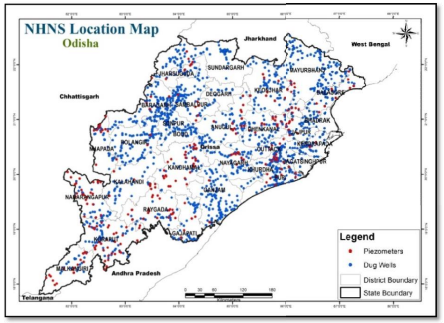

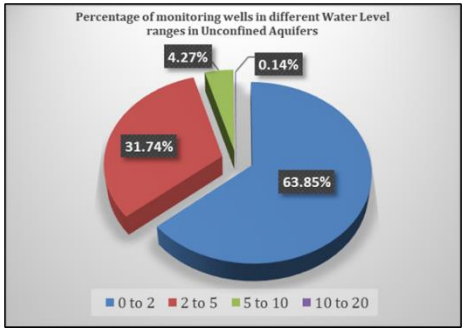

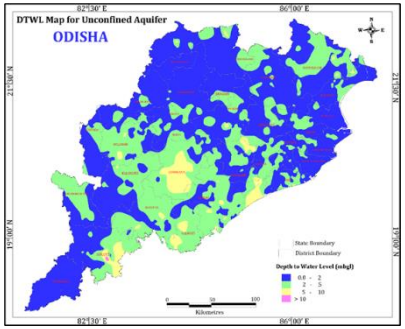

GROUNDWATER LEVEL BULLETIN

AUGUST 2025

ODISHA

ABSTRACT

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

CGWB, SOUTH EASTERN REGION, BHUBANESWAR

1. INTRODUCTION

Ground Water bulletin is prepared by GWB depicting changes in ground water regime of the state through different seasons. It is an effort to obtain information on ground water levels through representative monitoring wells. The important attributes of ground water regime monitoring are ground water level. The natural conditions affecting the groundwater regime involve climatic parameters like rainfall, evapotranspiration etc., whereas anthropogenic influences include pumping from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc. Ground Water levels are being measured by Central Ground Water Board, South Eastern Region four times a year during January, April, August and November in the state of Odisha. A network of 1791 observation wells called National Hydrograph Network Stations (NHNS), as on 31.08.2025, located all over the state is being- monitored.

2. STUDY AREA

Odisha State is the 8th largest state in India covering geographical area of 1, 55, 707 Km2. It lies between 17° 49' and 22° 34' latitudes and 81° 24'and 87° 29'longitudes. The State is bordered on the east by Bay of Bengal (~575 km), south by Andhra Pradesh, west by Chhattisgarh and north by Jharkhand and West Bengal states. Administratively, the state is comprises of 3 revenue divisions, 30 districts, 58 subdivisions and 314 community development blocks. The population of Odisha is 41,947,358 (census 2011) having a decadal growth rate of 13.97% and the density of population is 269 persons per sq. km. The rural population constitute about 83.32% of the total population.

Odisha's geology is dominated by Precambrian crystalline rocks such as BGC, Khondalites, and Charnockites, with Gondwana formations and coastal alluvium. Aquifers mainly develop in weathered regolith and saprolite as unconfined zones, while fractured granites and schists yield confined aquifers, alongwith productive unconfined alluvial aquifers in the coastal belt.

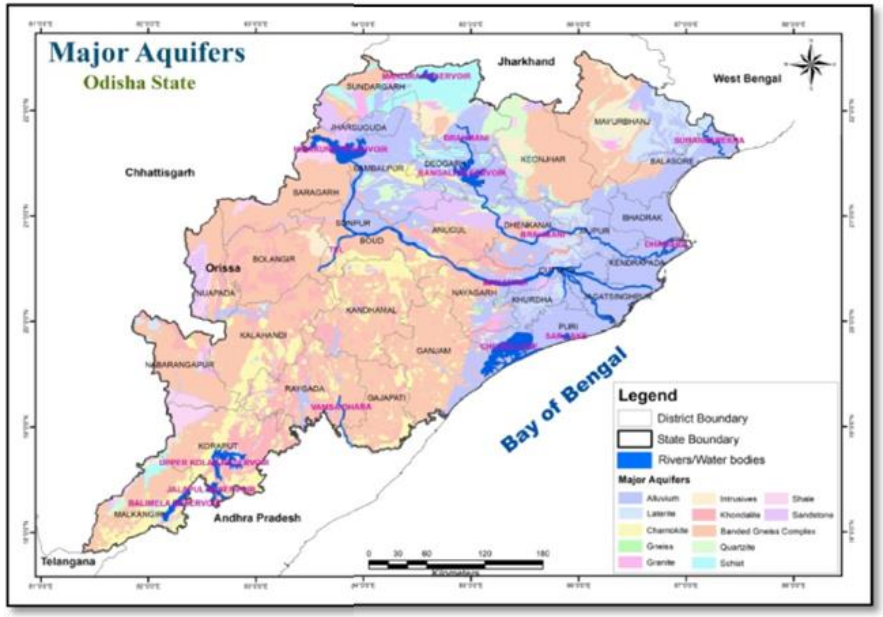

Fig. 1. Map showing major aquifers and administrative divisions of Odisha

Physiographically, the state has varied and picturesque landforms. The southern and central parts of the state in Rayagada, Kalahandi, Kandhamal and Gajapati districts present a rugged hilly tract. Plateau occupies the Northern districts of Sundergarh, Keonjhar and Mayurbhanj and parts of Nabarangpur district in the Southwest. Undulating plains characterizes the major river valleys. A narrow coastal plain borders the Bay of Bengal.

Physiographically the state can be divided into five distinct units, namely (i) Coastal plains, (ii) Northern uplands, (iii) The erosional plains of Mahanadi and other river valleys (iv) South Western hilly region and (v) Subdued plateaus.

