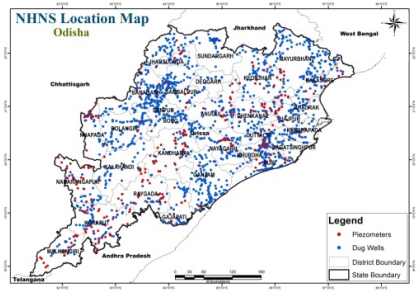
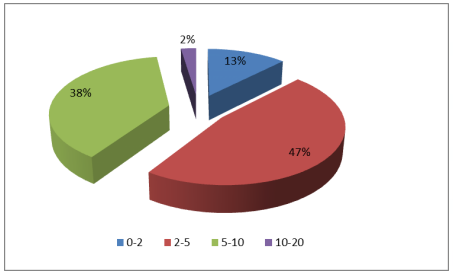
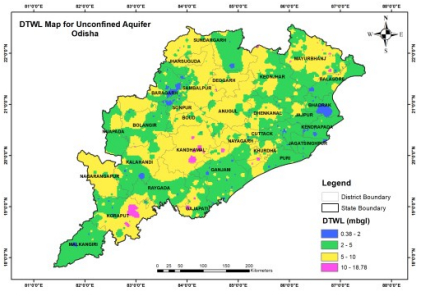






GROUND WATER LEVEL BULLETIN

APRIL 2025

ODISHA

ABSTRACT

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

CGWB, SOUTH EASTERN REGION, BHUBANESWAR

1.0 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., where as anthropogenic influences include pumpage 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 East Region four times a year during January, April, August and November. A network of 1780 observation wells called **National Hydrograph Network Stations (NHNS)** as on 31.03.2025, located all over the state is being-monitored.

2.0 STUDY AREA

Odisha State is the 8th largest state in India covering geographical area of 1, 55, 707 Km^2. It lies between NL 17° 49' and 22° 34' and EL 81° 24'and 87° 29'. 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 comprising 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.

Physiographically, The State presents 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) Southwestern hilly region and (v) Subdued plateaus.

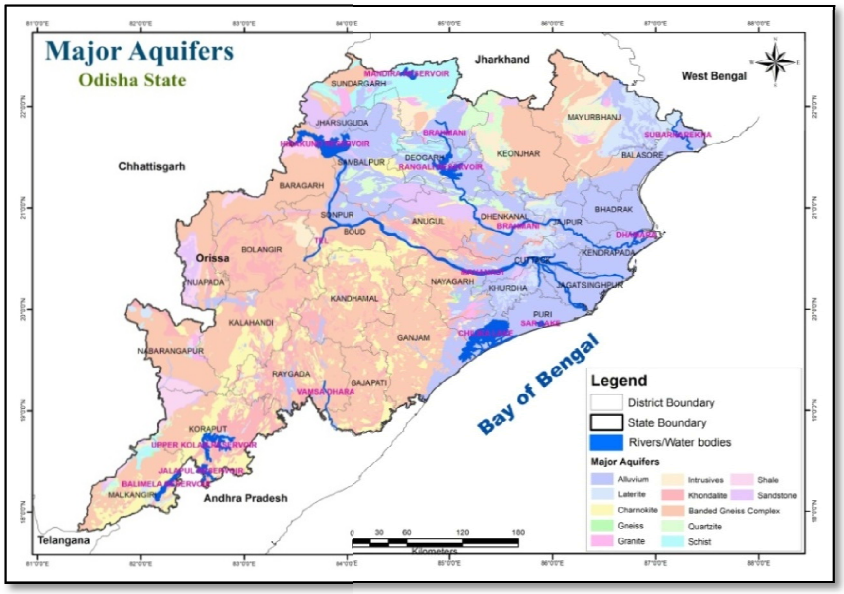


Fig.1. Map showing major aquifers and administrative divisions of Odisha

3.0 GROUNDWATER LEVEL MONITORING

Central Ground Water Board, South Eastern Region, is monitoring changes in ground water regime in Odisha state on quarterly basis continuously. This is facilitated by a network of monitoring stations in the State located indiverse hydrogeological and geomorphic units. The number of operational wells till April 2025 is 1780 which include 1491 dug wells and 289 piezometers. Among these, 1602 wells monitored and water level recorded in 1533 wells and 69 wells are dry, while 175 wells could not be monitored due to various reasons like inaccessibility issues, pump fitted, filled up etc. The district-wise breakup of the water level monitoring stations is given in **Table-1**.

