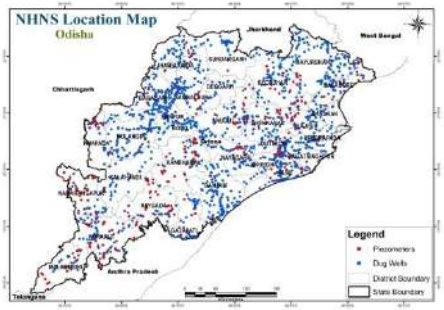

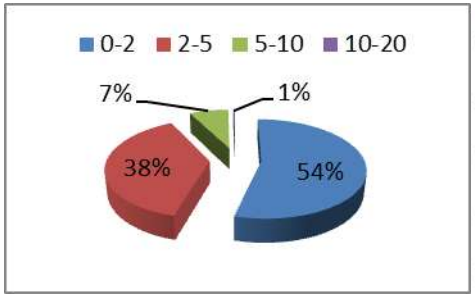

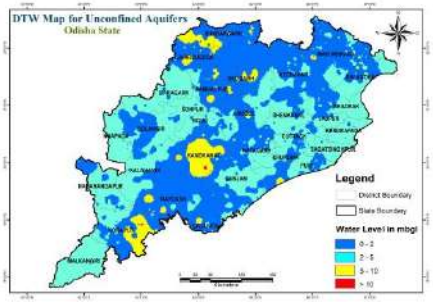

GROUNDWATERLEVELBULLETIN
JANUARY2025
ODISHA

ABSTRACT

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

CGWB, SOUTH EASTERN REGION, BHUBANESWAR

1.0 INTRODUCTION

Groundwater bulletin is prepared by GWB depicting changes in groundwater regime of the state 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, South East Region four times a year during January, April, August and November. A network of 1760 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 31.01.2025, 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.

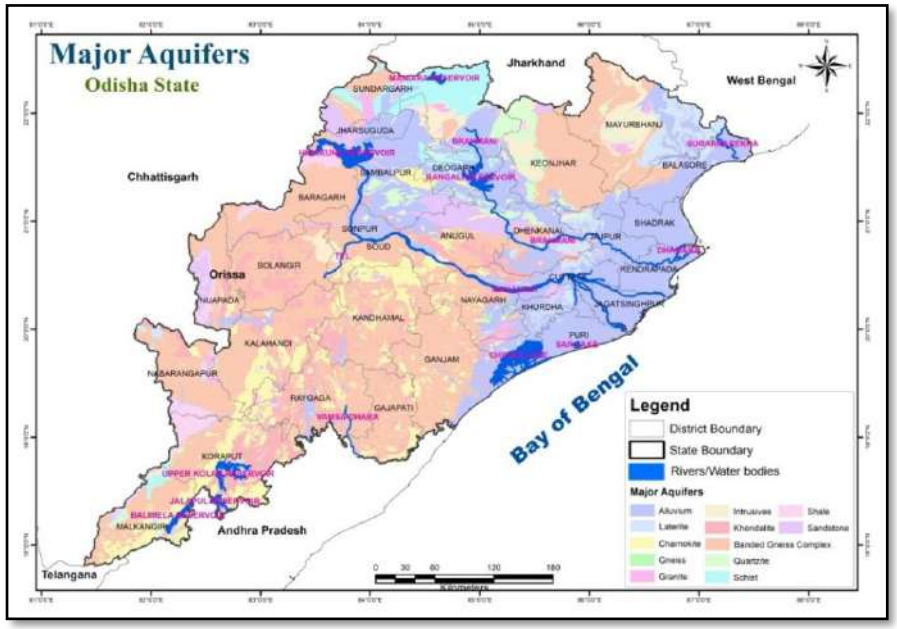

Fig.1. Map showing major aquifers and administrative divisions of Odisha

3.0 GROUNDWATER LEVEL MONITORING

Central Ground Water Board, South Eastern Region, is monitoring changes in 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 well still January 2025 is 1760 which include 1480 dug wells and 280 piezometers. Among these, 1565 wells monitored, and water level recorded, while 195 wells could not be monitored due to various reasons like inaccessibility issues. The district-wise breakup of the water level monitoring stations is given in **Table-1**.

