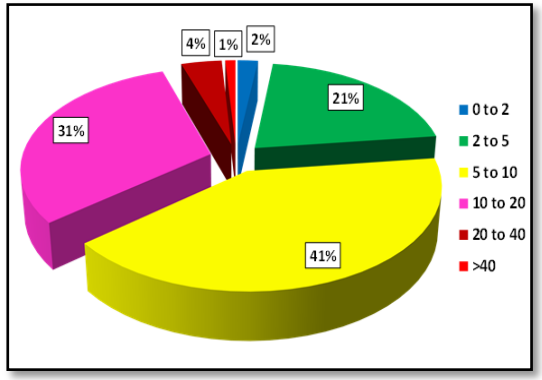

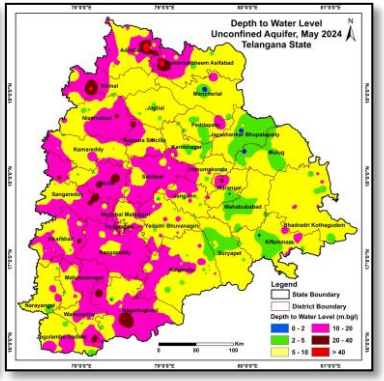

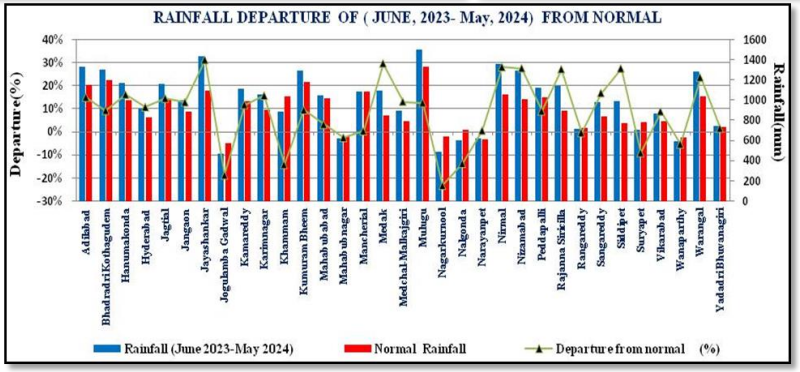

GROUND WATER LEVEL BULLETIN

May 2024

TELANGANA STATE

ABSTRACT

Ground water level Scenario during May-2024 highlighting the findings, status of ground water level in different aquifers and its seasonal, annual and decadal comparison.

CGWB, SOUTHERN REGION, HYDERABAD

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 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, March/April/May, August and November. The regime monitoring started in the year 1969 by Central Groundwater Board. A network of 1281 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 31.03.2024, located in Telangana State is being monitored.

2.0 STUDY AREA

Telangana State is the 29th State (Act, 2014) formed in India covering geographical area of 1,12,077 Km^2 (after transferring 107 villages from Khammam district to residual Andhra Pradesh). It lies between NL 15° 48' and 19° 54'and EL 77° 12' and 81° 50'.The state is bordered by Maharashtra state in the north, Karnataka state in the west, Andhra Pradesh state in the south and east and Chhattisgarh state in the north-east. Administratively, the State comprises of 33 districts and governed by 620 revenue mandals (blocks/tehsils) with 10,434 revenue villages. The largest district is Bhadradri Kothagudem whereas Hyderabad is the smallest district. The total population of the state is ~3.5 crores with sex ratio of 988 (2011 census), of which 61 % lives in rural area and 39% in urban area. The density of population is 312 per sq. km. The decadal growth in population is ~13.6 % (2001 to 2011 census).

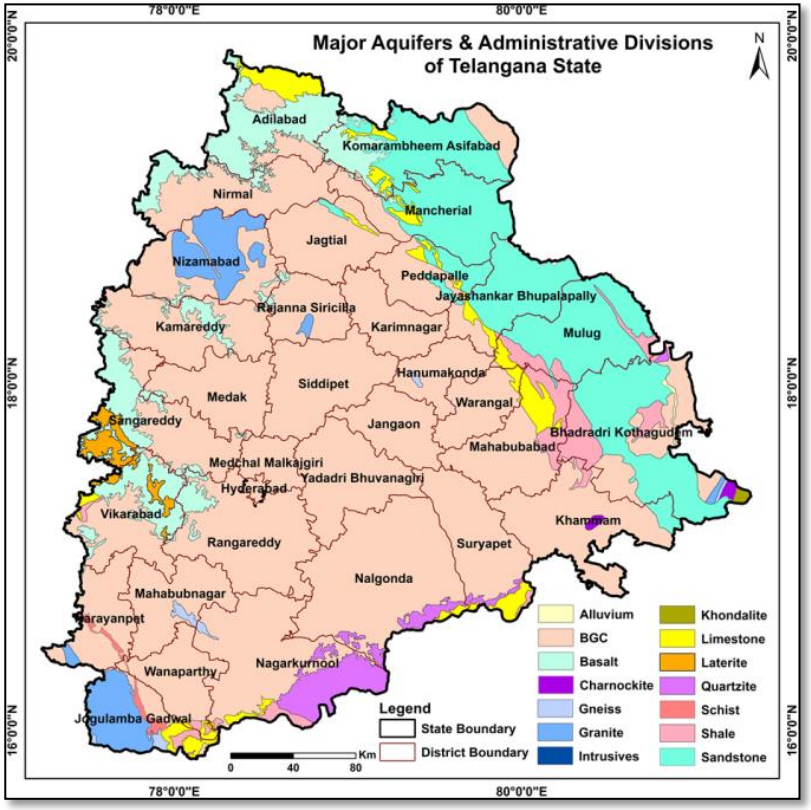

Figure-1: Map showing major aquifers and administrative divisions of Telangana State

Physiographically, Telangana state is occupied by western Pediplains except a fringe of Eastern Ghats in the northeastern part of Khammam district. The Pediplains depict rolling topography with flat to undulating tracts. The state extends largely between elevations of 150 to 600 mamsl except at places where it is overlain by basaltic lava flows, the elevation of which ranges from 600 to 900 m amsl.

The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. Nearly 81 % of the state area is underlain by hard rocks (consolidated formations) belonging to the Peninsular Gneissic Complex, Dharwar and Eastern Ghats of Archaean to Middle Proterozoic age, Pakhal Group of rocks belonging to Middle to Upper Proterozoic age and Deccan Traps.