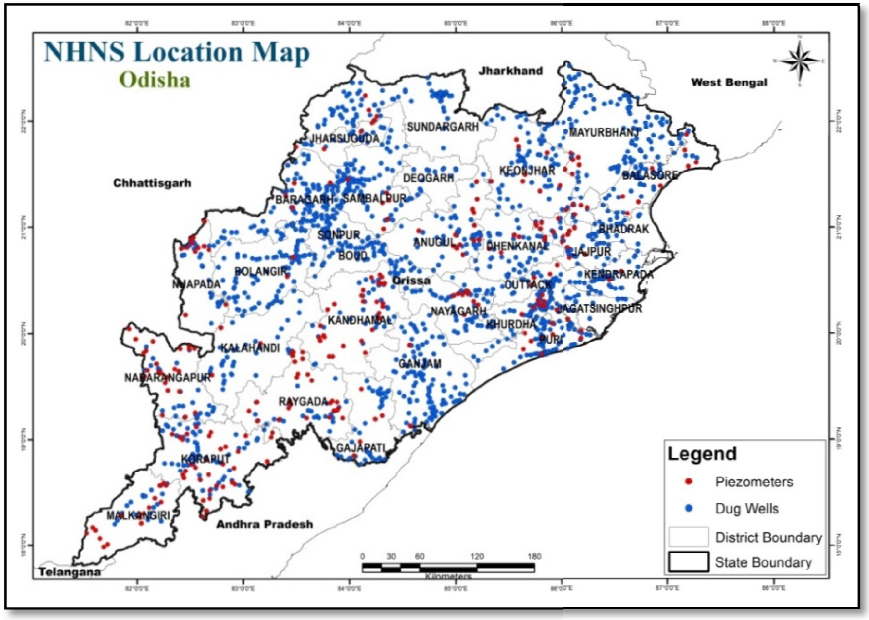


Fig.2.Mapshowinglocationsofmonitoringwells(NHNS)inOdishastate

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

Sl. No.	District	No. of Monitoring Stations		
		DW	BW	Total
1	ANUGUL	54	13	67
2	BALANGIR	77	5	82
3	BALESHWAR	39	9	48
4	BARGARH	71	3	74
5	BAUDH	25		25
6	BHADRAK	52		52
7	CUTTACK	74	5	79
8	DEBAGARH	11		11
9	DHENKANAL	41	6	47
10	GAJAPATI	38	5	43
11	GANJAM	94	3	97
12	JAGATSINGHAPUR	16		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	71	9	80
20	KORAPUT	63	36	99
21	MALKANGIRI	20	18	38
22	MAYURBHANJ	110	9	119
23	NABARANGAPUR	28	25	53
24	NAYAGARH	43	12	55
25	NUAPADA	24	12	36
26	PURI	76	9	85
27	RAYAGADA	24	27	51
28	SAMBALPUR	85	6	91
29	SONAPUR	48	4	52
30	SUNDARGARH	87	5	92
Grand Total		1491	289	1780

4.0 RAINFALL

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 2024 - September 2024. Table-2 gives the district-wise rainfall data for the period June September 2023 & 2024, normal and the departure of June- October 2024 rainfall with other periods.