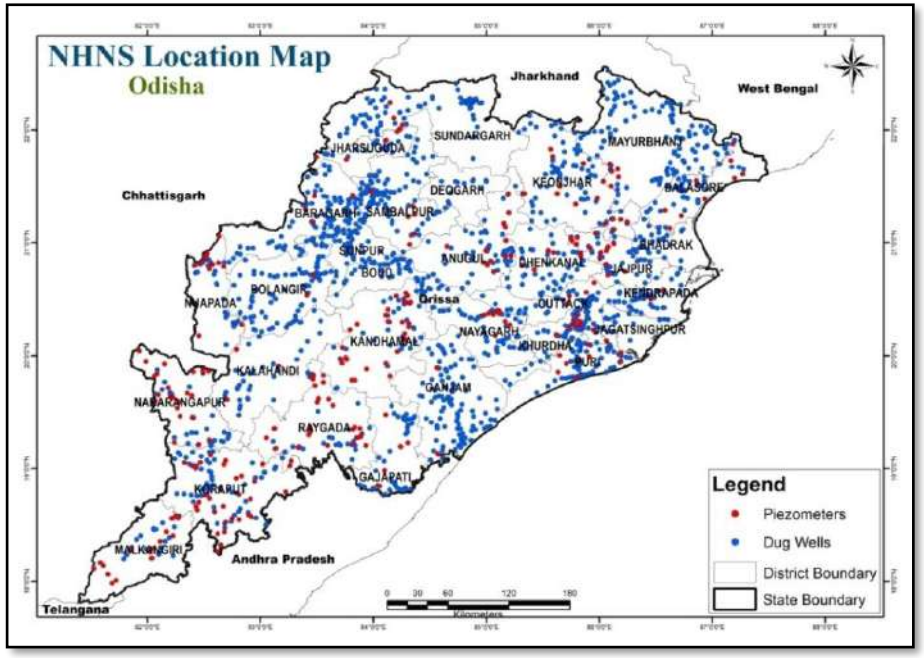

Fig.2.Map showing locations of monitoring wells (NHNS) in Odisha state

Table 1 District-wise distribution of water level monitoring stations

Sl. No.	District	No. of Monitoring Stations		
		DW	BW	Total
1	ANUGUL	48	13	61
2	BALANGIR	80	2	82
3	BALESHWAR	37	9	46
4	BARGARH	73	3	76
5	BAUDH	54		54
6	BHADRAK	26		26
7	CUTTACK	69	5	74
8	DEBAGARH	11		11
9	DHENKANAL	41	6	47
10	GAJAPATI	37	5	42
11	GANJAM	96	3	99
12	JAGATSINGHAPUR	12		12
13	JAJAPUR	38	14	52
14	JHARSUGUDA	19	4	23
15	KALAHANDI	35	3	38
16	KANDHAMAL	31	29	60
17	KENDRAPARA	26	3	29
18	KENDUJHAR	70	14	84
19	KHORDHA	72	8	80
20	KORAPUT	60	36	96
21	MALKANGIRI	20	18	38
22	MAYURBHANJ	110	9	119
23	NABARANGAPUR	27	25	52
24	NAYAGARH	43	12	55
25	NUAPADA	25	12	37
26	PURI	81	9	90
27	RAYAGADA	25	27	52
28	SAMBALPUR	83	6	89
29	SONAPUR	48		48
30	SUNDARGARH	83	5	88
Grand Total		1480	280	1760

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.

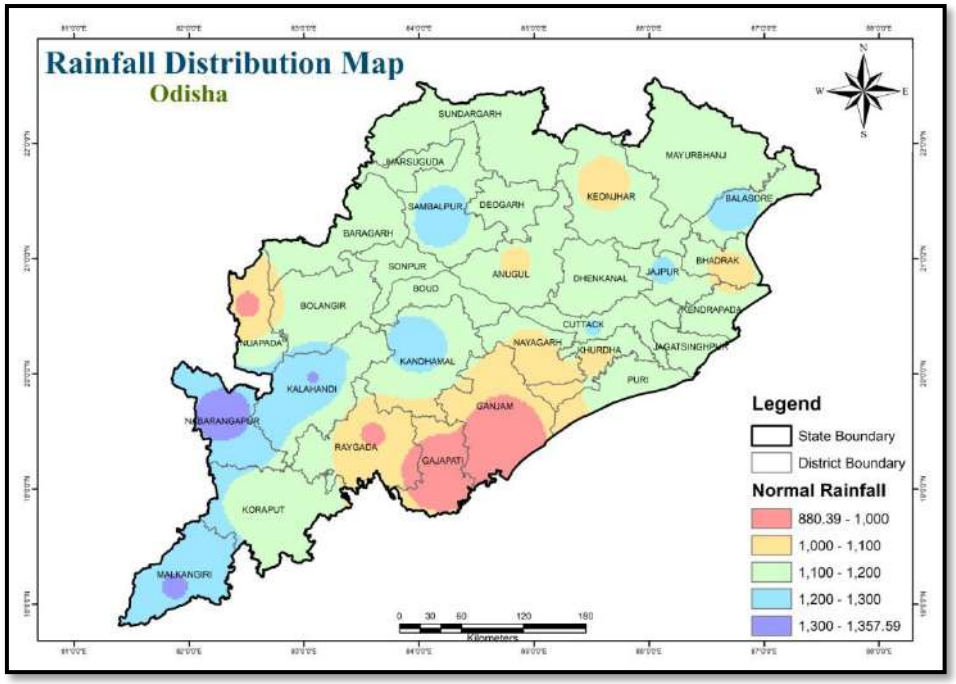

Fig.3. Rainfall deviation (June 2024-October 2024) from normal rainfall

Sl. No.	DISTRICT	Total Rain-fall_2024	Normal rainfall	Total Rain-fall_2023	Deviation from Nor-mal rainfall (%)	Deviation from rain-fall 2023 (%)
1	Anugul	1042.28	1083.53	1165.09	-3.81	-10.54
2	Balasore	929.33	1252.70	1086.00	-25.81	-14.43
3	Bargarh	1097.79	1131.56	1236.98	-2.98	-11.25
4	Bhadrak	757.74	1048.12	1021.36	-27.70	-25.81
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	19.94
8	Deogarh	936.33	1132.43	1272.13	-17.32	-26.40
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	15.54
12	Jagatsinghpur	1144.18	1101.36	912.89	3.89	25.34
13	Jajpur	955.66	1221.60	970.59	-21.77	-1.54
14	Jharsuguda	933.94	1169.42	1408.12	-20.14	-33.67
15	Kalahandi	1176.12	1305.19	1112.78	-9.89	5.69
16	Kandhamal	944.67	1275.24	1253.70	-25.92	-24.65
17	Kendrapara	895.07	1131.83	835.72	-20.92	7.10
18	Keonjhar	870.33	1072.20	1145.42	-18.83	-24.02
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	40.97
22	Mayurbhanj	1106.48	1150.45	1056.79	-3.82	4.70
23	Nawarangpur	1245.78	1357.63	1027.31	-8.24	21.27
24	Nayagarh	1106.91	1067.96	1024.25	3.65	8.07
25	Nuapada	1201.10	979.33	1002.12	22.65	19.86
26	Puri	846.88	1140.85	816.44	-25.77	3.73
27	Rayagada	751.48	986.15	867.43	-23.80	-13.37
28	Sambalpur	1109.26	1283.59	1484.41	-13.58	-25.27
29	Subarnapur	1297.67	1196.29	1253.27	8.47	3.54
30	Sundargarh	978.13	1113.84	1139.90	-12.18	-14.19

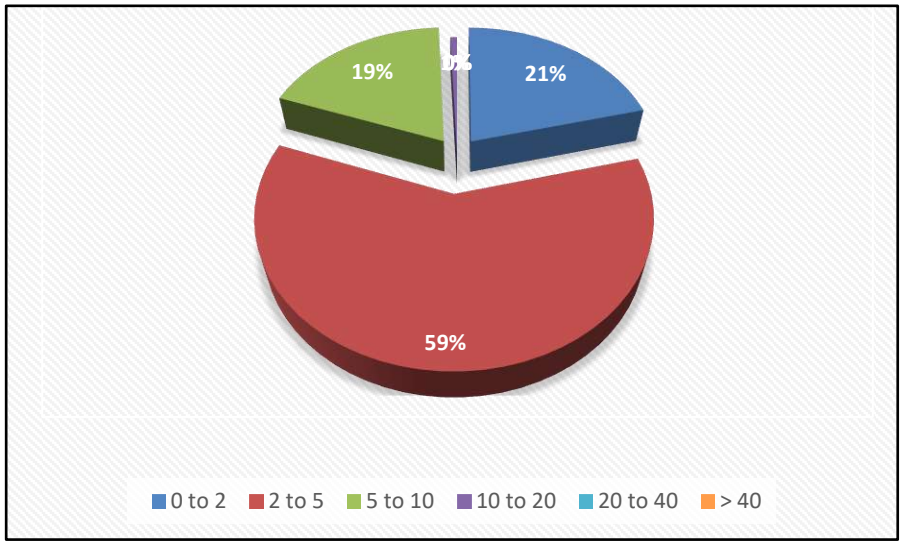

Fig.4. Percentage of wells in different water level ranges in unconfined aquifer.