3. GROUNDWATER LEVEL MONITORING

Central Ground Water Board, South Eastern Region, is monitoring changes in groundwater regime in Odisha 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 August 2025 is 1791 which include 1485 dug wells and 306 piezometers. Among these, 1607 wells monitored and water level recorded, while 184 wells could not be monitored due to various reasons like in accessibility issues. The district-wise breakup of the water level monitoring stations is given in Table-1.

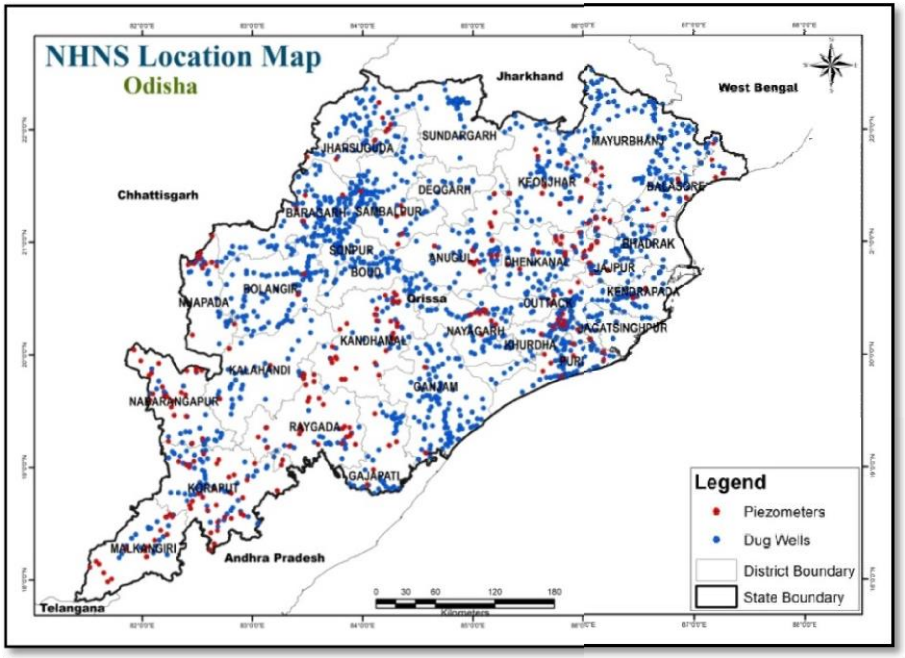

Fig.2. Map showing locations of monitoring wells (NHNS) in Odisha state

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

Sl. No.	District	No. of Monitoring Stations		
		DW	BW	Total
1	ANGUL	53	13	66
2	BALANGIR	77	13	90
3	BALESHWAR	39	9	48
4	BARGARH	71	3	74
5	BAUDH	51	0	51
6	BHADRAK	24	0	24
7	CUTTACK	74	5	79
8	DEBAGARH	11	0	11
9	DHENKANAL	41	6	47
10	GAJAPATI	38	5	43
11	GANJAM	92	3	95
12	JAGATSINGHAPUR	16	0	16
13	JAJAPUR	39	14	53
14	JHARSUGUDA	19	4	23
15	KALAHANDI	35	3	38
16	KANDHAMAL	30	30	60
17	KENDRAPARA	27	3	30
18	KENDUJHAR	70	14	84
19	KHORDHA	70	14	84
20	KORAPUT	63	36	99
21	MALKANGIRI	20	18	38
22	MAYURBHANJ	110	9	119
23	NABARANGAPUR	27	25	52
24	NAYAGARH	43	15	58
25	NUAPADA	24	14	38
26	PURI	76	8	84
27	RAYAGADA	24	27	51
28	SAMBALPUR	85	6	91
29	SONAPUR	48	4	52
30	SUNDARGARH	88	5	93
	Grand Total	**1485**	**306**	**1791**