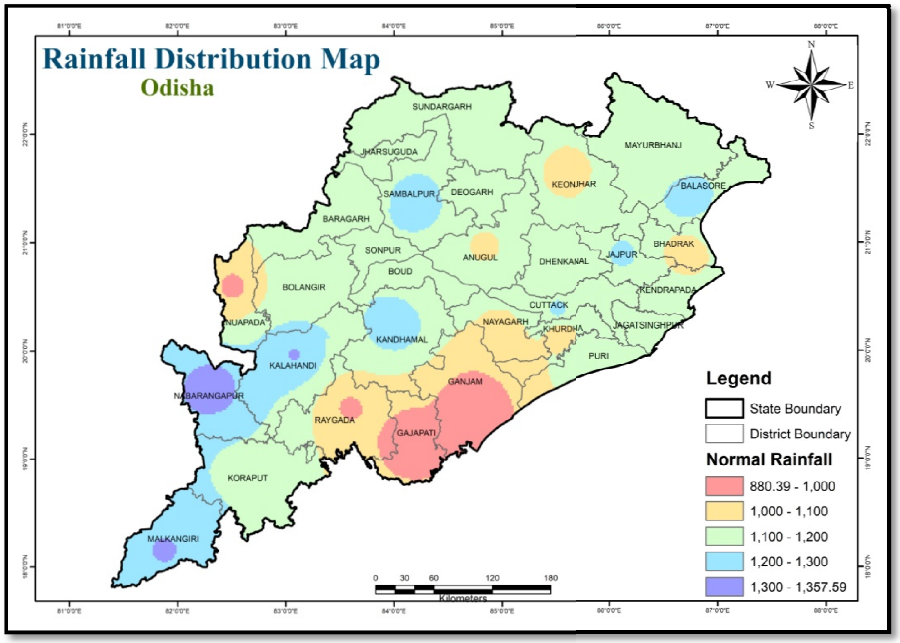


Fig.3. Rainfall deviation (June 2024-October 2024) from normal rainfall

Table-2: District-wise rainfall data

Sl. No.	DISTRICT	Total Rain-fall_2024	Normal rainfall	Total Rain-fall_2023	Deviation from Nor-mal rainfall (%)	Deviati from ra fall 20 (%)
1	Anugul	1042.28	1083.53	1165.09	-3.81	-10.5
2	Balasore	929.33	1252.70	1086.00	-25.81	-14.4
3	Bargarh	1097.79	1131.56	1236.98	-2.98	-11.2
4	Bhadrak	757.74	1048.12	1021.36	-27.70	-25.8
5	Balangir	968.26	1112.37	1031.17	-12.96	-6.10
6	Boudh	1221.13	1152.72	1293.73	5.93	-5.61
7	Cuttack	1237.54	1222.38	1031.83	1.24	19.9
8	Deogarh	936.33	1132.43	1272.13	-17.32	-26.4
9	Dhenkanal	1197.14	1107.82	1280.21	8.06	-6.49
10	Gajapati	850.13	940.31	864.75	-9.59	-1.69
11	Ganjam	810.69	880.37	701.66	-7.91	15.5
12	Jagatsinghpur	1144.18	1101.36	912.89	3.89	25.3
13	Jajpur	955.66	1221.60	970.59	-21.77	-1.54
14	Jharsuguda	933.94	1169.42	1408.12	-20.14	-33.6
15	Kalahandi	1176.12	1305.19	1112.78	-9.89	5.69
16	Kandhamal	944.67	1275.24	1253.70	-25.92	-24.6
17	Kendrapara	895.07	1131.83	835.72	-20.92	7.10
18	Keonjhar	870.33	1072.20	1145.42	-18.83	-24.0
19	Khordha	1032.87	1055.27	946.82	-2.12	9.09
20	Koraput	1426.14	1187.47	1275.00	20.10	11.85
21	Malkanagiri	2035.96	1304.10	1444.30	56.12	40.9
22	Mayurbhanj	1106.48	1150.45	1056.79	-3.82	4.70
23	Nawarangpur	1245.78	1357.63	1027.31	-8.24	21.2
24	Nayagarh	1106.91	1067.96	1024.25	3.65	8.07
25	Nuapada	1201.10	979.33	1002.12	22.65	19.8
26	Puri	846.88	1140.85	816.44	-25.77	3.73
27	Rayagada	751.48	986.15	867.43	-23.80	-13.3
28	Sambalpur	1109.26	1283.59	1484.41	-13.58	-25.2
29	Subarnapur	1297.67	1196.29	1253.27	8.47	3.54
30	Sundargarh	978.13	1113.84	1139.90	-12.18	-14.1