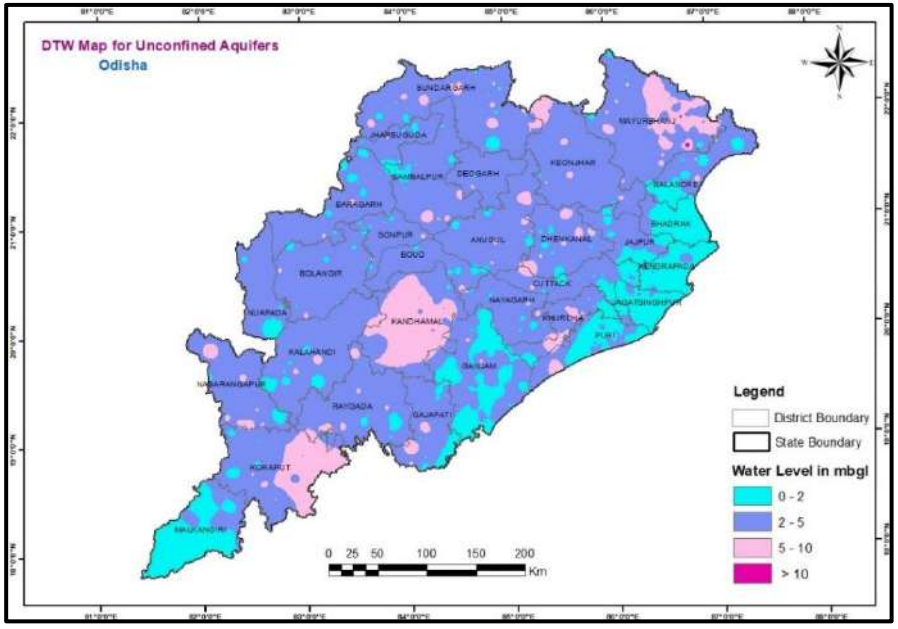

Fig.5. Depth to water level of unconfined aquifer during January 2025.

4.1 SHALLOW AQUIFER (UNCONFINED)

4.1.1 DEPTH TO WATERLEVEL

Depth to Water Level in Unconfined Aquifer (January 2025)

The depth to water level of 1337 wells is used for the analysis. Analysis of depth to water level data of 1337 wells shows water level varies between 0.10 m bgl (Sambalpur district) to 15.12 m bgl (Mayurbhanj district).

Shallow water level of less than 2 m bgl is observed in 281 number of wells in all the districts covering 21.02% of the NHS wells of the State. About 59.61% 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 797 no. of wells. The districts with the more than 70% of wells showing this range of water level are Bargarh (73.77%), Nuapada (81.82%), Boudh (76.47%) and Balangir (78.26%). 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 18.70% of the total NHS wells (250 no.of wells) recorded water level in the range of 5-10 mbgl and present as isolated patches. Districts like Kandhamal (53.57%), Koraput (43.14%), Nabarangpur (38.46%) and Deogarh (36.36%) showed water level 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 9 wells (0.67%) of the wells of the state fall in the range of 10-20 mbgl. It is observed in 3 wells of Mayurbhanj, 3 wells of Kandhamal, 1 well of Gajapati, Koraput and Sundergarh. None of the monitored wells of January 2025 showed water level in more than 20 mbgl.

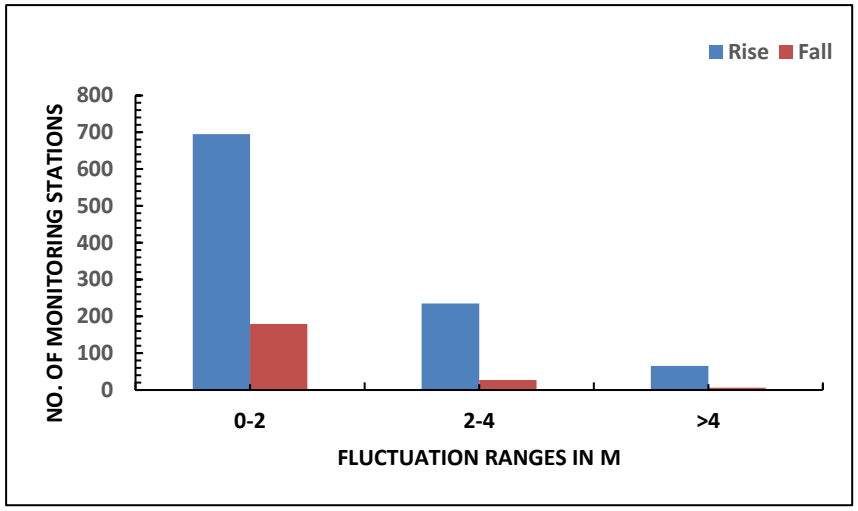

Fig.6.Wells showing rise and fall in WL in unconfined aquifer (April 2024 to January2025)