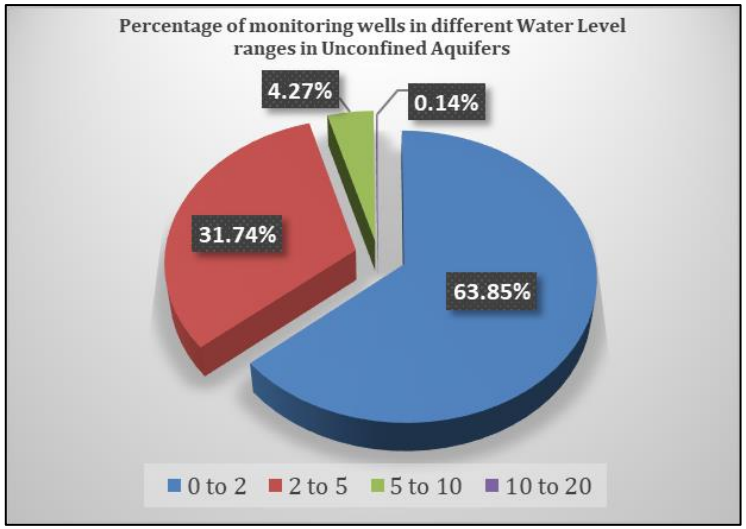

Fig.3. Percentage of Wells in different Water Level ranges in Unconfined Aquifer

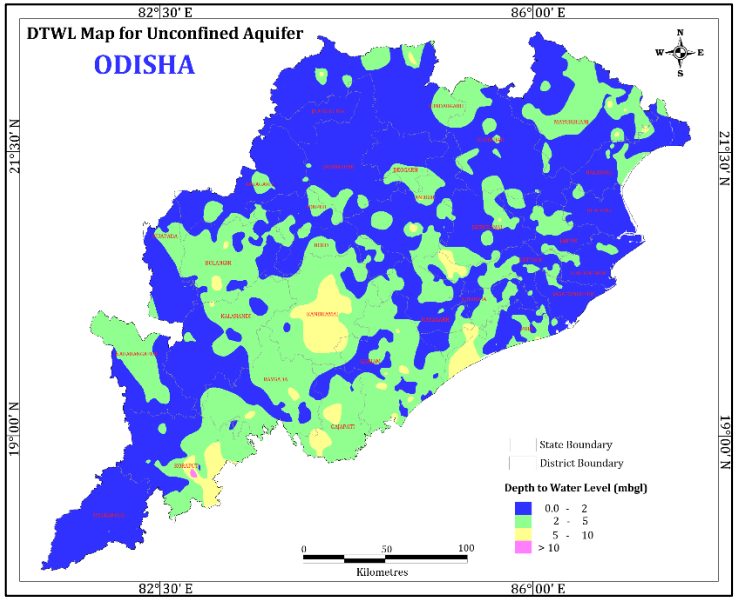

Fig.4. Depth to Water Level of unconfined aquifer during August 2025

4. GROUND WATER LEVEL SCENARIO (AUGUST,2025)

4.1. SHALLOW AQUIFER (UNCONFIED)

4.1.1. DEPTH TO WATER LEVEL

Depth to Water Level in Unconfined Aquifer (August 2025)

The depth to water level of 1607 wells is used for the analysis. Analysis of depth to water level data of 1607 wells shows water level varies between 0.01 mbgl (Sambalpur district) to 14.40 mbgl (Koraput district).

Shallow water level of less than 2 m bgl is observed in maximum number of wells in all the districts covering all the district's 63.85% of the NHS wells of the State. About 31.74% of the NHS wells have shown water level in this range of 2–5 mbgl. All the districts have recorded water level in this range. The districts with the maximum number of wells showing this range of water level are Balangir (67.65%), Gajapati (64.86%), Ganjam (58.24%), Khandamal (50.00%) and Khordha (46.97%). The major command areas of the state like Hirakud, Mahanadi, delta stage I & II, Baitarani, Salandi and Anandpur have shown water level in this range. Around 4.27% of the total NHS wells recorded water level in this range of 5-10 mbgl and present as isolated patches. Districts like Khandamal (30.00%) Raygada (15.00%), Gajapati (13.51%), and Koraput (10.17%) showed water level of the wells in this range. The hard rock and hilly terrains of the state have recorded water level in this range in majority of wells. Only 2 wells (3.39%) of the wells of the state fall in the range of beyond 10 mbgl. It is observed in 2 wells of Koraput district. None of the monitored wells of August 2025 showed water level in more than 20 mbgl.

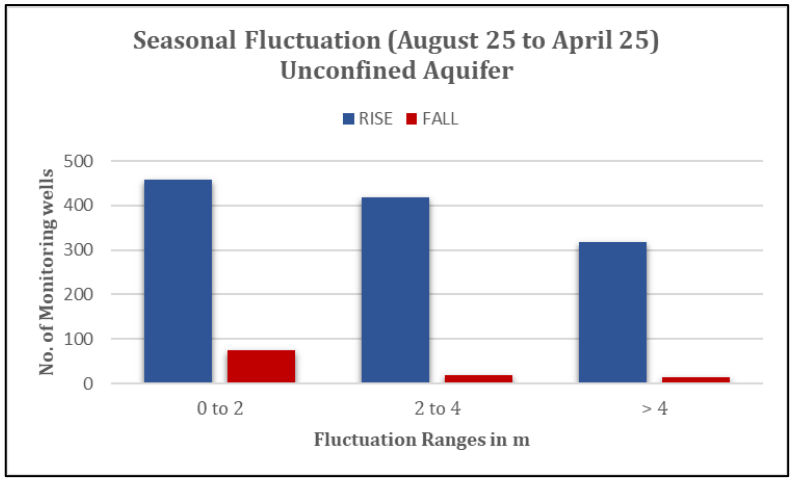

Fig.5.Wells showing rise and fall in WL in unconfined aquifer (April 2025 to August 2025)

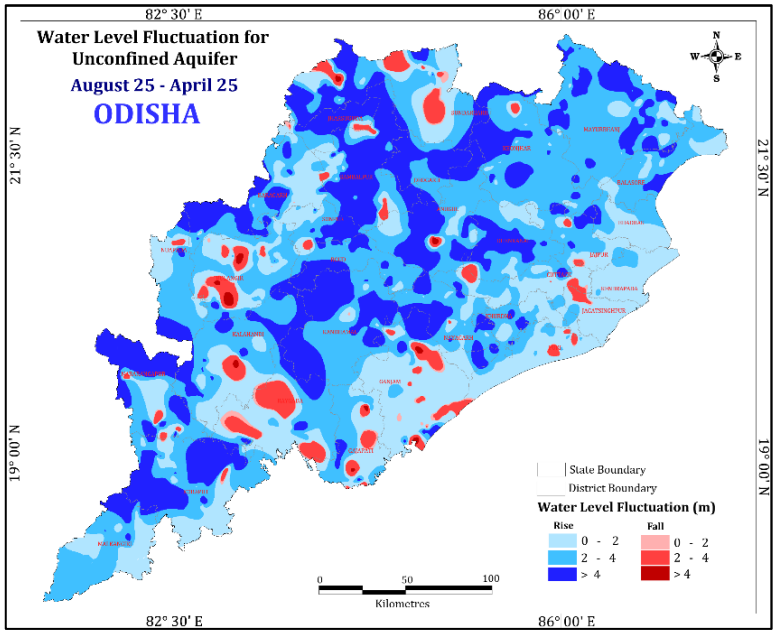

Fig.6. Seasonal water level fluctuation in unconfined Aquifer (April 2025 to August 2025)

4.1.2. SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water Level in Unconfined Aquifer (April 2025-August 2025)

Rise in Water Level:

Out of 1195 wells, water level rise of less than 2 m is recorded in 38.41% wells,2 to 4 m in 35.06% wells and more than 4 m in 26.53 % of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Kendrapara, Puri, Cuttack, Bhadrak, Bargarh, Khordha and Cuttack districts. Water level rise in the range of 2 to 4m is observed in all districts mainly in districts such as Kendujhar, Mayurbhanj, Dhenkanal and Boudh districts. Rise of more than 4 m is significantly observed in Jharsugda, Deogarh, Sambalpur, Nabarangpur, Anugul and Kandhamal districts.