The remaining part of the state is underlain by semi consolidated sedimentary formations comprising Gondwanas, Tertiaries and Sub-Recent to Recent Unconsolidated Alluvium.

3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board, Southern Region, is monitoring changes in groundwater regime in Telangana 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 January, 2024 was 1281 which include 274 dug wells and 1007 piezometers. In May 2024, 1214 wells monitored (1190 water level recorded and 24 wells were dry), while 67 wells (9 dug wells and 58 piezometers) could not be monitored due to various reasons like inaccessibility, filled up, installation of pump units, road damaged, gate locked, etc. No wells were abandoned or included in May 2024 monitoring period. The number of operational wells after completion of May 2024 monitoring stands at 1281, which include 274 dug wells and 1007 Bore wells. The district-wise breakup of the water level monitoring stations is given in **Table-1**.

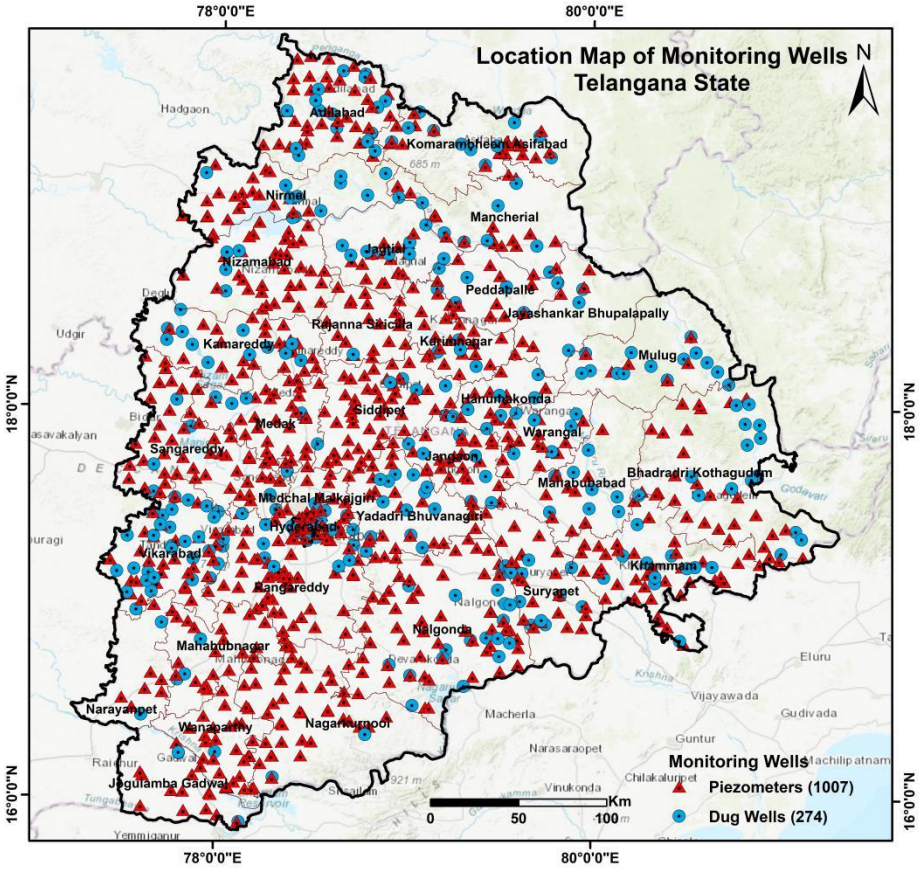

Figure- 2: Map showing locations of monitoring wells (NHNS) in Telangana State

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

SR. No.	District	Number of Water Level Monitoring Stations				
		2022	2023	2024		
		Total	Total	DW	PZ	Total
1	Adilabad	**51**	55	16	39	55
2	Bhadradri Kothagudem	**73**	73	15	58	73
3	Hanamkonda	**18**	18	4	14	18
4	Hyderabad	**25**	28	8	20	28
5	Jagtial	**25**	24	8	16	24
6	Jangaon	**42**	42	9	33	42
7	Jayashankar Bhupalapally	**14**	14	3	11	14
8	Jogulamba Gadwal	**17**	17	3	14	17
9	Kamareddy	**25**	39	12	27	39
10	Karimnagar	**23**	26	5	21	26
11	Khammam	**68**	69	12	57	69
12	Komarambheem Asifabad	**39**	42	10	32	42
13	Mahabubabad	**21**	21	8	13	21
14	Mahabubnagar	**28**	26	3	23	26
15	Mancherial	**32**	33	10	23	33
16	Medak	**38**	38	5	33	38
17	Medchal Malkajgiri	**20**	39	3	36	39
18	Mulugu	**23**	21	14	7	21
19	Nagarkurnool	**46**	47	2	45	47
20	Nalgonda	**80**	81	17	64	81
21	Narayanpet	**12**	12	2	10	12
22	Nirmal	**34**	33	8	25	33
23	Nizamabad	**42**	42	5	37	42
24	Peddapalli	**18**	20	6	14	20
25	Rajanna Sircilla	**21**	21	1	20	21
26	Rangareddy	**73**	95	13	82	95
27	Sangareddy	**60**	65	6	59	65
28	Siddipet	**51**	53	5	48	53
29	Suryapet	**34**	34	11	23	34
30	Vikarabad	**66**	65	29	36	65
31	Wanaparthy	**25**	26	1	25	26
32	Warangal	**20**	20	7	13	20
33	Yadadri Bhuvanagiri	**43**	42	13	29	42
	Total	**1207**	**1281**	**274**	**1007**	**1281**

4.0 RAIN FALL

The rainfall data collected and compiled from weekly and monthly weather reports from India Meteorological Department were used to analyze the rainfall for the period June 2023 - May 2024. Table-2 gives the district-wise rainfall data for the period June 2023- May 2024, normal and the departure of June 2022- May 2023 rainfall with other periods.