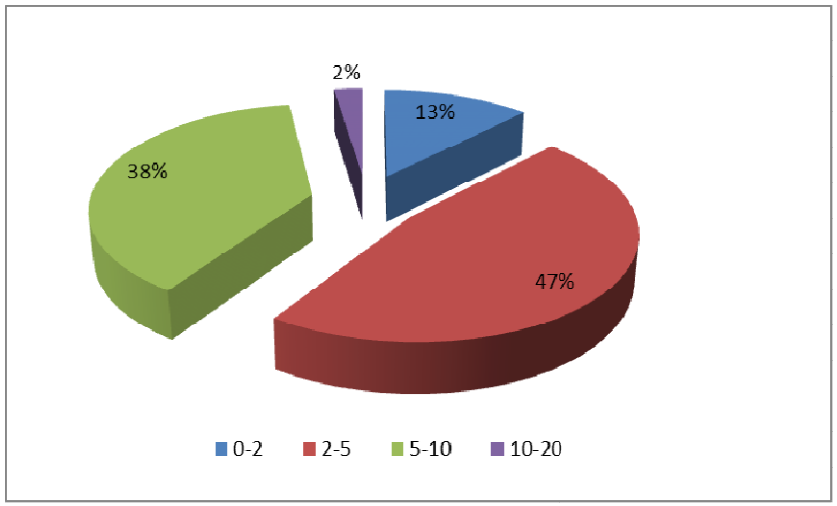


Fig.4. Percentage of wells in different water level ranges in unconfined aquifer.

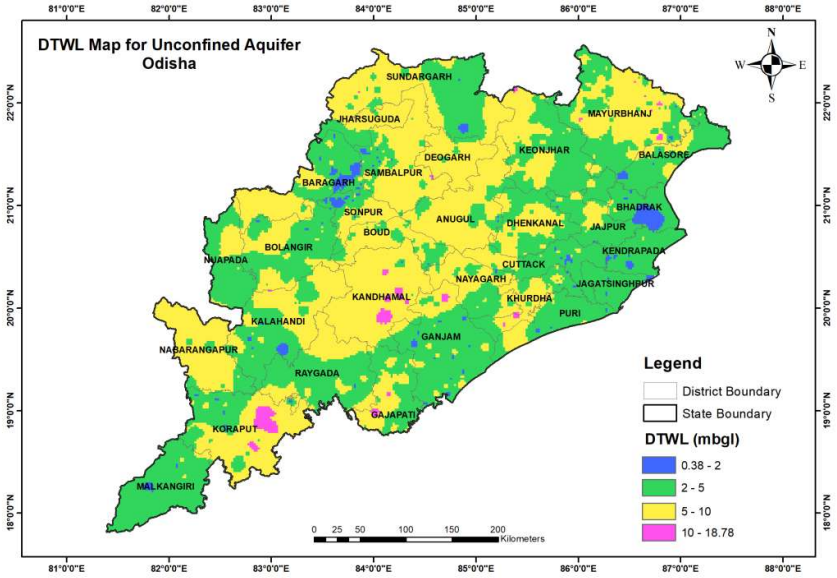


Fig.5. Depth to water level of unconfined aquifer during April 2025.

5.0 SHALLOW AQUIFER (UNCONFINED)

5.1 DEPTH TO WATERLEVEL

Depth to Water Level in Unconfined Aquifer (April 2025)

The depth to water level of 1299 wells is used for the analysis. Analysis of depth to water level data of 1299 wells shows water level varies between 0.15 m bgl (Ganjam district) to 19.60 m bgl (Koraput district).