Fall in Water Level:

Out of 106 wells that have registered fall in water level, 70.75% have recorded less than 2 m while 16.98% in the range of 2 to 4 m and remaining 12.26% wells registered water level fall of more than 4m. Fall of less than 2m is observed as isolated patches, mainly parts of Ganjam, Jagatsinghapur, Balangir, Jharsuguda, Rayagada, Nuapada and Bargarh districts. Fall of water level in the range of 2 to 4 m is observed in 8 wells in Rayagada, Jagatsinghpur and Nuapada, districts. Fall of beyond 4 m is observed in Gajapati, Balanagir, Nabarangpur, Kalahandi district.

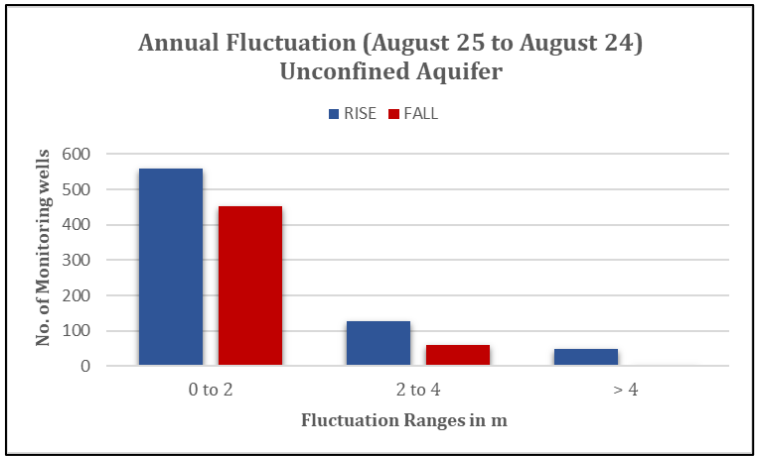

Fig.7.Wells showing rise and fall in WL in unconfined aquifer (August 2023 to August 2024)

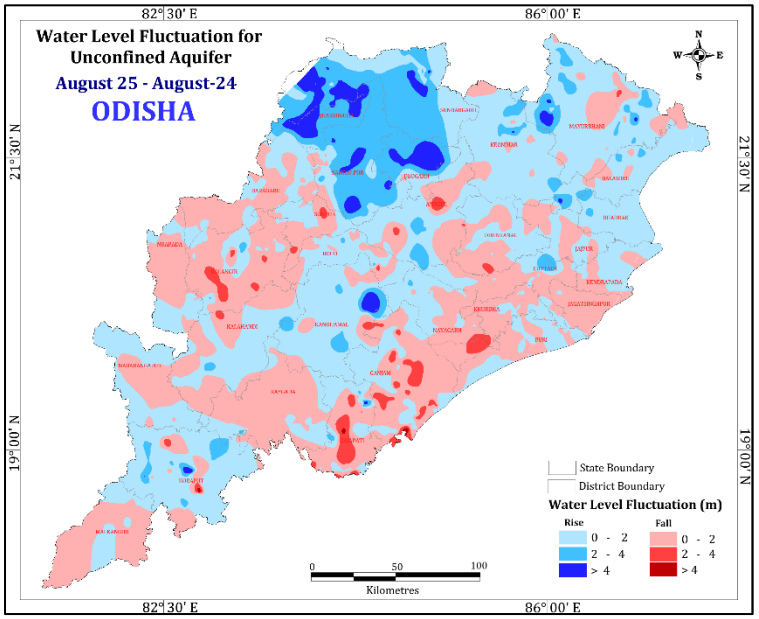

Fig.8. Annual water level fluctuation in unconfined Aquifer (August 2024 to August 2025)

4.1.3. ANNUAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 734 wells, water level rise of less than 2 m is recorded in 76.29% wells,2 to 4 m in 17.17% wells and more than 4 m in 6.54% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Bhadrak, Nabarangpur, Koraput, Kendujhar and Mayurbhaj districts. Water level rise in the range of 2 to 4m is observed mainly in districts such as Jharsuguda, Sundargarh, Sambalpur, Deogarh and Mayurbhanj districts. Rise of more than 4 m is significantly observed in Deogarh, Jharsuguda, Sundargarh, Sambalpur and Mayurbhanj districts.

Fall in Water Level:

Out of 516 wells that have registered fall in water level, 87.79% have recorded less than 2 m while 11.43% in the range of 2 to 4 m and re- maining 0.78% wells registered water level fall of more than 4m. Fall of water level less than 2m is observed in all districts, mainly parts of Balangir, Cuttack, Bargarh, Jagatsinghapur, Khordha, Malkangiri, Nuapada and Rayagada districts. Fall of water level in the range of 2 to 4 m is ob- served mainly in Gajapati, Ganjam, Anugul, Bolangir and Baleshwar districts. Fall of beyond 4 m is observed as isolated patches in Deogarh, Koraput and Ganjam districts.