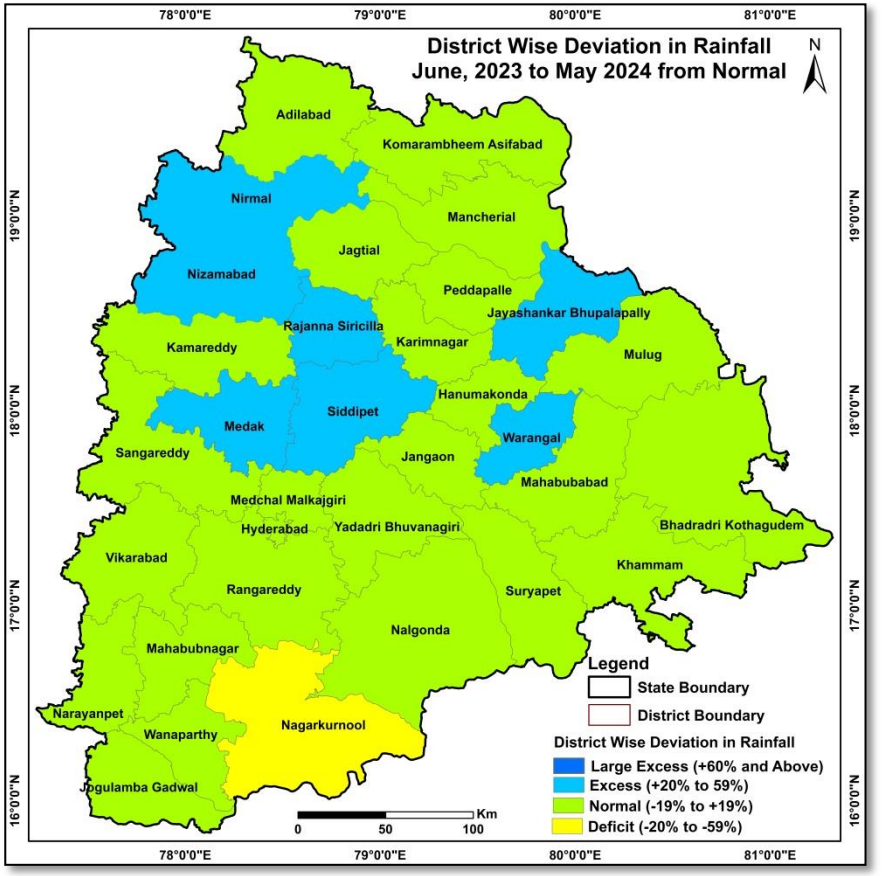

Figure-3: Rainfall deviation (June 2023-May 2024) from normal rainfall

Table-2: District wise variability of rainfall in Telangana State (2024)

S NO	District	Rainfall (June 2023-May 2024)	Rainfall (June 2022-May 23)	Normal Rainfall	Departure from 2022 (%)	Departure from normal (%)	Remark
1	2	3	4	5	6	7	8
1	Adilabad	1332	1728	1158	-23%	15%	Normal
2	Bhadradri Kothagudem	1311	1663	1200	-21%	9%	Normal
3	Hanumakonda	1171	1430	1008	-18%	16%	Normal
4	Hyderabad	920	1118	831	-18%	11%	Normal
5	Jagtial	1164	1777	1015	-35%	15%	Normal
6	Jangaon	1004	1425	890	-29%	13%	Normal
7	Jayashankar	1443	1834	1100	-21%	31%	Excess
8	Jogulamba Gadwal	471	850	579	-45%	-19%	Normal
9	Kamareddy	1115	1463	997	-24%	12%	Normal
10	Karimnagar	1057	1559	913	-32%	16%	Normal
11	Khammam	895	1144	1042	-22%	-14%	Normal
12	Kumuram Bheem	1297	1962	1184	-34%	10%	Normal
13	Mahabubabad	1053	1449	1021	-27%	3%	Normal
14	Mahabubnagar	628	1083	643	-42%	-2%	Normal
15	Mancherial	1092	1747	1088	-37%	0%	Normal
16	Medak	1100	1288	848	-15%	30%	Excess
17	Medchal-Malkajgiri	901	1222	796	-26%	13%	Normal
18	Mulugu	1508	2090	1339	-28%	13%	Normal
19	Nagarkurnool	495	970	645	-49%	-23%	Deficient
20	Nalgonda	609	886	706	-31%	-14%	Normal
21	Narayanpet	623	1728	619	-64%	1%	Normal
22	Nirmal	1359	1862	1061	-27%	28%	Excess
23	Nizamabad	1296	1760	1016	-26%	28%	Excess
24	Peddapalli	1130	1652	1036	-32%	9%	Normal
25	Rajanna Siricilla	1149	1456	904	-21%	27%	Excess
26	Rangareddy	724	1129	726	-36%	0%	Normal
27	Sangareddy	986	1233	844	-20%	17%	Normal
28	Siddipet	991	1278	777	-22%	27%	Excess
29	Suryapet	714	998	785	-28%	-9%	Normal
30	Vikarabad	871	1200	800	-27%	9%	Normal
31	Wanaparthy	598	991	631	-40%	-5%	Normal
32	Warangal	1292	1490	1045	-13%	24%	Excess
33	Yadadri Bhuvanagiri	750	1088	739	-31%	2%	Normal
	State Mean	**1001**	**1411**	**909**	**-29%**	**10%**	**Normal**

5.0 GROUND WATER LEVEL SCENARIO (May 2024)

5.1 SHALLOW AQUIFER (UNCONFINED)

5.1.1 DEPTH TO WATER LEVEL

Depth To Water Level in Unconfined Aquifer (May 2024)

Analysis of depth to water level data of 611 wells shows water levels vary between 0.48 m bgl (Mulugu district) to 102 m bgl (Adilabad district). Water level of lessthan 2 m bgl is recorded in 2 % of wells, between 2 and 5 m bgl in 21% of wells,between 5 and 10 m bgl in 41% of wells, between 10 and 20 m bgl in 31 % of wells, between 20 and 40 m bgl in 4% of wells and water level more than 40 mbgl is registered in 1 % of wells.