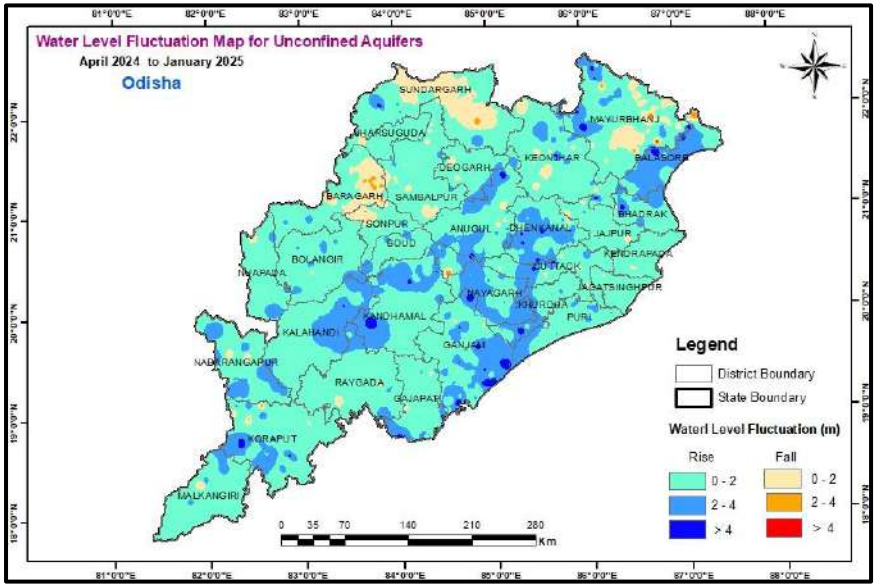

Fig.7. Seasonal water level fluctuation in unconfined Aquifer (April 2024 to January 2025)

4.1.2 SEASONAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 995 wells, water level rise of less than 2 m is recorded in 57.58% wells, 2 to 4 m in 19.47% wells and more than 4 m in 5.39% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Jagatsinghpur, Jajpur, Kendrapara and Puri districts.Water level rise in the range of 2 to 4m is observed in all districts except Deogarh mainly in districts such as Anugul, Baleshwar, Nayagarh and Nabarangpur districts. Rise of more than 4 m is significantly observed in Baleshwar, Deogarh, Dhenkanal and Ganjam districts.

Fall in Water Level:

Out of 212 wells that have registered fall in water level, 14.83% have recorded less than 2 m while 2.24% in the range of 2 to 4 m and remaining 0.54% wells registered water level fall of more than 4m. Fall of less than 2m is observed as isolated patches, mainly parts of Sundargarh, Sonepur, Sambalpur and Bargarh districts. Fall of water level in the range of 2 to 4 m is observed in 27 wells in Anugul, Bargarh, Kendujhar, Koraput, Malkangiri, Mayurbhanj, Sonepur, Sundergarh, Gajapati and Cuttack districts. Fall of beyond 4 m is observed in only 6 wells from 4 wells from which Mayurbhanj and one well each from Baleshwar and Bhadrak district. Total 8 no. of wells showed no fluctuation from Bolangir, Baudh, Koraput, Myurbhanj, Nuapada and Sundergarh districts.

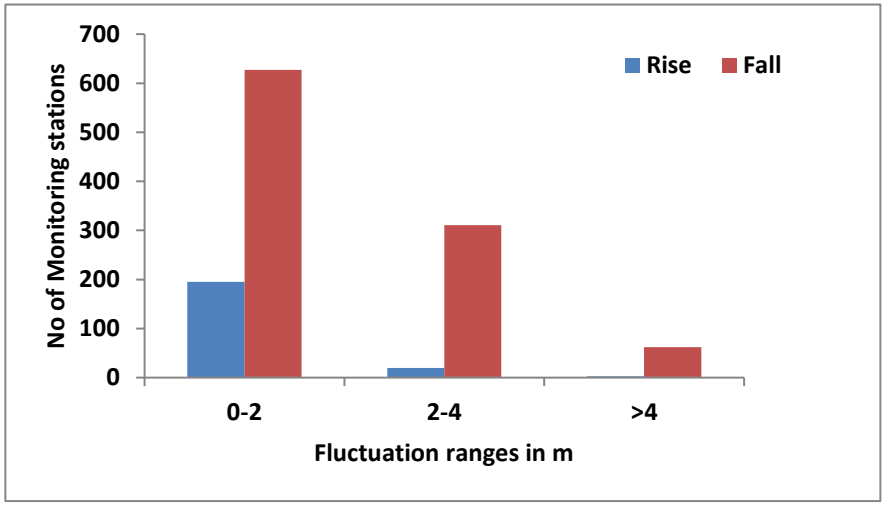

Fig.8. Wells showing rise and fall in WL in unconfined aquifer (August 2024 to January 2025)

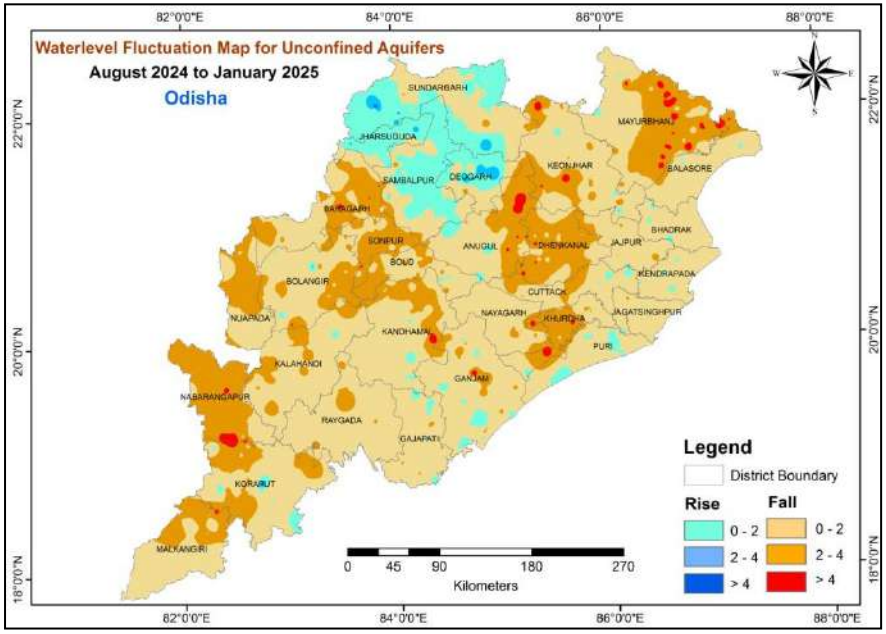

Fig.9. Seasonal water level fluctuation in unconfined Aquifer (August 2024 to January 2025)

4.1.2 SEASONAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 218 wells, water level rise of less than 2 m is recorded in 94.93% wells, 2 to 4 m in 9.17% wells and more than 4 m in 1.38% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Sundargarh, Sambalpur, Ganjam and Puri districts. Water level rise in the range of 2 to 4m is observed in isolated patches mainly in Sundargarh, Sambalpur, Jharsuguda and Deogarh districts. Rise of more than 4 m is observed in only 3 wells of Sundargarh, Sambalpur and Koraput districts.