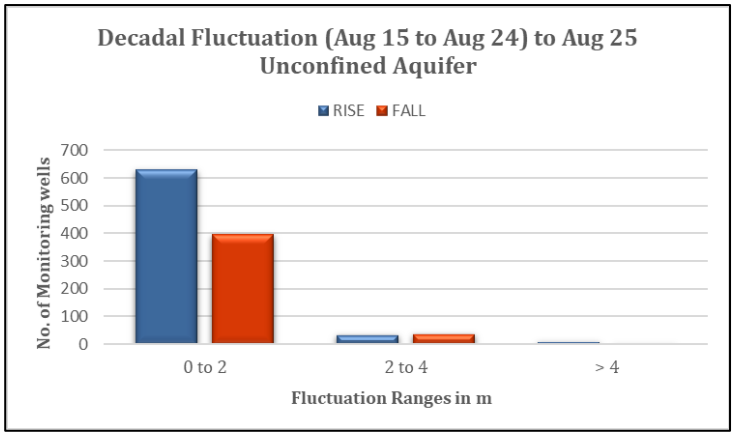

Fig.9. Wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean August (2015-2024) to August 2025)

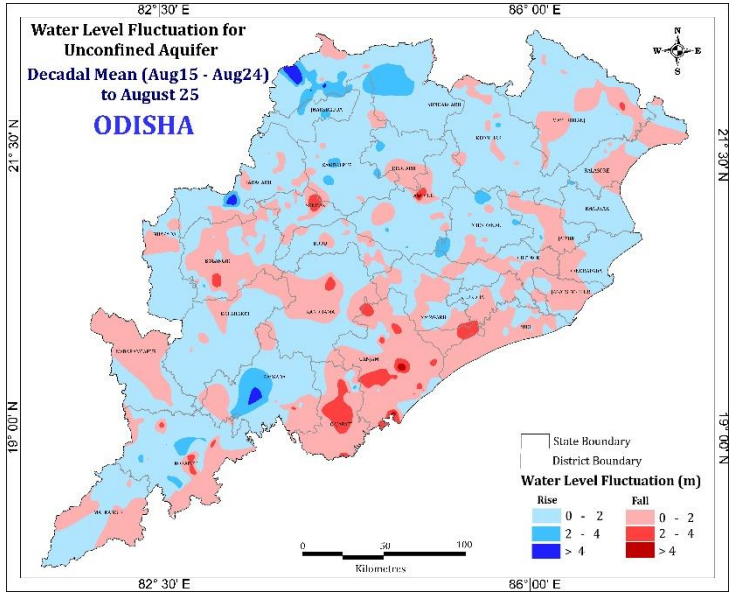

Fig.10. Decadal water level fluctuation in unconfined Aquifer (Decadal Mean August (2015-2024) to August 2025)

4.1.4. DECADAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 680 wells, water level rise of less than 2 m is recorded in 93.09% wells,2 to 4 m in 5.29% wells and more than 4 m in 1.62% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Sundargarh, Mayurbhanj, Sambalpur, Kendujhar, Bargarh, Boudh, Cuttack, Balangir and Anugul and Koraput districts. Water level rise in the range of 2 to 4m is observed mainly in districts such as Sundargarh, Koraput and Sambalpur districts. Rise of more than 4 m is significantly observed in Sundargarh and Koraput districts.

Fall in Water Level:

Out of 442 wells that have registered fall in water level,90.05% have recorded less than 2 m while 9.05% in the range of 2 to 4 m and more than 4 m in 0.90% of the wells. Fall of water level less than 2m is observed in all districts, mainly parts of Puri, Ganjam, Balangir, Khordha, Cuttack, Gajapati and Mayurbhanj districts. Fall of water level in the range of 2 to 4 m is observed mainly in Ganjam, Gajapati, Koraput, Khordha and Anugul districts. Fall of beyond 4 m is observed as isolated patches in Ganjam, Anugul and Khordha districts.

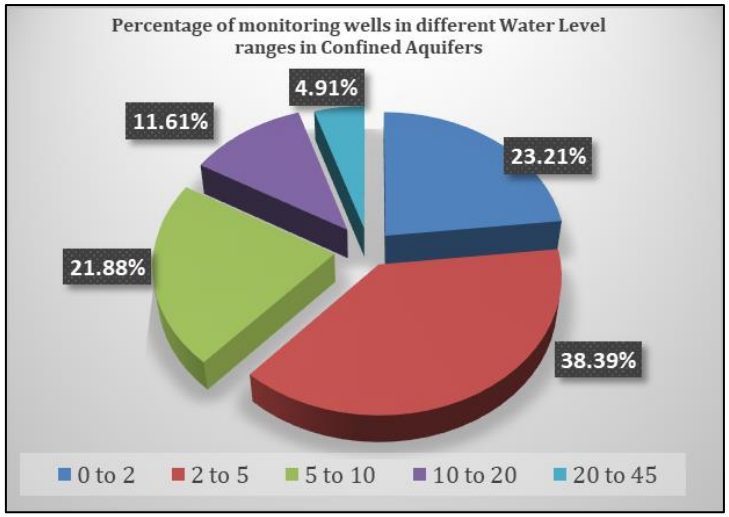

Fig.11. Percentage of wells in different piezometric levels (August 2025)

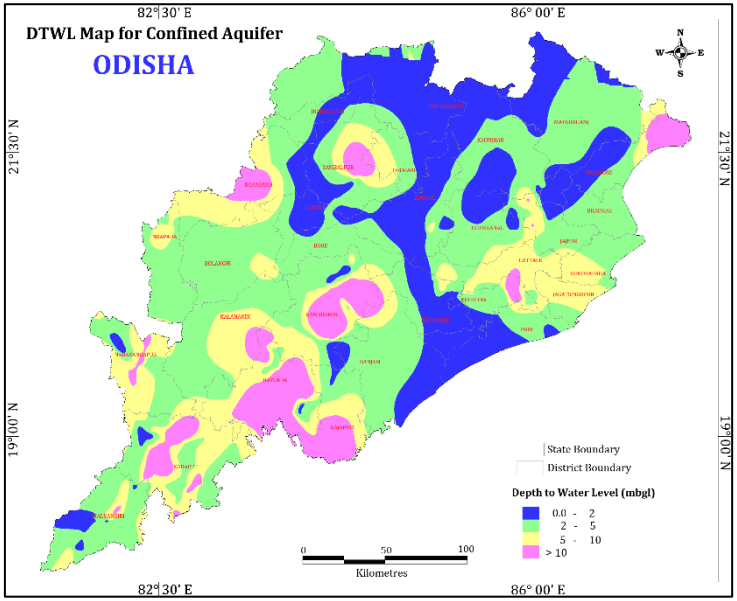

Fig.12. Depth to piezometric Level in deeper aquifer in August 2025

4.2. DEEPER AQUIFER (CONFINED/ SEMI-CONFIED)

4.2.1. DEPTH TO PIEZOMETRIC LEVEL

Depth to Piezometer Level in Confined/Semi-Confined Aquifer (August 2025)