Shallow water level of less than 2 m bgl occur as isolated patches in parts of Jayashankar Bhupalapally, Mancherial, Mulugu and Warangal districts covering only an area of 0.16% of the State. While water level of 2 to 5 m bgl is observed mainly in parts of Nalgonda, Suryapet, Y. Bhuvanagiri, Khammam, Mahabubabad, Bhadradri Kothagudem , Warangal, Mulugu, J. Bhupalapally, Karimnagar, Peddapall and Mancherial districts covering an area of 7.07% of the State. 49.20% area of the State is represented by depth to water level of 5 to 10 m bgl, which covers the majority parts of the state with significant area in eastern, northeastern and southeastern part. Water level of 10 to 20 m bgl is covered in 37.12% of the area and is significant in western and southwestern part of the state. Deeper water levels of more than 20 m cover 6% area of the State covering parts of Rangareddy, Vikarabad, Nagarkurnool, Wanaparthy, Medak, Sangareddy, Nirmal, Adilabad and Komarambheem Asifabad district.

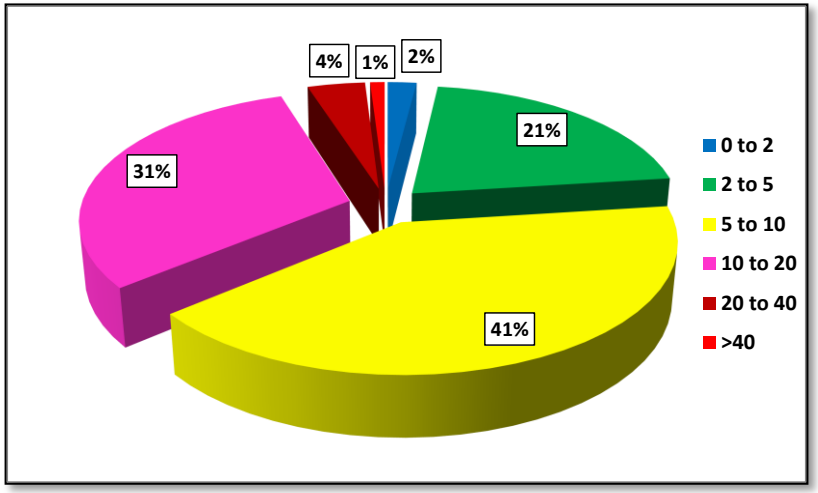

Figure-4: Percentage of wells in different water level ranges in unconfined aquifer.

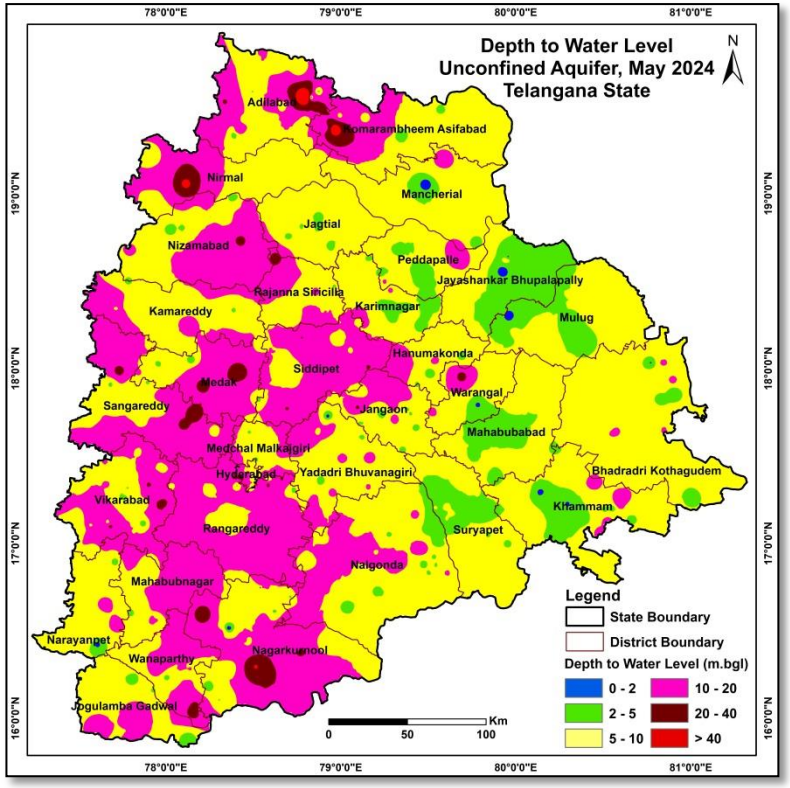

Figure-5: Depth to water level of unconfined aquifer during May 2024.

5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

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

Analysis of data of 592 wells shows that water level rise is recorded in 13% wells (77 wells), water level fall is recorded in 87% wells (515 wells).

Rise in Water Levels:

Out of 77 wells, water level rise of less than 2 m is recorded in 61% wells,2 to 4 m in 20% wells and more than 4 m in 19% of the wells. Water level rise of less than 2 m is seen occurs as isolated patches throughout the state. Water level rise of 2 to 4 m is observed mainly in parts of Adilabad, K. Asifabad, Kamareddy, Sangareddy, Medchal Malkajgiri, Yadadri Bhuvanagiri, Suryapet, Wanaparthy, Vikarabad and Hanumakonda districts. Rise of more than 4 m is significantly observed in parts of Adilabad, K. Asifabad, Kamareddy, Sangareddy, Medchal Malkajgiri, Yadadri Bhuvanagiri, Suryapet, Wanaparthy, Vikarabad and Hanumakonda districts.

Fall in Water Levels:

Out of 515 wells that have registered fall in water levels, 44% have recorded less than 2 m while 31% 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 throughout the state. Fall of 2 to 4 m is observed mainly in southern, southwestern, western and central parts of the district. Fall of >4 m is observed in parts of RangaReddy, Hyderabad, Mahabubnagar, Nagarkurnool, Vikarabad, Jogulamba Gadwal, Nizamabad, Nirmal, Sangareddy and Nalgonda district.

