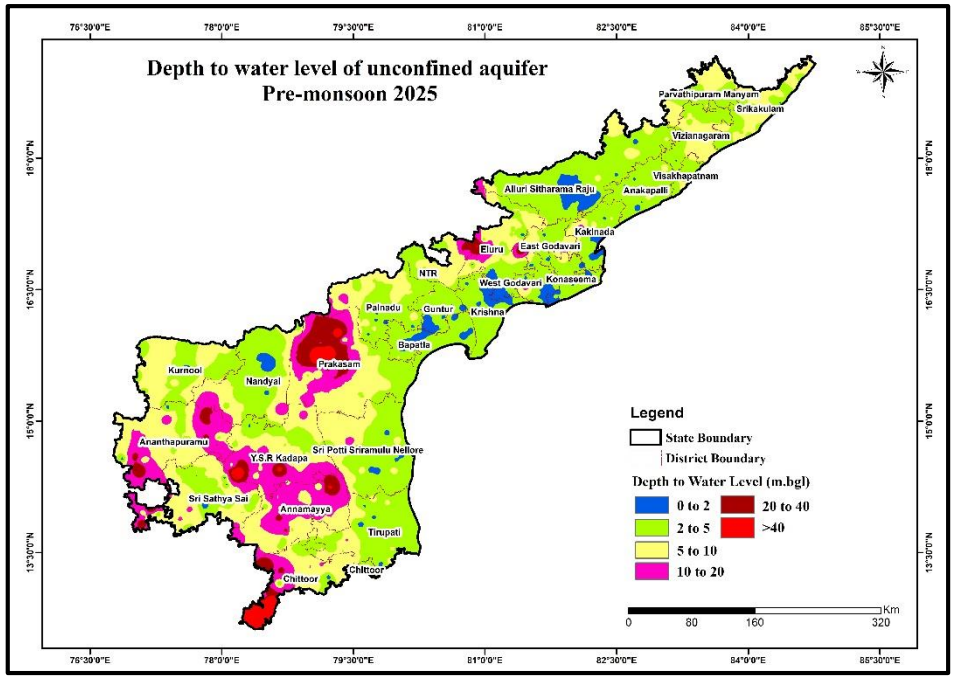

Figure 5: Depth to water level of unconfined aquifer during Pre-monsoon 2025

5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer (Pre-monsoon 2024 to Pre-monsoon 2025)

Analysis of data of 687 wells shows that water level rise is recorded in 86% wells (591 wells), water level fall is recorded in 14% wells (96 wells).

Rise in Water Level

Out of 591 wells, water level rise of less than 2 m is recorded in 65% wells, 2 to 4 m in 23% wells and more than 4 m in 12% of the wells. Water level rise of less than 2 m is seen in almost all districts of the state. Water level rise of 2 to 4 m is observed mainly in Anakapalli, ASR, Kakindada, Eluru, West Godavari, Ananthapuramu, Chittoor, Prakasam, SPS, Annamayya and Y.S.R districts. Rise of more than 4 m is seen majorly in Nandyal, Ananthapuramu, Sri Sathya Sai, Annamayya, Prakasam, Eluru and ASR districts.

Fall in Water Level

Out of 96 wells that have registered fall in water levels, 65% have recorded less than 2 m while 10% in the range of 2 to 4 m and remaining 25% wells registered water level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of ASR, Ananthapuramu, Chittoor, Prakasam, Palnadu, Y.S.R Kadapa, NTR, small patches in Srikakulam and ASR districts. Fall of 2 to 4 m is observed mainly in Prakasam, Y.S.R Kadapa, Ananthapuramu, Eluru and NTR districts. Fall of >4 m is mainly observed in Chittoor, Prakasam, Y.S.R Kadapa, Ananthapuramu, Eluru and NTR districts.