Shallow water level of less than 2 m bgl is observed in 160 numbers of wells in all the districts covering 12.39% of the NHS wells of the State. About 46.96% 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 which is about 610 no. of wells. The districts with the more than 70% of wells showing this range of water level are Jagatsinghpur (72.73%), Kendrapara (70.83%) and Malkangiri(70.59%).The major command areas of the state like Hirakud, Mahanadi, and delta stage I & II, Baitarani, Salandi and Anandpur have shown water level in this range. Around 38.26% of the total NHS wells (497 no.of wells) recorded water level in the range of 5-10 mbgl and present in all the districts except Jagatsinghpur. Districts like Deogarh (80.00%), Jharsuguda (76.92%), Kandhamal (66.67%) and Anugul (64.58%) showed water level of most of the wells in this range.The hard rock and hilly terrains of the state has recorded water level in this range in majority of wells. Only 31 wells (2.39%) out of the total wells of the state fall in the range of 10-20 mbgl. It is observed mostly in Kandhamal (20.00%), Koraput (9.26%), Gajapati (6.90%) and Mayurbhanj (6.48%) districts. None of the monitored wells of April 2025 showed water level in more than 20 mbgl.

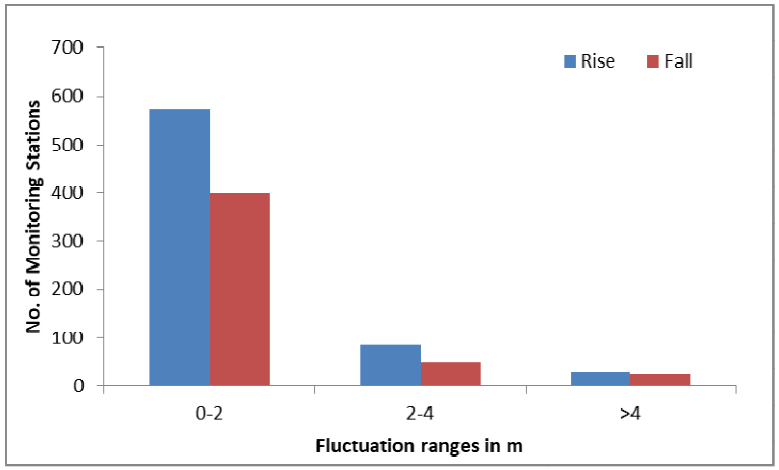
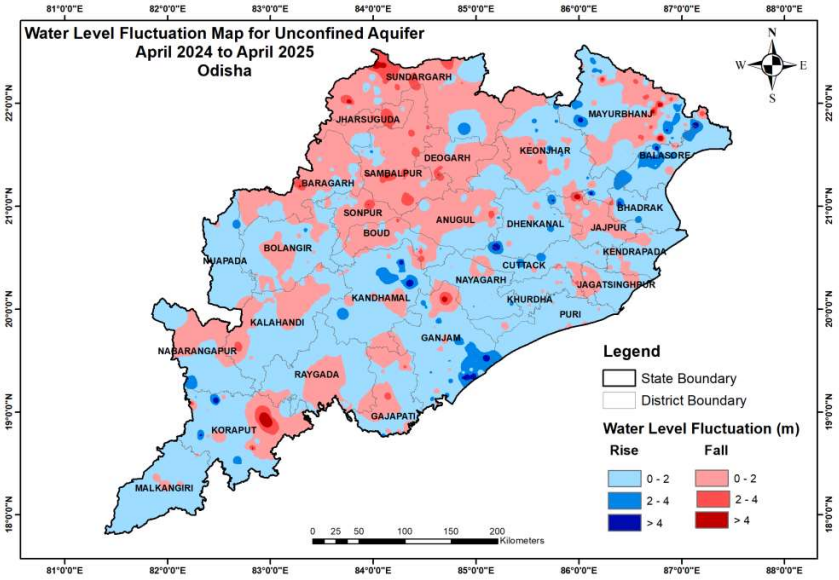


Fig.6.Wells showing rise and fall in WL in unconfined aquifer (April 2024 to April 2025)



5.2 ANNUAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 683 wells, water level rise of less than 2 m is recorded in 83.75% wells,2 to 4 m in 12.30% wells and more than 4 m in 3.95% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Nayagarh, Nuapada and Puri districts.Water level rise in the range of 2 to 4m is observed mainly in districts such as Baleshwar, Nuapada, Mayurbhanj, Ganjam, Kendujhar and Kandhamal districts. Rise of more than 4 m is observed in isolated patches mainly in Bhadrak, Baleshwar, Ganjam, Kandhamal, Koraput and Mayurbhanj districts.