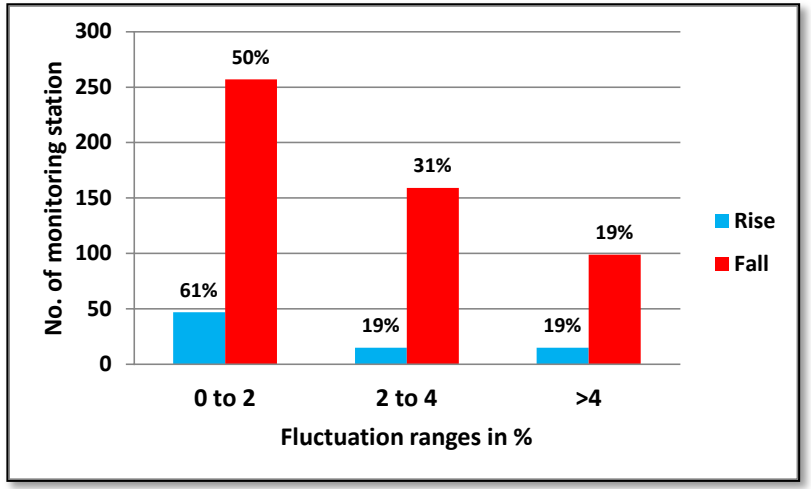

Figure-6: Percentage of wells showing rise and fall in WL in unconfined aquifer (May 2023 to May 2024)

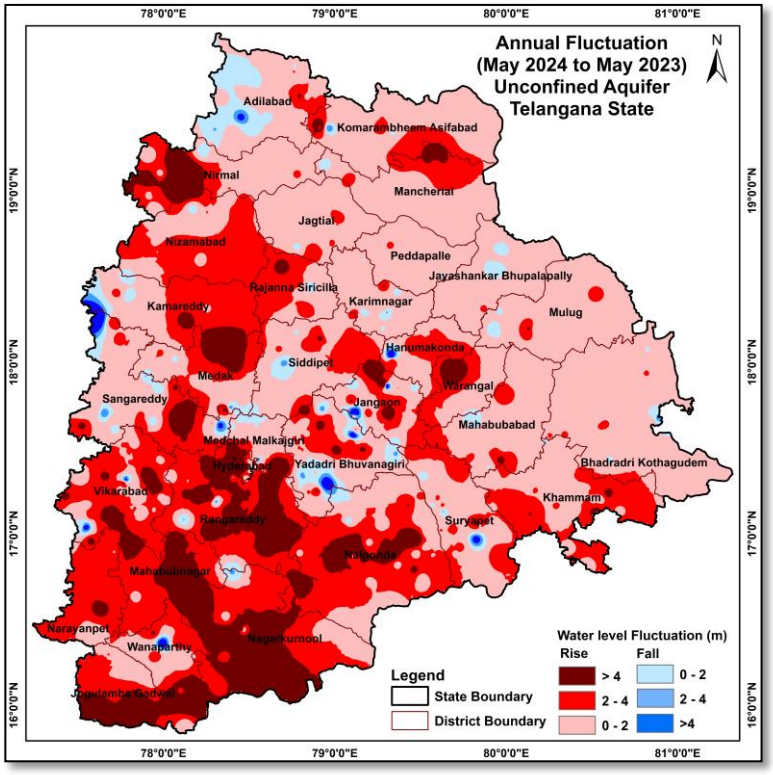

Figure-7: Annual water level fluctuation in unconfined aquifer(May 2023 to May 2024)

5.1.3 DECADAL FLUCTUATION IN WATER LEVEL

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

Analysis of data of 532 wells shows that water level rise is recorded only in 57.50 % wells (306 wells), water level fall is recorded in 42.50% wells (226 wells).

Rise in Water Levels:

Out of 306 wells, water level rise of less than 2 m is recorded in 60 % wells,2 to 4 m in 17 % wells and more than 4 m in 23 % of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in eastern, central and southern part of the State. Water level rise of 2 to 4 m is observed mainly in central, western and southern part of the State. Water level rise of more than 4 m is significantly observed in parts of Yadadri Bhuvanagiri, Nalgonda, Nagarkurnool, Mahabubnagar, Medak, Sangareddy, Jangaon and Jayashankar Bhupalapally district.

Fall in Water Levels:

Out of the 226 wells that have registered fall in water levels, 65% have recorded less than 2 m while 19 % in the range of 2 to 4 m and remaining 16 % wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in majority parts of the state. Fall of 2 to 4 m, recorded in parts of Bhadradri kothagudem, Suryapet, Nagarkurnool, Jogulamba Gadwal, Nirmal, Komarambheem Asifabad, Adilabad, Peddapally, Jayashankar Bhupalapally, Nizamabad, Rajanna Sircilla, etc. Fall beyond 4 m is recorded mainly in parts of Adilabad, Nirmal, Komarambheem Asifabad, Rajanna Sircilla, Nizamabad, Bhadradri Kothagudem, Jogulamba Gadwal, Wanaparthy and Jayashankar Bhupalapally districts.

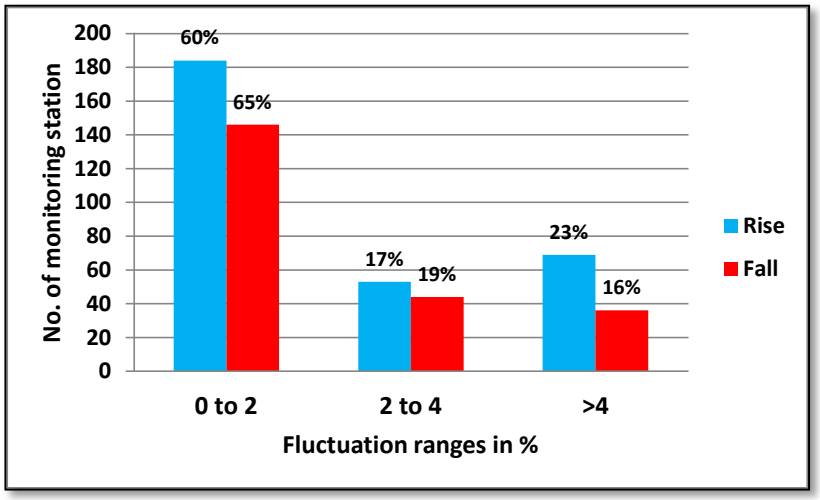

Figure-8: Percentage of wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean May (2014-2023) to May 2024)