Fall in Water Level:

Out of 1000 wells that have registered fall in water level, 62.7% have recorded less than 2 m while 31.1% in the range of 2 to 4 m and remaining 6.2% wells registered water level fall of more than 4m. Fall of less than 2m is observed in all the districts, mainly parts of Bhadrak, Nayagarh, Rayagada, Puri and Jagatsinghpur districts. Fall of water level in the range of 2 to 4 m is observed in all the districts except Bhadrak, Jharsuguda and Kendrapara. Fall in 2 to 4 m range significantly observed in Sonepur, Bargarh, Nabarangpur, Boudh and Koraput districts. Fall of beyond 4 m is observed in isolated patches mainly in Mayurbhanj, Anugul, Dhenkanal and Nabarangpur districts.

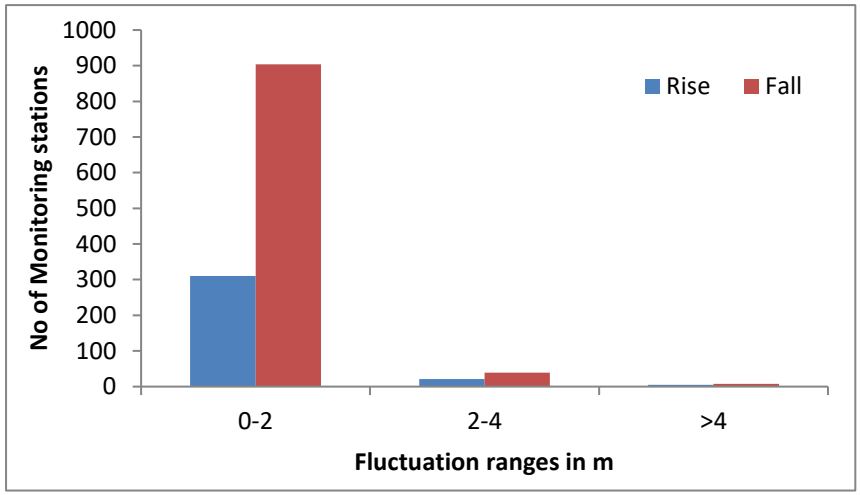

Fig.10. Wells showing rise and fall in WL in unconfined aquifer (November 2024 to January 2025)

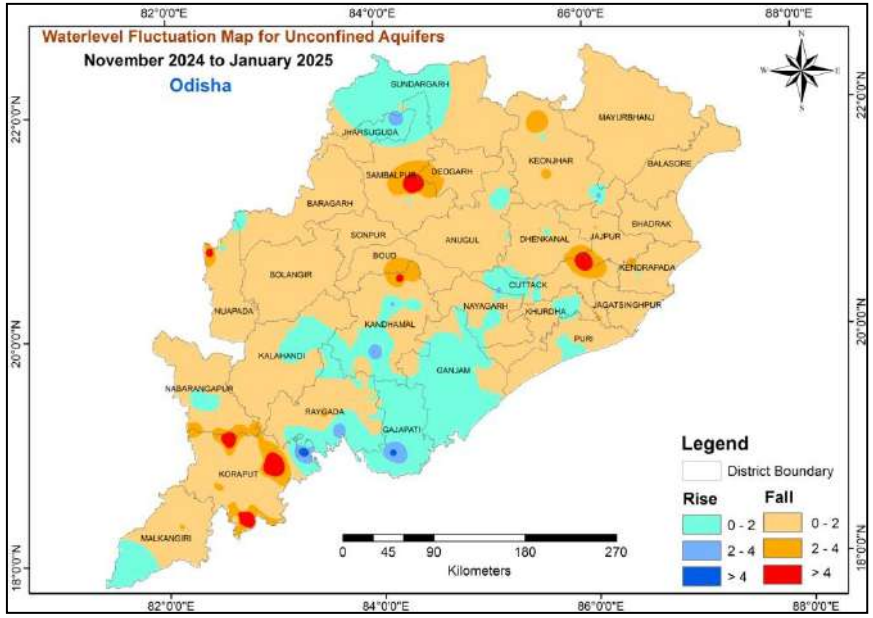

Fig.11. Seasonal water level fluctuation in unconfined Aquifer (November 2024 to January 2025)

4.1.3 SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water Level in Unconfined Aquifer (November 2024 to January 2025)

Rise in Water Level:

Out of 336 wells, water level rise of less than 2 m is recorded in 92.26% wells, 2 to 4 m in 6.25% wells and more than 4 m in 1.49% of the wells. Water level rise of less than 2 m is seen in all the districts except Bhadrak. Rise in less than 2 m is significantly observed in Gajapati, Ganjam, Jharsuguda and Jagatsinghapur districts. Water level rise in the range of 2 to 4m is observed in isolated patches mainly in districts such as Ganjam, Baleshwar, Boudh and Sundargarh districts. Rise of more than 4 m is observed in only 5 wells of Kandhamal, Khordha, Koraput, Sambalpur and Sundargarhdistricts.

Fall in Water Level:

Out of 951 wells that have registered fall in water level, 95.06% have recorded less than 2 m while 4.10% in the range of 2 to 4 m and remaining 0.84% wells registered water level fall of more than 4m. Fall of less than 2m is observed in all the districts, mainly parts of Bhadrak, Mayurbhanj, Sonepur, Kendujhar, Nabarangpur, Puri and Malkangiri districts. Fall of water level in the range of 2 to 4 m is observed in isolated patches mainly in Kandhamal, Anugul, Jajapur, Bargarh and Koraput districts. Fall of beyond 4 m is observed in only 8 wells from which2 wells in Sundargarh and one well each from Boudh, Ganjam, Kandhamal, Kendujhar, Nabarangpur and Nayagarh districts.