Fall in Water Level:

Out of 472 wells that have registered fall in water level, 84.53% have recorded less than 2 m while 10.59% in the range of 2 to 4 m and remaining 4.87% recorded more than 4 m water level. Less than 2m is observed in all districts, mainly parts of Jajpur, Sonepur, Bargarh, Rayagada and Sambalpur districts. Fall of water level in the range of 2 to 4 m is observed mainly in Jharsuguda, Sambalpur, Sundargarh and Deogarh districts. Fall of beyond 4 m is observed as isolated patches in Deogarh, Sundergarh, Myurbhanj, Koraput, Sambalpur and Jajapur districts.

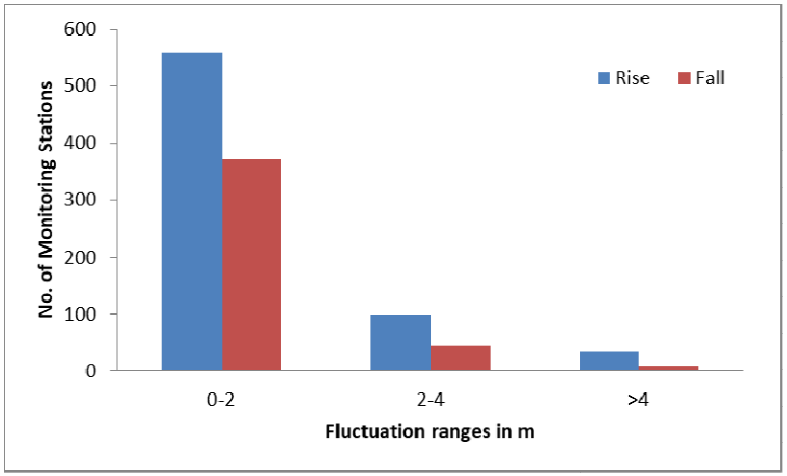


Fig.8.Wells showing rise and fall in WL in unconfined aquifer (April 2023 to April 2025)

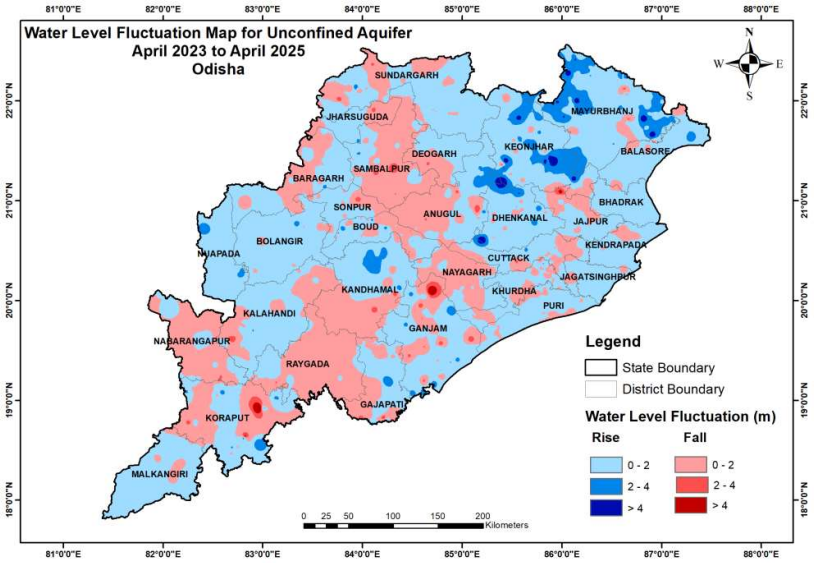


Fig.9. Annual water level fluctuation in unconfined Aquifer (April 2023 to April 2025)

5.3 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Unconfined Aquifer (April 2023 to April 2025)

Rise in Water Level:

Out of 691 wells, water level rise of less than 2 m is recorded in 80.90% wells, 2 to 4 m in 14.33% wells and more than 4 m in 4.77% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Bhadrak, Balangir, Jagatsinghpur, Kendrapara, Sonapur and Puri districts. Water level rise in the range of 2 to 4m is observed in isolated patches mainly in Nuapada, Mayurbhanj, Kandhamal, Koraput, Ganjam and Gajapati districts. Rise of more than 4 m is observed in isolated patches mainly in Kendujhar, Mayurbhanj, Dhenkanal and Kandhamal districts.