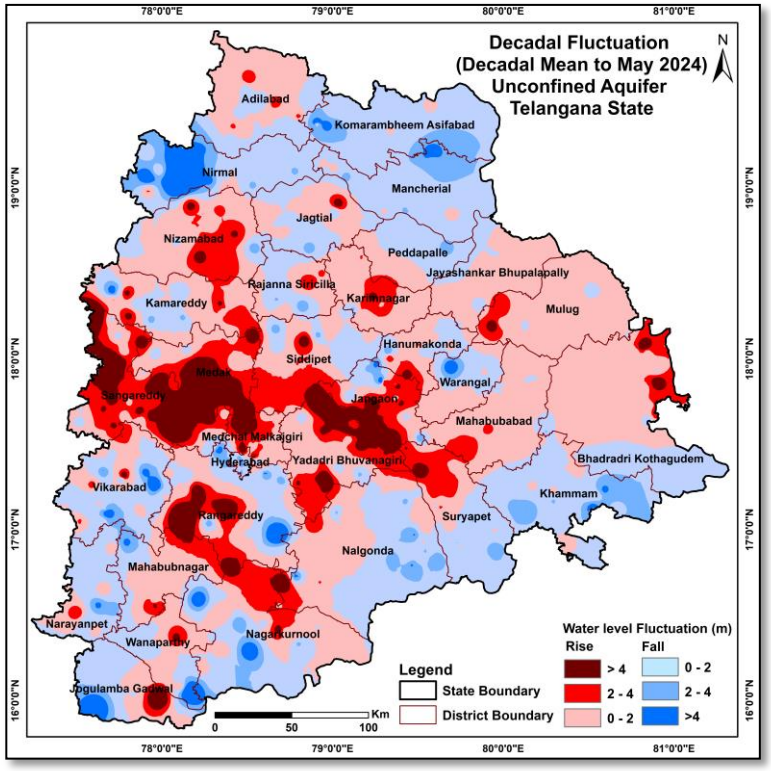

Figure-9: Decadal water level fluctuation in unconfined Aquifer (Decadal Mean May (2014-2023) to May 2024)

5.2 DEEPER AQUIFER (CONFINED/ SEMI-CONFINED)

5.2.1 DEPTH TO PIEZOMETRIC LEVEL

Depth To Piezometric Level in Confined/Semi-Confined Aquifer (May 2024)

Analysis of piezometric level data of 575 wells shows piezometric levels vary between 0.35 m.bgl (B.Kothagudem) to 97.69 bgl (Rangareddy district). Piezometric level of less than 2 m bgl is recorded in 2% of wells, between 2 and 5 m bgl in 13% of wells, between 5 and 10 m bgl in 32% of wells, between 10 and 20 m bgl in 35 % of wells, between 20 and 40 m bgl in 14% of wells and piezometric level more than 40 m bgl is registered in 4 % of wells.

Shallow piezometric level of less than 2 m bgl is noticed in isolated patches in Bhadradri Kothagudem, Nalgonda and Yadadri Bhuvanagiri districts covering an area of 0.5 % of the State. Piezometric level of 2 to 5 m bgl mainly observed in parts of Mulugu, Bhadradri Kothagudem, Khammam, Mahabubabad, Warangal, Yadadri Bhuvanagiri and Nalgonda districts covering an area of 19% of the State. 30 % area of the State is covered by depth to piezometric level of 5 to 10 m bgl in eastern, southern part with significant area in Bhadradri Kothagudem,Khammam, Suryapet, Mahabubabad, Warangal, Mulugu, Nalgonda, Y. Bhuvanagiri, Mancherial, K. Asifabad, Jagtial, Karimnagar, Rajanna Sircilla, Peddapalle, Narayanpet, Nagarkurnool, J. Gadwal districts. Piezometric level of 10 to 20 m bgl is covered in 38% of the State area in central, western and northern part. Deeper piezometric levels of more than 20 m covers 12.5% area of the State, exist as isolated patches and mainly observed in parts of Adilabad, Nirmal, Sangareddy, Vikarabad, Ranga Reddy, Medak and B. Kothagudem district.

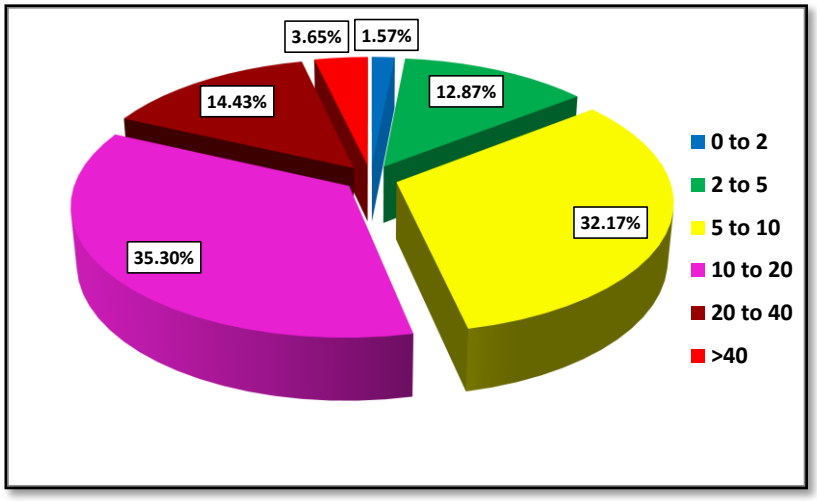

Figure-14: Percentage of wells in different piezometric levels (May 2024)