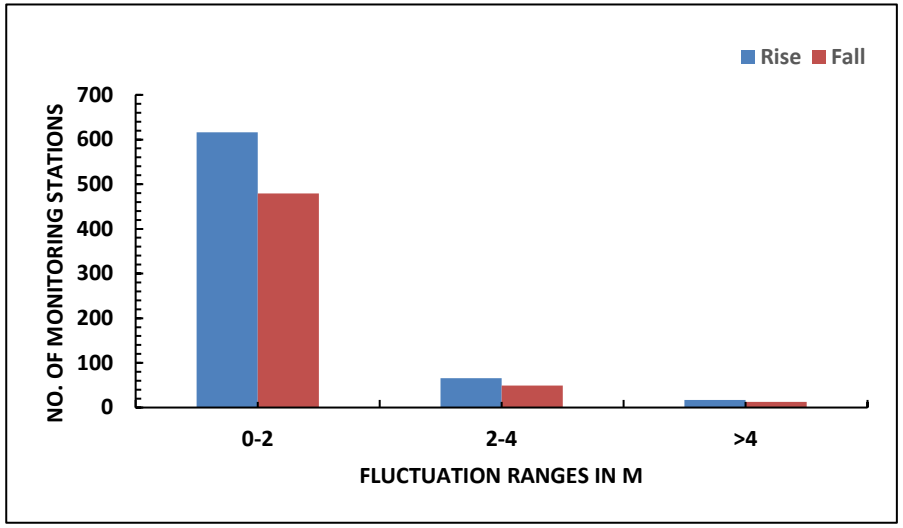

Fig.12. Wells showing rise and fall in WL in unconfined aquifer (January 2024 to January 2025)

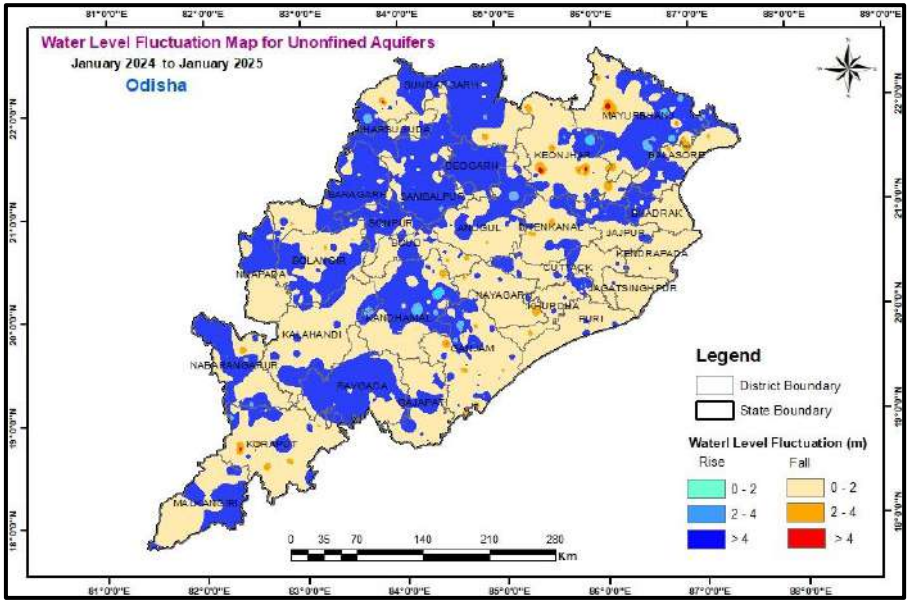

Fig.13. Annual water level fluctuation in unconfined Aquifer (January 2024 to January 2025)

4.1.4 ANNUAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 699 wells, water level rise of less than 2 m is recorded in 49.36% wells, 2 to 4 m in 5.29% wells and more than 4 m in 1.36% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Gajapati, Kendrapara, Nayagarh and Puri districts. Water level rise in the range of 2 to 4m is observed mainly in districts such as Deogarh, Dhenkanal, Ganjam, Jagatsinghpur and Nayagarh districts. Rise of more than 4 m is not observed in many districts except in Baleshwar, Kendujhar, Koraput, Ganjam, Khurdha, Myurbhanj and Sundergarh districts.

Fall in Water Level:

Out of 541 wells that have registered fall in water level, 38.38% have recorded less than 2 m while 3.93% in the range of 2 to 4 m and remaining 1.04% recorded more than 4 m water level. Less than 2m is observed in all districts, mainly parts of Bargarh, Deogarh, Sonepur, and Sambalpur districts. Fall of water level in the range of 2 to 4 m is observed mainly in Sundargarh, Nabarangpur, Mayurbhanj and Kandhamal districts. Fall of beyond 4 m is observed asisolated patches in Ganjam, Kandhmal, Kendujhar, Khurdha, Koraput, Myurbhanj and Sundergarh districts.

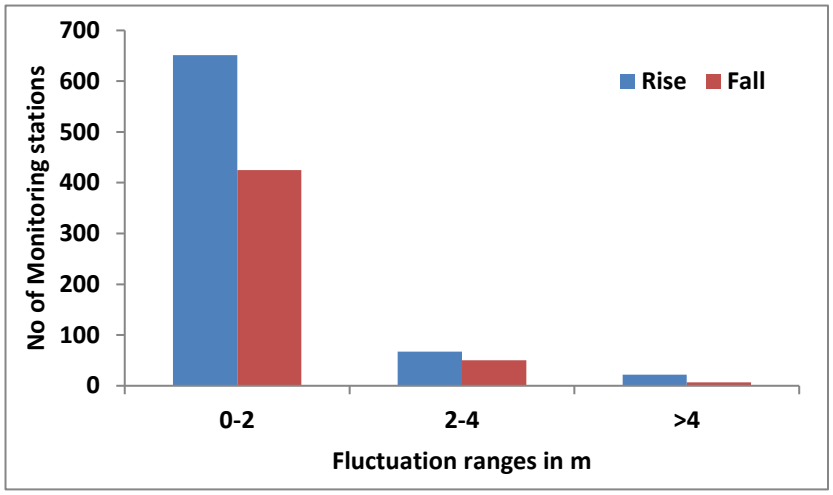

Fig.14. Wells showing rise and fall in WL in unconfined aquifer (January 2023 to January 2025)