Analysis of piezometric level data of 224 wells shows piezometric levels vary between 0.1mbgl (Puri district) to 43.57mbgl (Khandamal district). Piezometric level of less than 2 m bgl is recorded in 23.21% of wells, between 2 to 5 m bgl in 38.39% of wells, between 5 to 10 m bgl in 21.88% of wells, between 10 to 20 mbgl in 11.61 % of wells, between 20-45 m bgl in 4.91% of wells.

Shallow piezometric level of less than 2mbgl is noticed in isolated patches mainly in Dhenkanal (60%), Nayagarh (60%), Sundargarh (60%), Kendujhar (55.56%), Anugul (54.55%) and Sonepur districts.Within the Piezometric level of 2 to 5mbgl range is mainly observed in parts of Balangir (77.78%), Mayurbhaj (75.00%) Ganjam (66.67%), Kalahandi (66.67%), Kendrapara (66.67%) and Nuaapada (66.67%) districts. The districts covered by depth to piezometric level of 5 to 10 mbgl with significant area in Cuttack, Nabarangapur, Bargarh, Ganjam, Kalahandi and Nuapada districts.

Piezometric level beyond 10 mbgl is significantly found in Gajapati, Baleshwar, Bargarh, Kendrapara, Khordha, Raygada, Khandamal, Khordha and Koraput districts.

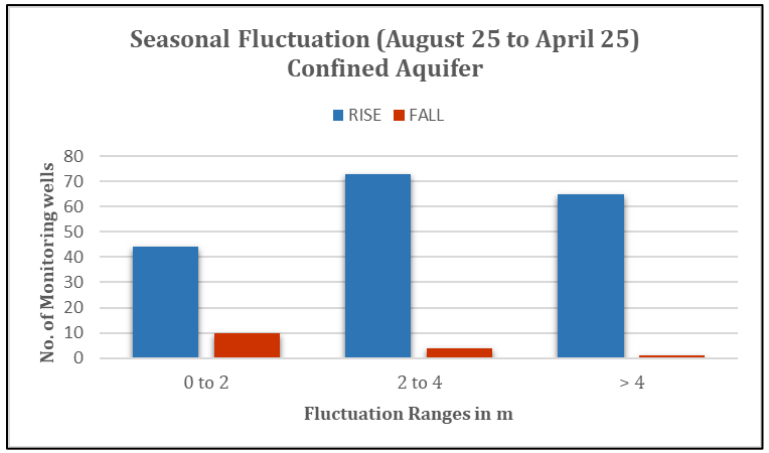

Fig.13. Wells showing rise and fall in piezometric level in confined/ semi-confined aquifer (April 2024 to August 2024)

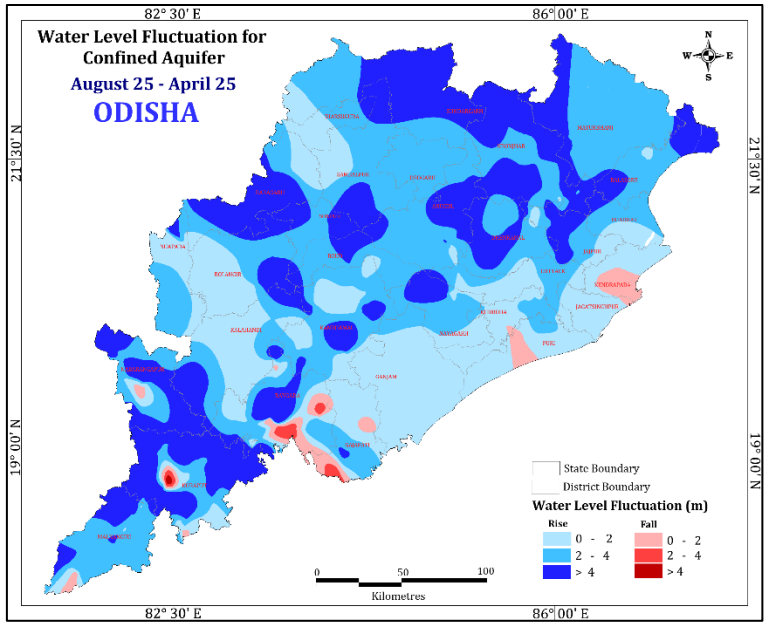

Fig.14. Annual water level fluctuation in Confined/Semi-confined Aquifer (April 2024 to August 2024)

4.2.2. SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Seasonal Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (April 2025 to August 2025)

Rise in Piezometric levels

Out of 182 wells that have registered rise, the piezometric level rise of less than 2 m is recorded in 24.18% wells, 2 to 4 m in 40.11 % wells and more than 4 m in 35.71% of the wells. Piezometric level rise of less than 2m is seen in most of the dis- tricts, significantly in Kandhamal, Raygada, Nuapada and Koraput districts. Piezometric level rise of 2 to 4m is observed mainly in districts such as Kandhamal, Malkangiri, Raygada, Khordha and Kendujhar districts. Rise of more than 4m is observed in Koraput, Nabarangpur, Jajpur, Anugul, Raygada and Kandhamal districts.