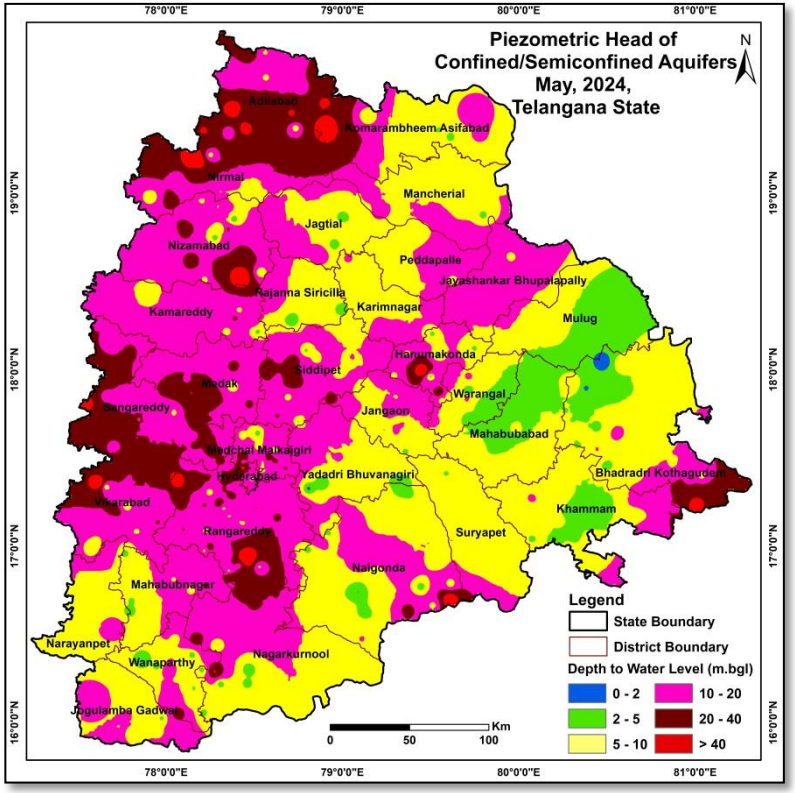

Figure-15: Depth to piezometric Level in deeper aquifer in May 2024.

5.2.2 ANNUAL FLUCTUATION IN PIEZOMETRIC LEVEL

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

Analysis of data of 521 wells shows that water level rise is recorded only in 13% wells (71 wells), water level fall is recorded in 87% wells (450 wells).

Rise in Piezometric Levels:

Out of 71 wells, piezometric level rise of less than 2 m is recorded in 54% wells, 2 to 4 m in 23% wells and more than 4 m in 24% of the wells. Piezometric level rise of less than 2 m found as isolated patches in parts of K. Asifabad, B. Kothagudem, Adilabad, Nirmal, M. Malkajgiri, Kamareddy, Warangal, ranga Reddy, Jangaon and Hanamkonda district. districts. Piezometric level rise of 2 to 4 m and >4 m observed as small pockets in parts of K. Asifabad, Nirmal, Medchal malkajgiri, Nalgonda, Kamareddy, Adilabad districts.

Fall in Piezometric Levels:

Out of 450 wells that have registered fall in piezometric levels, 39% have recorded less than 2 m while 30% in the range of 2 to 4 m and remaining 31% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed throughout the district. Fall of 2 to 4 m is observed mainly observed in western, central, southern and northern part of the state. Fall of beyond 4 m is observed mainly in parts of Ranga Reddy, Hyderabad, Mahabubnagar, Nagarkurnool, Nalgonda , Suryapet, Vikarabad, Sangareddy, Kamareddy, Nizamabad, Nirmal, Adilabad, Jayashankar Bhupalapally and Hanumakonda districts.

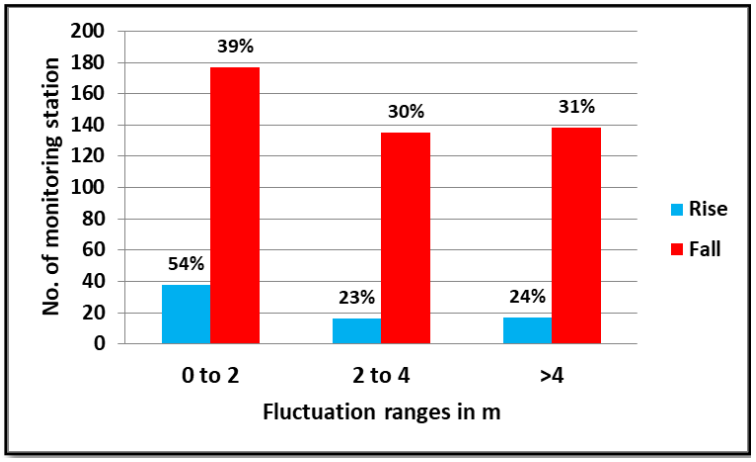

Figure-16: Percentage of wells showing rise and fall in piezometric level in confined/semi-confined aquifer (May 2024 to May 2023).

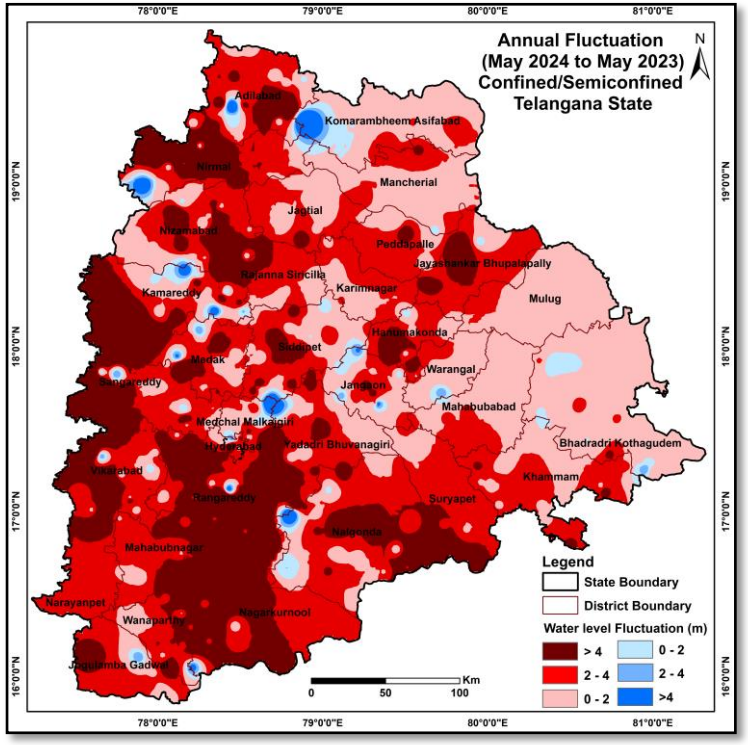

Figure-17: Annual water level fluctuation in piezometric level in confined/ semi-confined aquifer (May 2024 to May 2023)

5.2.3 DECADAL FLUCTUATION IN WATER LEVEL

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

Analysis of data of 261 wells shows that water level rise is recorded only in 45% wells (118 wells) while water level fall is recorded in 55% wells (143 wells).