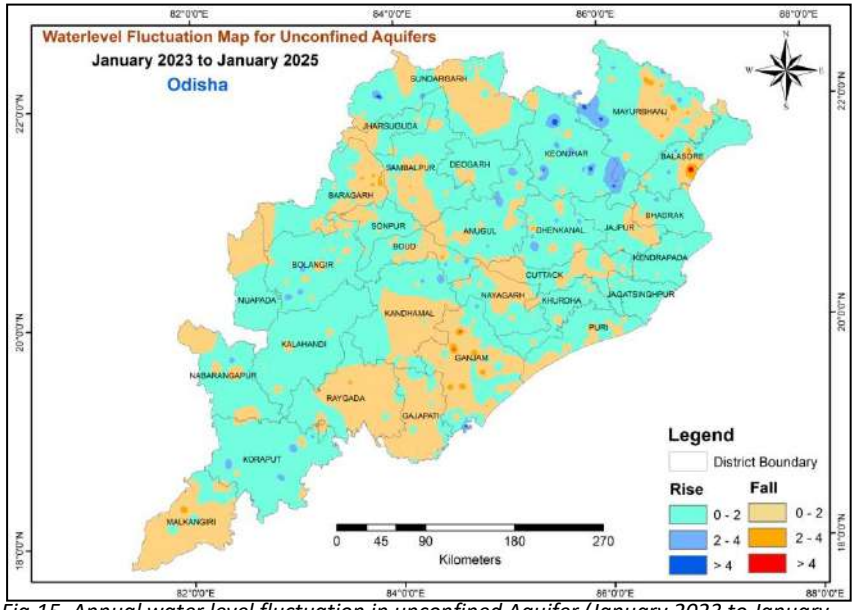

Fig.15. Annual water level fluctuation in unconfined Aquifer (January 2023 to January 2025)

4.1.5 ANNUAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 740 wells, water level rise of less than 2 m is recorded in 87.97% wells,2 to 4 m in 9.05% wells and more than 4 m in 2.97% of the wells. Water level rise of less than 2 m is seen in all the districts significantly in Kendrapara, Kalahandi, Jagatsinghpur, Khordha, Jajapur, Balangir and Sambalpur districts. Water level rise in the range of 2 to 4m is observed in isolated patches mainly in Dhenkanal, Kendujhar, Deogarh, Mayurbhanj, Kandhamal, Koraput and Anugul districts. Rise of more than 4 m is observed in isolated patches mainly in Kendujhar, Mayurbhanj, Koraput and Sambalpur districts.

Fall in Water Level:

Out of 482 wells that have registered fall in water level, 88.17% have recorded less than 2 m while 10.37% in the range of 2 to 4 m and remaining 1.45% recorded more than 4 m water level. Less than 2m is observed in all districts, mainly parts of Rayagada, Gajapti, Malkangiri and Nayagarh districts. Fall of water level in the range of 2 to 4 m is observed in isolated patches mainly in Bargarh, Mayurbhanj, Ganjam and Dhenakanal districts. Fall of beyond 4 m is observed in only 7 wells in 4 wells of Ganjam, 2 wells in Baleshwar and 1 well in Mayurbhanj district.

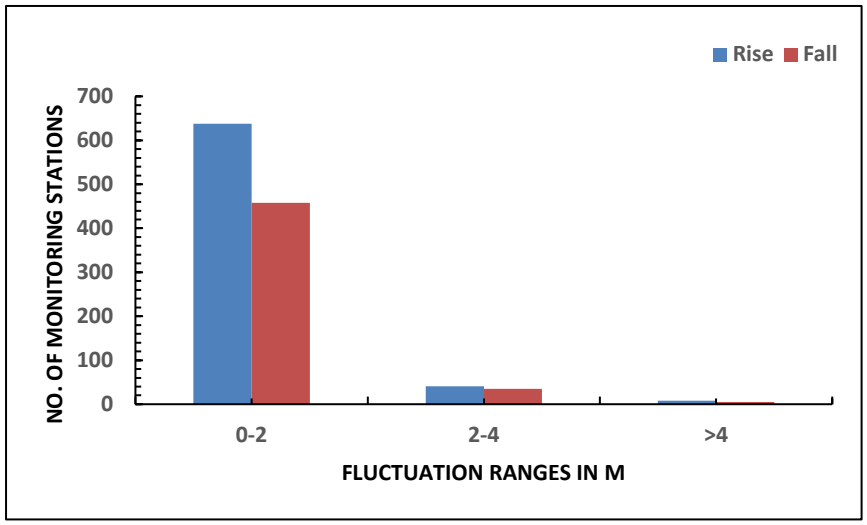

Fig.16. Wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean January (2015-2024) to Jannuary 2025)

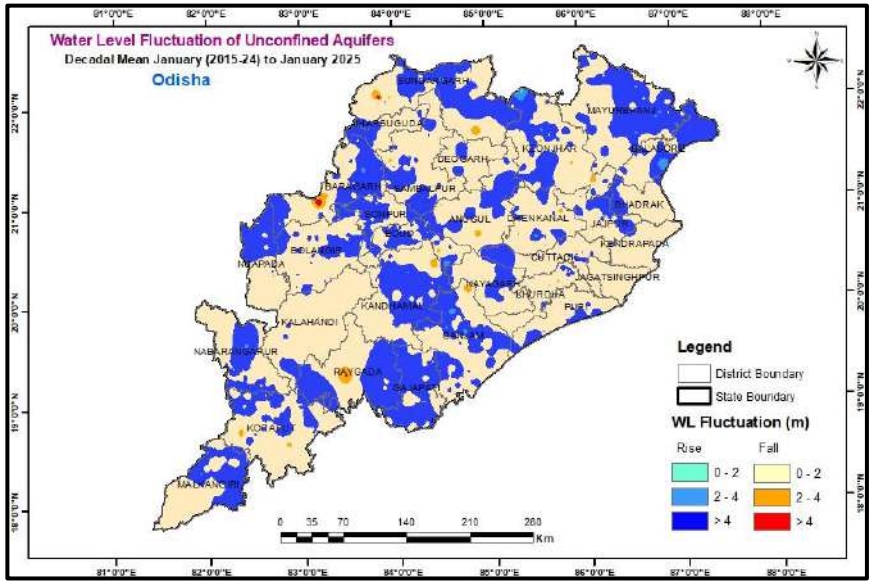

Fig.17. Decadal water level fluctuation in unconfined Aquifer (Decadal Mean January (2015-2024) to Jannuary 2025)

4.1.6 DECADAL FLUCTUATION IN WATER LEVEL

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

Rise in Water Level:

Out of 533 wells, water level rise of less than 2 m is recorded in 94.93% wells,2 to 4 m in 4.69% wells and more than 4 m in 0.37% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Nuapada, Dhenkanal, Kalahandi and Balangir districts. Water level rise of 2 to 4 m is observed mainly in Anugul, Dhenkanal, Kandhamal and Gajapati districts and rise of more than 4 m is observed in 2 wells of Jajapur and Khordha districts.