Fall in Water Level:

Out of 425 wells that have registered fall in water level, 87.53% have recorded less than 2 m while 10.59% in the range of 2 to 4 m and remaining 1.88% recorded more than 4 m water level. Less than 2m is observed in all districts, mainly parts of Nabarangapur, Nayagarh, Boudh, Rayagada and Malkangiri districts. Fall of water level in the range of 2 to 4 m is observed in isolated patches mainly in Rayagada, Debagarh, Jharsuguda, Ganjam and Gajapati districts. Fall of beyond 4 m is observed in only 8 wells in 2 wells of Koraput, 1 well in Kalahandi, Gajapati, Jajapur, Anugul, Khordha and Ganjam districts.

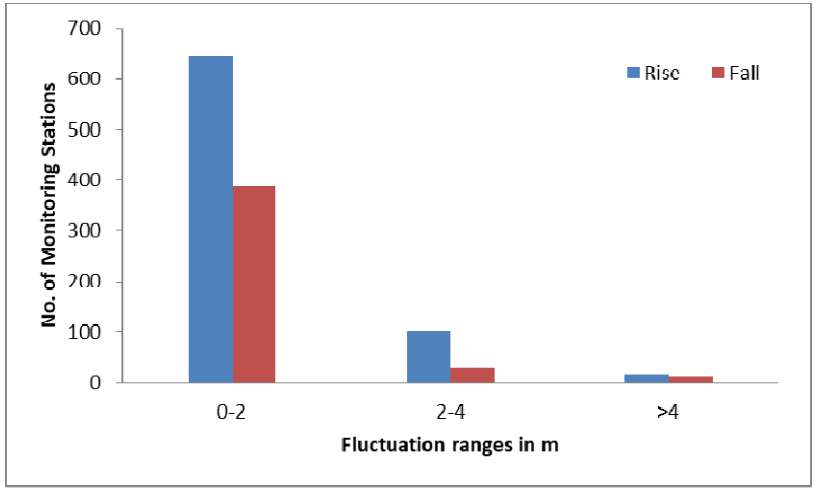


Fig.10. Wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean April (2015-2024) to April 2025)

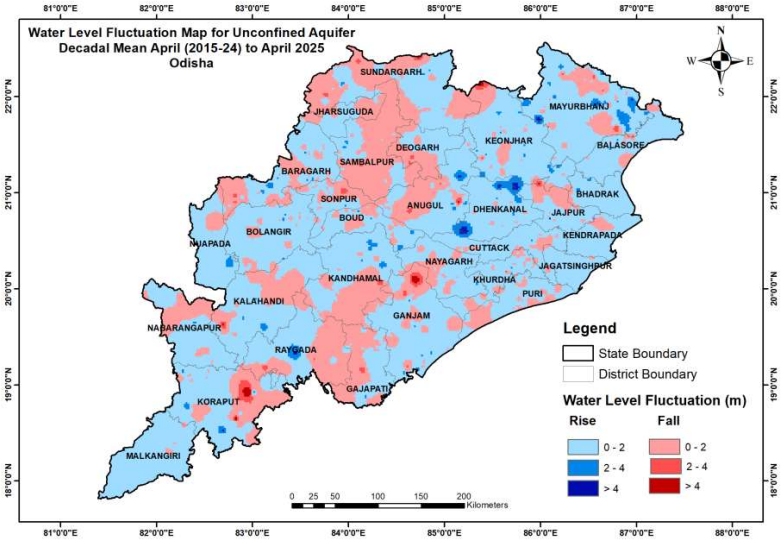


Fig.11. Decadal water level fluctuation in unconfined Aquifer (Decadal Mean April (2015-2024) to April 2025)

5.4 DECADAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 763 wells, water level rise of less than 2 m is recorded in 84.66% wells,2 to 4 m in 13.24% wells and more than 4 m in 2.10% of the wells. Water levelrise of less than 2 m is seen in all the districts, significantly in Kendrapara, Jagatsinghapur, Bhadrak and Malkangiri districts. Water level rise of 2 to 4 m is observed mainly in Nuapada, Kandhamal, Kendujhar and Mayurbhanj districts and rise of more than 4 m is observed in isolated patches mainly in parts of Jajpur, Rayagada, Dhenkanal and Mayurbhanj districts.