Fall in Piezometric Level

Out of 15 wells that have registered fall in piezometric levels, 66.67% have recorded less than 2 m while 26.67% wells in the range of 2 to 4 m and remaining 6.67% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in many parts specially in Puri and Raygada. Fall within 2m to 4m is observed in districts of Raygada, Kendrapara and Gajapati. Fall beyond 4 m is observed in 1 well of Koraput district.

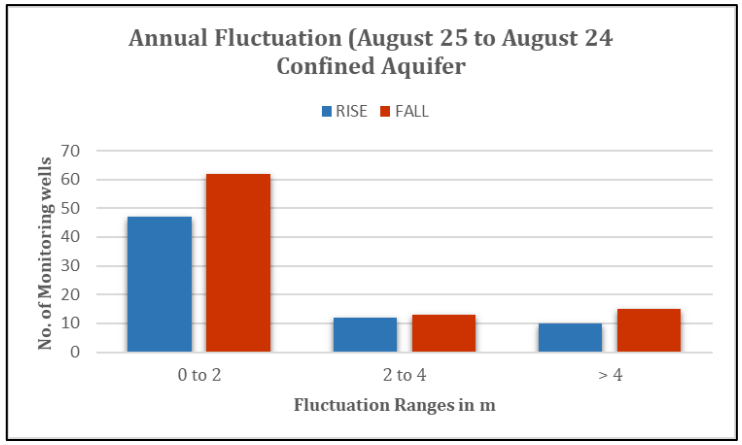

Fig.15. Wells showing rise and fall in piezometric level in confined/ semi-confined aquifer (August 2024 to August 2025)

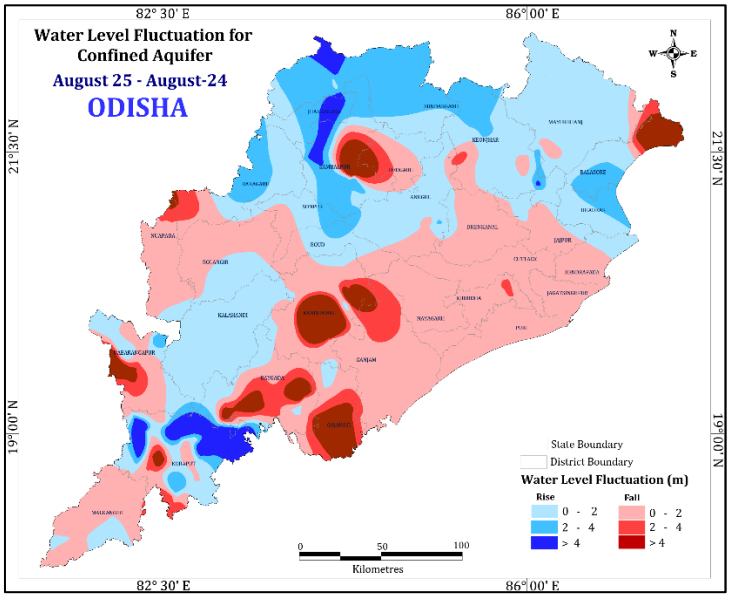

Fig.16. Annual water level fluctuation in Confined/Semi-confined Aquifer (August 2024 to August 2025)

4.2.3. ANNUAL FLUCTUATION IN PIEZOMETRIC LEVEL

Annual Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (August 2024 to August 2025)

Rise in Piezometric levels

Out of 69 wells, piezometric level rise of less than 2 m is recorded in 67.65% wells, 2 to 4 m in 17.65% wells and more than 4 m in 14.71% of the wells. Piezometric level rise of less than 2m is seen in most of the districts, significantly in Koraput, Kendujhar, Rayagada, Anugul and Nabarangpur districts. Piezometric level rise of 2 to 4m is observed mainly in districts such as Sambalpur, Kendujhar, Koraput, Mayurbhaj and Nabarangpur districts. Rise of more than 4m is observed in Kendujhar and Koraput districts.

Fall in Piezometric Level

Out of 90 wells that have registered fall in piezometric levels, 68.13% have recorded less than 2 m while 14.29% of wells have recorded the piezometric level in the range of 2 to 4 m and remaining 16.48% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in many districts but partly in districts of Kandhamal, Jajapur, Malkangiri and Nuapada districts. Fall within 2 to 4m is observed in districts like Khordha, Koraput, Baleswar, Nuapada etc. Fall beyond 4 m is observed in Rayagada,Nabarangpur, Kandhamal, Gajapati districts.

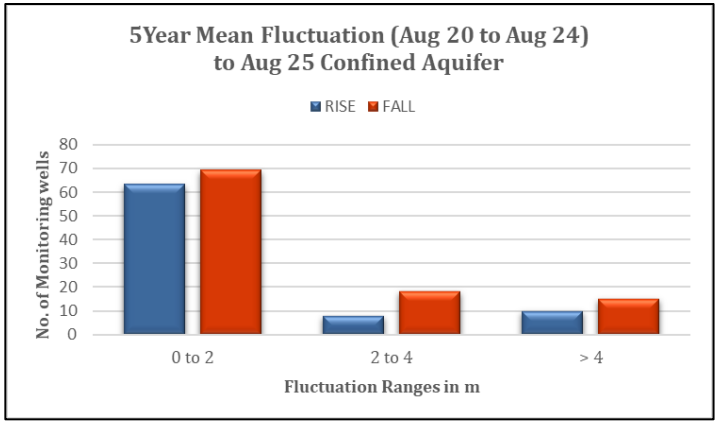

Fig.17. Wells showing rise and fall in piezometric level Confined/Semi-confined Aquifer (August 2020 to August 2024) to August 25