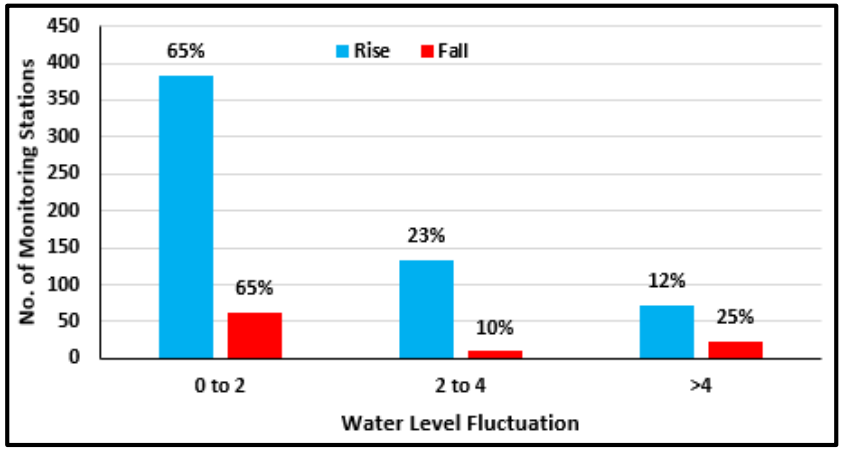

Figure 6: Percentage of wells showing rise and fall in WL in an unconfined aquifer (Pre-monsoon 2024 to Pre-monsoon 2025)

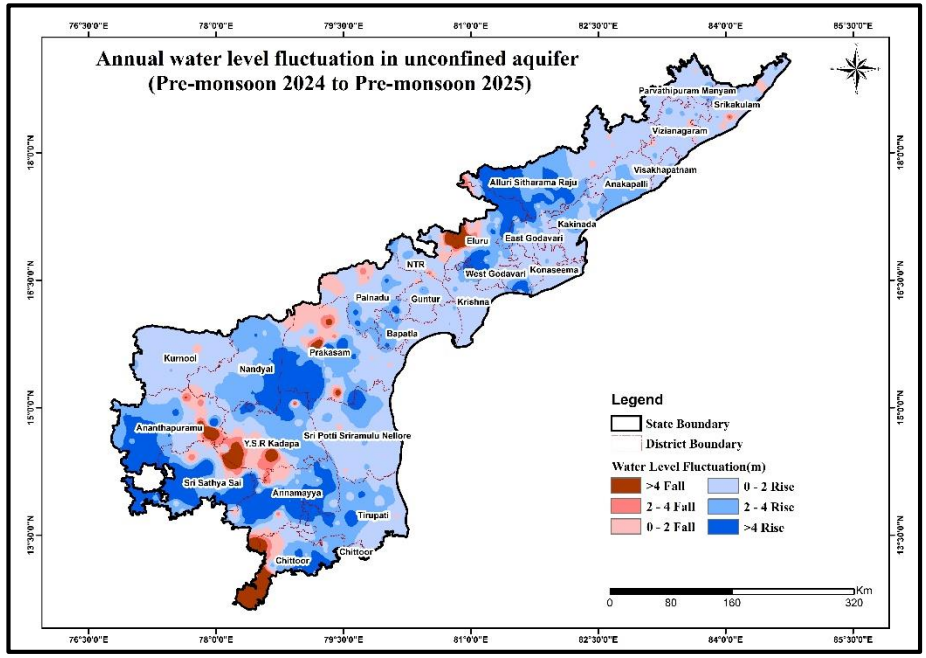

Figure 7: Annual water level fluctuation in unconfined aquifer (Pre-monsoon 2024 to Pre-monsoon 2025)

Annual Fluctuation of Water Level in Unconfined Aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

Analysis of data of 687 wells shows that water level rise is recorded in 42% wells (291 wells), water level fall is recorded in 58% wells (396 wells).

Rise in Water Level

Out of 291 wells, water level rise of less than 2 m is recorded in 76% wells, 2 to 4 m in 14% wells and more than 4 m in 10% of the wells. Water level rise of less than 2 m is seen in almost all of districts of the state except Kurnool. Water level rise of 2 to 4 m is observed mainly in Krishna, A.S.R, Eluru, S.P.S Nellore, Prakasam, Y.S.R Kadapa, Sri Sathya Sai, P. Manyam and Annamayya districts. Rise of more than 4 m is seen majorly in Y.S.R Kadapa, SPS Nellore, Sri Sathya Sai, Prakasam, Krishna, Eluru and A.S.R districts