Rise in Water Levels:

Out of 118 wells, water level rise of less than 2 m is recorded in 33% wells, 2 to 4 m in 27% wells and more than 4 m in 40% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly throughout the State. Water level rise of 2 to 4 m is observed mainly in parts of Rangareddy, Mahabubnagar, Nalgonda, Nagarkurnool, Jayashankar Bhupalapally, Adilabad, Y. Bhuvanagiri, Warangal, Jangaon, Mahabubabad, Sangareddy and Vikarabad districts. Water level rise of more than 4 m mainly observed in parts of Rangareddy, Mahabubnagar, Nalgonda, Nagarkurnool, Jayashankar Bhupalapally, Adilabad, Sangareddy and Kamareddy district.

Fall in Water Levels:

Out of the 143 wells that have registered fall in water levels, 50% have recorded less than 2 m while 20% in the range of 2 to 4 m and remaining 30 % wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in majority parts of the district. Fall of 2 to 4 m, recorded in parts of Bhadradri kothagudem, Suryapet, Narayanpet, Wanaparthy, Jogulamba Gadwal, Nirmal, Adilabad, K. Asifabad, Nizamabad, Kamareddy, Siddipet, Hanumakonda, J. Bhupalapally, Peddapalle, Sangareddy and Vikarabad district. Fall beyond 4 m is recorded mainly in parts of Adilabad, Nirmal, Komarambheem Asifabad, Nizamabad, Vikarabad, Sangareddy, Kamareddy, B. Kothagudem, J.Bhupalapally and Hanumakonda districts.

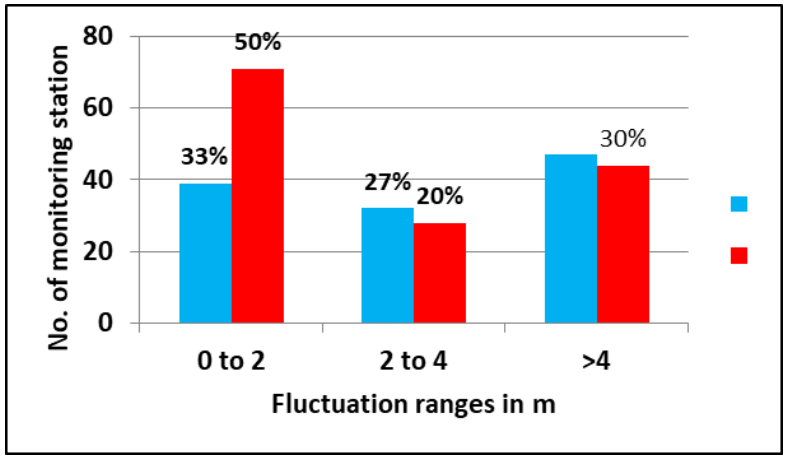

Figure-18: Percentage of wells showing rise and fall in piezometric level in confined/semi-confined aquifer (Decadal Mean to May 2024).

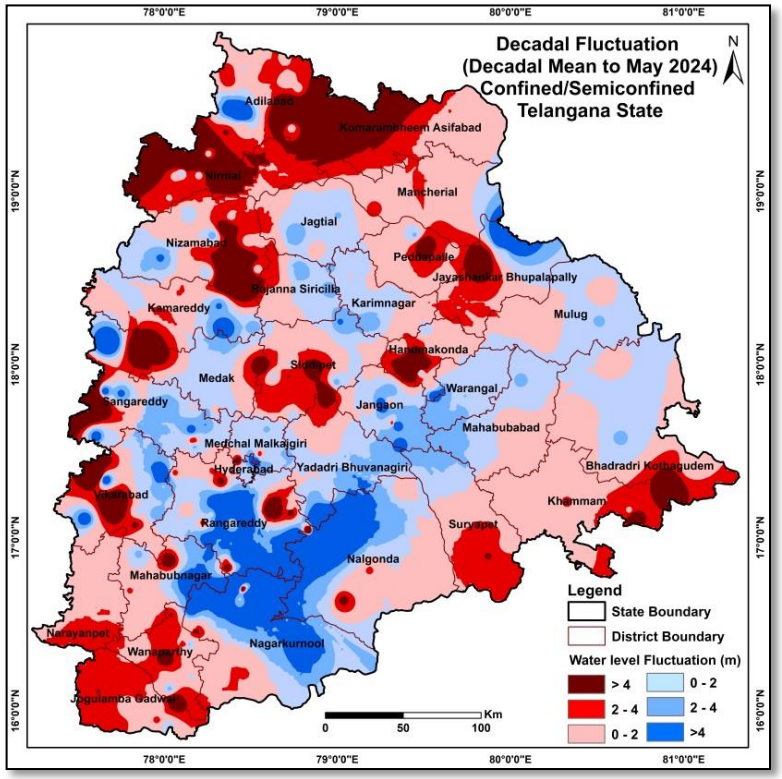

Figure-19: Decadal water level fluctuation in piezometric level in confined/ semi-confined aquifer (Decadal Mean to May 2024)

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, post-monsoon August, and November. Additionally, a yearly assessment of ground water quality is performed in May. As of May 30, 2024, the Southern Region of the Central Ground Water Board supervises 274 dug wells and 1007 piezometers. This comprehensive report aims to portray the variations in the state's groundwater conditions across different aquifers.

During May 2024, roughly 56.5% of the state's territory exhibited a water depth of up to 10 meters below the ground level in unconfined aquifers, while 49.5% of the area showed the same depth in confined and semiconfined aquifers. Areas with deeper water levels exceeding 20 meters accounted for 6% of the state's territory in unconfined aquifers and 12.5% in confined and semiconfined aquifers, mainly in Rangareddy, Vikarabad, Hyderabad, Medchal Malkajgiri, Medak, Sangareddy, Nizamabad, Nirmal, Adilabad, K. Asifabad, and B. Kothagudem districts.

The groundwater level in Telangana State during May 2024 has been significantly impacted by a notable shortfall in rainfall from June 2023 to May 2024, resulting in a -10% departure from normal rainfall levels for the same period in the previous year, classifying the region as experiencing deficient rainfall. This significant deficiency has further contributed to the depletion of groundwater levels in May 2024.

A comparison of the annual water level with the previous year, May 2023 to May 2024, shows that about 87% of wells in unconfined and confined/semiconfined wells experienced a drop in water levels due to the deficit rainfall of the 2023 monsoon season. Additionally, 57.5% and 45% of wells in unconfined and confined aquifers, respectively, experienced a rise in water levels in the decadal mean water level fluctuation of 2014-2023 compared to May 2024.