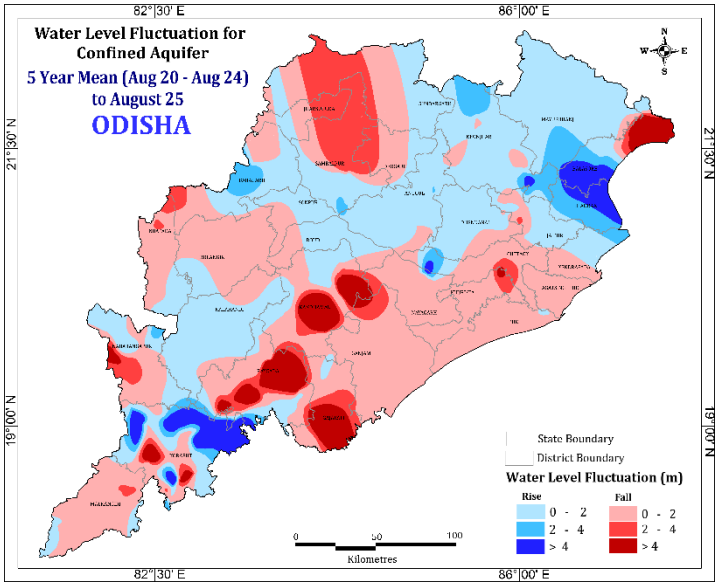

Fig.18. Five year mean water level fluctuation in Confined/Semi-confined Aquifer (August 2020 to August 2024) to August 25

4.2.4. FIVE-YEAR MEAN FLUCTUATION IN PIEZOMETRIC LEVEL

Five Year Mean Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (August 2020-2024 to August 2025)

Rise in Piezometric levels

Out of 81 wells, piezometric level rise of less than 2 m is recorded in 77.78% wells, 2 to 4 m in 9.88% wells and more than 4 m in 12.35% of the wells.

Piezometric level rise of less than 2m is seen significantly in many districts specially in Anugul, Jajapur, Kandhamal and Raygada districts. Piezometric level rise of 2 to 4m is observed mainly in Kendujhar in district. Rise of more than 4m is observed in Koraput and Baleswar districts mainly.

Fall in Piezometric Level

Out of 102 wells that have registered fall in piezometric levels, 67.65% have recorded less than 2 m while 17.65% of wells have recorded the piezometric level in the range of 2 to 4 m and remaining 14.71% wells registered piezometric level fall of more than 4 m.

Fall of less than 2 m is mainly observed in many districts but partly in districts of Malkangiri, Koraput, Kandhamal, Nayagarh, Puri, Nuapada and Raygada districts. Fall within 2 to 4m is observed in districts like Khordha, Koraput, Malkangiri and Nuapada. Fall beyond 4 m is observed in Rayagada, Khandamal, Baleswar and Koraput districts.

5. SUMMARY

As a component of the National Ground Water Monitoring Program, the Central Ground Water Board, South Eastern Region, Bhubanes- war conducts monitoring of the ground water conditions on a quar- terly basis: in January, pre-monsoon in April, August, and post-monsoon in November. Additionally, a yearly assessment of ground water quality is performed in April. As of August 31, 2025, the- South Eastern Region of the Central Ground Water Board supervises 1485 dugwells and 306 piezometers. This comprehensive effort aims to portray the variations in the state's ground water conditions across different aquifers.

In August 2025, the state recorded water level in 0-5mbgl range in almost all the districts. Some wells in the hilly districts recorded water level in 5-10 mbgl range.

Seasonal water level comparison with pre monsoon period (April - 2025) to August-2025 has shown that about 91.92% monitoring stations of the state experienced rise in seasonal water level fluctua- tion and only 8.08 % experienced fall in seasonal water level fluctuation due to monsoon rainfall.

Annual water level comparison with previous year (August -2024) to August-2025 has shown that about 88.72 % monitoring stations of the state experienced rise in annual water level fluctuation and 11.28 % experienced fall in annual water level fluctuation. In general, a rise in water level has been observed in August 2025 with respect to August 2024.

Decadal mean comparison of August 2015-2024 to August 2025 for Unconfined Aquifers has shown 60.61% of wells experienced rise in decadal mean water level fluctuation and 39.39 % wells experienced fall in decadal mean water level fluctuation. Five years mean comparison of August 2020-2024 to August 2025 for Confined Aquifers has shown 44.26% of wells experienced rise in five years mean water level fluctuation and 55.74 % wells experienced fall in five year mean water level fluctuation. In general, a rise in water level of the unconfined aquifer has been observed in August 2025 with respect to decadal mean (August 2015 – 2024).

6. RECOMMENDATION

The monsoon season plays a pivotal role in groundwater recharge across the State. While a general rise in water levels is observed during this period, localized stress conditions and depletion in certain pockets mainly in Ganjam, Jagatsinghapur, Balangir, Jharsuguda, Rayagada, Nuapada and Bargarh districts, need careful planning and management. In light of the prevailing scenario, the following recommendations are suggested for effective conservation and sustainable utilization of water resources:

Construction and strengthening of check dams, percolation tanks, recharge wells, contour bunds and other suitable structures in appropriate hydro geological areas should be prioritized. Equally important is the maintenance and revival of existing rainwater harvesting systems, including rooftop harvesting in both urban and rural areas, so as to maximize recharge and ensure long-term sustainability of groundwater resources.

Promotion of conjunctive use of surface and groundwater is necessary to reduce stress on aquifers, particularly during lean periods.

Adoption of micro-irrigation techniques such as drip and sprinkler systems is essential to enhance irrigation efficiency and reduce water wastage. Diversification from water-intensive crops to less water-demanding alternatives, along with scientific irrigation scheduling and soil moisture conservation practices, will further aid in sustainable agricultural water use.

Urban planning must integrate storm water management with recharge measures to reduce run-off losses and localized water logging.