Fall in Water Level

Out of 396 wells that have registered fall in water levels, 73% have recorded less than 2 m while 15% in the range of 2 to 4 m and remaining 12% wells registered water level fall of more than 4 m. Fall of less than 2 m is seen in all districts. Fall of 2 to 4 m is observed mainly in Palnadu, Parakasam, Y.S.R Kadapa, Kurnool, Nandyal, Annamayya and small patches in NTR, Eluru, P Manyam districts. Fall of >4 m is mainly observed in Palnadu, Parakasam, Y.S.R Kadapa, Ananthapuramu, Annamayya, NTR, Eluru and Chittoor districts

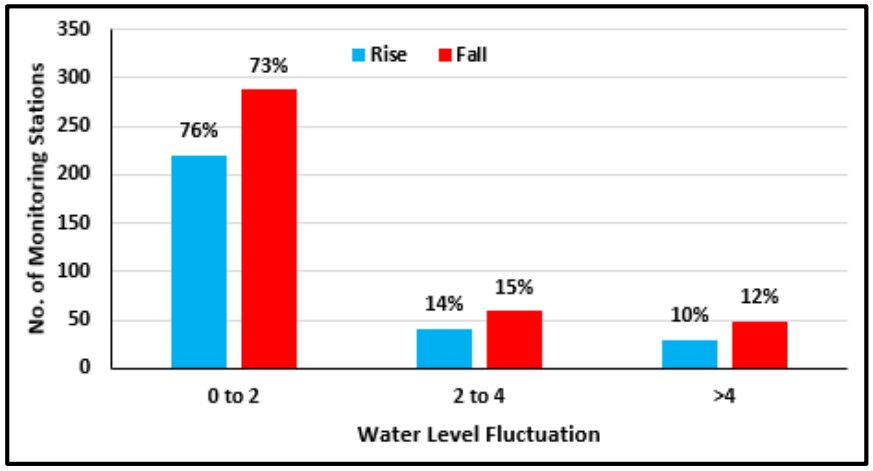

Figure 8: Percentage of wells showing rise and fall in WL in an unconfined aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

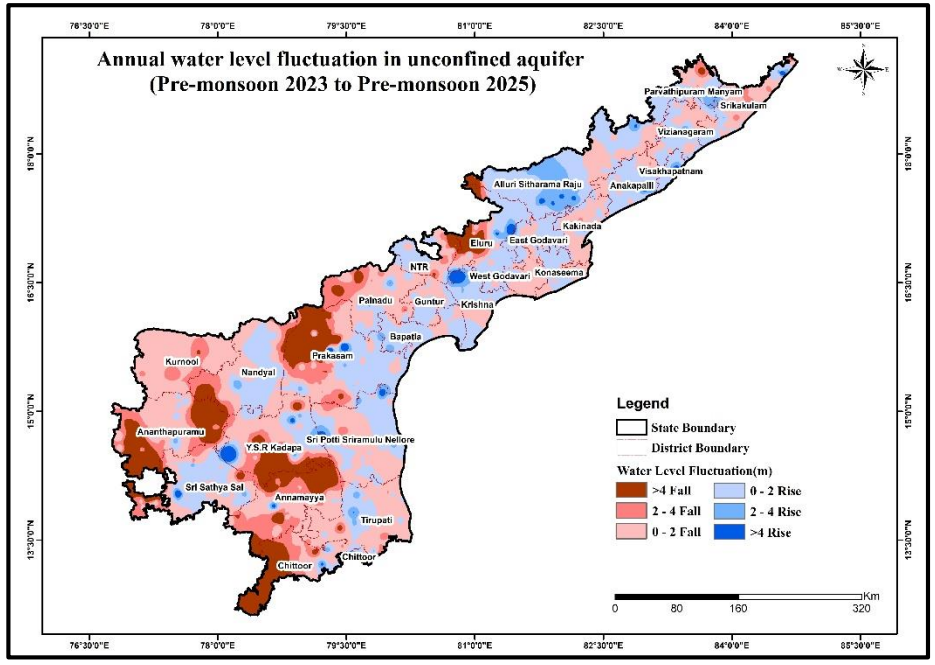

Figure 9: Annual water level fluctuation in unconfined aquifer (Pre-monsoon 2023 to Pre-monsoon 2025)

5.1.4 DECADAL FLUCTUATION IN WATER LEVEL

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

Analysis of data of 557 wells shows that water level rise is recorded in 80% wells (445 wells), water level fall is recorded in 20% wells (112 wells).