Fall in Water Level:

Out of the 427wells that have registered fall in water levels, 90.40% have recorded less than 2 m while 6.79% in the range of 2 to 4 m and remaining 2.81% wells registered water level fall of more than 4 m. Fall of less than 2 m is observed in all districts mainly in parts of Gajapati, Sonepur, Rayagada, Puri and Jharsuguda districts. Fall of 2 to 4m, recorded in Deogarh, Rayagada, Jharsuguda and Anugul districts. Fall beyond 4m recorded mainly in Anugul, Kalahandi, Koraput and Jajpur districts.

6.0 SUMMARY

The Central Ground Water Board (CGWB), South Eastern Region, Bhubaneswar, monitors groundwater levels in Odisha through a network of 1,780 observation wells. The data is collected quarterly (January, April, August, and November) to assess seasonal, annual, and decadal groundwater fluctuations.

As of April 2025, 1602 observation wells (1368 dug wells and 234 piezometers) were monitored. Groundwater depth varied 0.15 m bgl in Ganjam district to 19.60 m bgl in Koraput district. Shallow water levels (<2m bgl) were observed in 12.39% of wells, while 2-5m bgl was the most common range (46.96% of wells). Deep water levels (>10m bgl) were recorded in only a few wells in Kandhamal, Gajapati, Koraput and Mayurbhanj. Rainfall data from June to October 2024 was compared to previous years.Some districts received below-normal rainfall (e.g., Bhadrak, Balasore, and Rayagada), while others, such as Koraput and Malkangiri, received significantly more rainfall than usual. Annually, 683 wells recorded a rise in water level, with most rising by less than 2m. A total no. of 472 wells showed a fall in water level, mostly by less than 2m. Whereas in comparison with April 2023,691 wells noticed a rise, while 425 wells noticed a fall in water levels. The decadal fluctuation recorded 763 wells showing rise in water levels (mostly <2m) and 427 wells experiencing a fall, primarily in western and southern districts.

The April 2025 bulletin highlights groundwater fluctuations in Odisha, showing long-term decline in many areas. Continuous monitoring is essential to address groundwater sustainability in the state.

7.0 RECCOMENDATIONS

Shallow water level with less than 2 mbgl is mostly observed in coastal districts covering Bargarh, Bhadrak, Jagatsinghpur, Cuttack and Kendrapara districts. Besides these districts, water level with less than 2 mbgl is also observed in small patches in almost all the districts except Deogarh, Dhenkanal, Jharsuguda and Keonjhar. In these areas over-irrigation should be avoided to prevent further rise in water table. Use of drip or sprinkler irrigation will help in apply of water more efficiently and improve the water logging condition. Crops that can tolerate high water table conditions, such as rice, jute, sugarcane etc should be cultivated in the areas having water level less than 2mbgl.

Water level between 2 to 5 mbgl is observed in 46.96% of wells covering all the districts. In these areas installation of rainwater harvesting systems in residential, industrial, and agricultural areas, construction of recharge wells and percolation tanks can enhance ground water recharge. In addition to this construction of check dams can also help to improve ground water condition by slowing down surface runoff and allow infiltration. Use of drip irrigation and sprinkler systems to reduce water use in agriculture sector must be encouraged. Crop diversification i.e., less water-intensive crops like millets instead of paddy and sugarcane should be adopted.

Water level in the range of 5 to 10 mbgl is mostly noticed in 38.26% of wells mainly in Deogarh, Jharsuguda, Kandhamal and Anugul districts. Ground water extraction should be regulated in these areas. In addition to this artificial recharge and rain water harvesting structures should be constructed. Promoting crop diversification with less water-intensive crops can help in improving the situation.

Effective implementation of these recommendations will help in improving groundwater availability and ensuring long-term water security.