Rise in Water Levels:

Out of 445 wells, water level rise of less than 2 m is recorded in 69% wells, 2 to 4 m in 22% wells and more than 4 m in 10% of the wells. Water level rise of less than 2 m is seen in all of the districts of the State. Water level rise of 2 to 4 m is mainly observed in Ananthapuramu, Sri Sathya Sai, Annamayya, Tirupati, SPS Nellore, YSR Kadapa, Nandyal, Prakasam, Eluru, East Godavarai and ASR districts. Water level rise of more than 4 m is significantly observed in parts Prakasam, Eluru, East Godavari, Annamayya, SPS Nellore, YSR Kadapa, Sri Sathya Sai, ASR and Nandyal districts.

Fall in Water Levels:

Out of the 112 wells that have registered fall in water levels, 86% have recorded less than 2 m while 11% 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 recorded in small patches in Annamayya, YSR Kadapa, Ananthapuramu, Palnadu and in North eastern districts. Fall of 2 to 4 m is observed in very small patches in Annamayya, YSR Kadapa, Sri Sathya Sai, Palnadu NTR and P Manyam districts. Fall beyond 4 mis seen as isolated patches in YSR Kadapa, Annamayya, Palnadu and NTR districts.

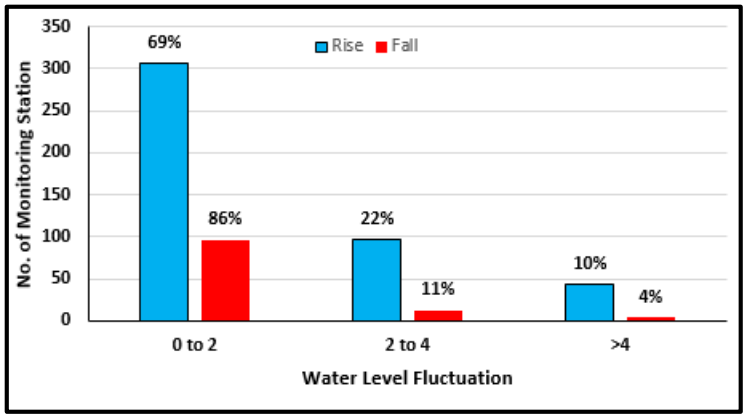

Figure 10: Percentage of wells showing rise and fall in WL in unconfined Aquifer

(Decadal Mean Pre-monsoon (2015-2024) to Pre-monsoon 2025)

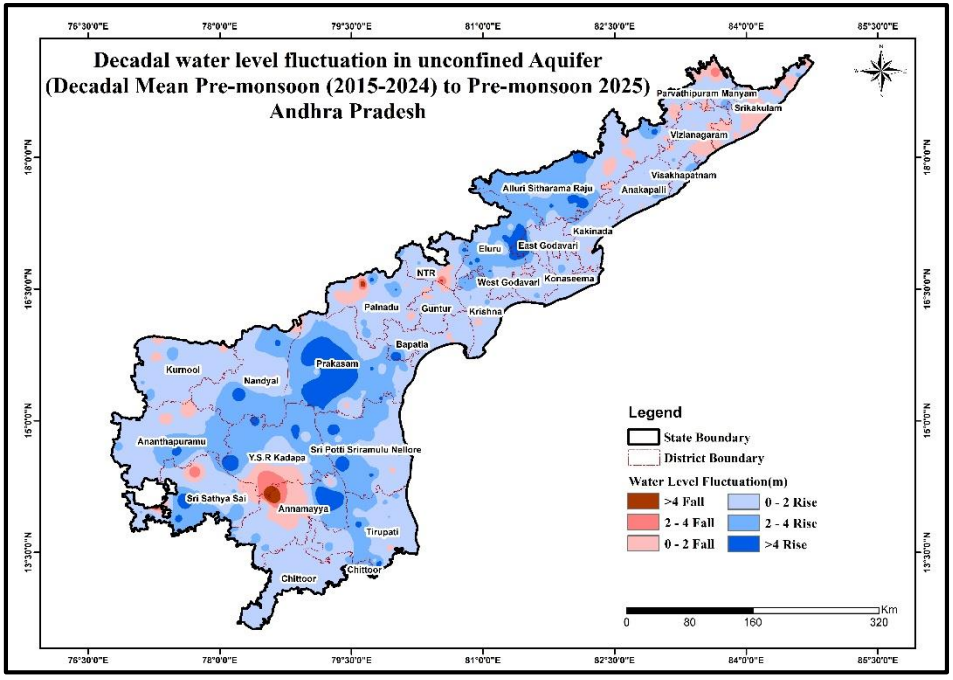

Figure 11: Decadal water level fluctuation in unconfined Aquifer

(Decadal Mean Pre-monsoon (2015-2024) to Pre-monsoon 2025)

6.0 SUMMARY

As a component of the National Ground Water Monitoring Programme, the CGWB, SR, Hyderabad conducts monitoring of the ground water conditions on a quarterly basis: in January, pre-monsoon May, August, and post- monsoon November. Additionally, a yearly assessment of ground water quality is performed in May. As of March 2025, the Southern Region of the Central Ground Water Board supervises 656 dug wells and 790 piezometers. This comprehensive report aims to portray the variations in the state's groundwater conditions across different aquifers.

During May 2025, 83% of the state's territory exhibited a water depth of up to 10 meters below the ground level in unconfined aquifers. Areas with deeper water levels exceeding 20 meters accounted for 4% of the state's territory in unconfined aquifers mainly in Prakasam, YSR Kadapa, Ananthapuramu, Chittoor, Eluru and small part of NTR & East Godavari districts.

During the period from June 2024 to May 2025, the state experienced a substantial increase in rainfall, recording a 44% rise compared to the previous year (June 2023 to May 2024) and a 29% departure above the long-term normal rainfall levels. This marked excess in rainfall has played a crucial role in replenishing groundwater resources across the region. As a result, a noticeable improvement in groundwater levels was observed in May 2025, reflecting the positive impact of the abundant rainfall on the overall water table conditions.

Annual fluctuation analysis (May 2024 to May 2025) indicated that 86% of wells recorded a rise in water levels, while 14% showed a decline. When compared to a two-year span (May 2023 to May 2025), 42% of wells recorded a rise and 58% showed a fall, suggesting variability depending on localized factors. However, decadal comparisons (mean of 2015–2024 vs. May 2025) showed long-term improvement, with 80% of wells recording a rise and only 20% showing a fall in groundwater levels.

7.0 RECOMMENDATIONS

Analysis of groundwater scenario of Andhra Pradesh state reveals that the dynamics of groundwater is highly related with the variation in rainfall. Hence the following recommendations are submitted:

- **Enhance Monsoon Recharge**: Implement rainwater harvesting structures such as check dams and percolation tanks at strategic locations identified in the Artificial Recharge Master Plan. Protect and restore natural recharge zones outlined in the District Recharge Plan to maximize monsoon recharge.
- **Promote Water-Efficient Agriculture**: Encourage the adoption of micro-irrigation systems like drip and sprinkler methods to minimize groundwater extraction. In drought-prone regions of Andhra Pradesh, promote cultivation of less water-intensive crops and implement crop diversification strategies to shift away from high water-demanding crops like paddy and sugarcane.
- **Regulate Groundwater Extraction in Deep Water Zones**: In areas with groundwater levels exceeding 20 meters, enforce restrictions on borewell dependency by offering incentives for sustainable water use. In urban settings, reduce reliance on deep aquifers by enhancing the availability of treated surface water for domestic needs. Encourage the reuse of treated wastewater for non-potable applications.
- **Promote Afforestation for Recharge**: Initiate large-scale afforestation programs in degraded and water-stressed regions to improve soil moisture retention and facilitate natural recharge. Prioritize native tree species with deep root systems to support long-term groundwater sustainability.
- **Strengthen Community Engagement**: Expand public awareness campaigns to educate farmers and industrial users on efficient water use practices. Establish community-based water conservation groups to foster participatory groundwater management and stewardship.


CENTRAL GROUND WATER BOARD
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