Fall in Water Level:

Out of the 689 wells that have registered fall in water levels, 83.02% haverecorded less than 2 m while 13.79% in the range of 2 to 4 m and remaining 3.19% wells registered water level fall of more than 4 m. Fall of less than 2 mis observed in all districts mainly in parts of Puri, Bhadrak, Kendrapara and Nabarangpur districts. Fall of 2 to 4m, recorded in Sambalpur, Jharsuguda, Sundargarh and Deoghar districts. Fall beyond 4m recordedmainly in Deogarh and Jharsuguda districts.

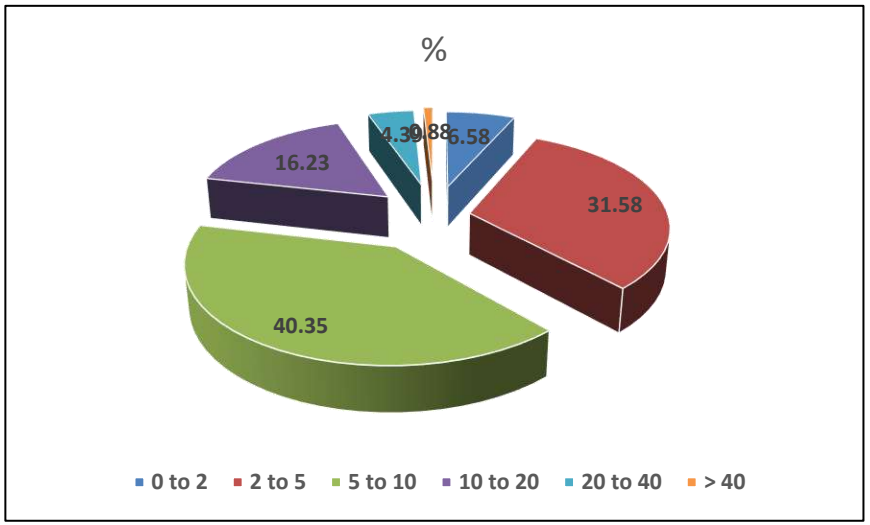

Fig.18. Percentage of wells in different piezometric levels (January 2025)

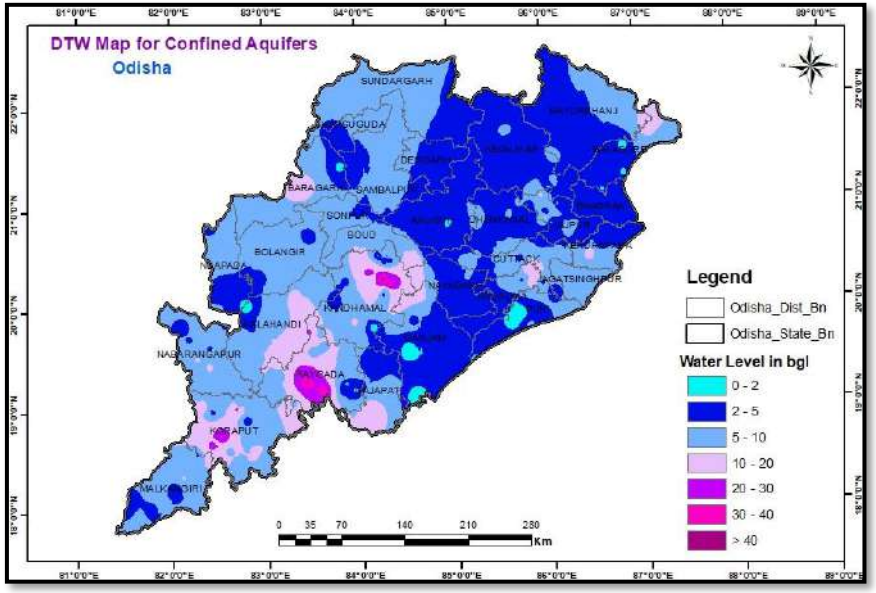

Fig.19. Depth to piezometric Level in deeper aquifer in January 2025

4.2 DEEPER AQUIFER (CONFINED/SEMI-CONFINED)

4.2.1 DEPTH TO PIEZOMETRIC LEVEL

Depth to Piezometric Level in Confined/Semi-Confined Aquifer (January 2025)

Analysis of piezometric level data of 228 wells shows piezometric levels vary between 0.53mbgl (Ganjam district) to 43.85 mbgl (Rayagada district). Piezometric level of less than 2 m bgl is recorded in 5.86% of wells, between 2 to 5 m bgl in 31.53% of wells, between 5 to 10 m bgl in 40.99% of wells, between 10 to 20 m bgl in 16.22 % of wells, between 20-40 m bgl in 4.50% of wells. Shallow piezometric level of less than 2mbgl is noticed in isolated patches mainly in Ganjam (40%), Puri (33.33%), Nayagarh (18.18%), and Baleshwar (12.50%) districts. Piezometric level of 2 to 5 mbgl mainly observed in parts of Balangir, Ganjam, Jharsuguda, Anugul and Malkangiri districts. The districts covered by depth to piezometric level of 5 to 10 m bgl with significant area in Sambalpur, Mayurbhanj, Kalahandi, Kendujhar and Dhenkanal districts. Piezometric level of 10 to 20 m bgl is significantly found in Gajapati, Baleshwar, Bargarh, Cuttack, Khordha, Koraput and Nabarangpur districts. Deeper piezometric levels of 20 to 40m mainly observed in Rayagada, Koraput and Khordhadistricts. Deeper piezometric level of more than 40m is observed in Kandhamal and Rayagada districts only.

4.2.2 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Seasonal Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (April 2024 to January 2025)

Rise in piezometric level:

Out of 147 wells, piezometric level rise of less than 2 m is recorded in 47.45% wells, 2 to 4 m in 14.80% wells and more than 4 m in 11.73% of the wells. Piezometric level rise of less than 2m is seen in most of the districts, significantly in Balangir, Cuttack, Jharsuguda and Nayagarh districts. Piezometric level rise of 2 to 4m is observed mainly in districts such as Kalahandi, Dhenkanal, Ganjam and Khordha districts. Rise of more than 4m is observed in Baleshwar, Baragarh, Gajapati and Malkangiri districts.

Fall in Piezometric Level:

Out of 48 wells that have registered fall in piezometric levels, 18.37% have recorded less than 2 m while 3.06% of wells are in the range of 2 to 4 m and remaining 3.06% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in parts of Dhenkanal, Kandhamal, Kendrapara, Kendujhar, Koraput and Sambalpur districts. Fall of 2 to 4 m is observed in Bargarh, Kandhamal, Koraput, Nuapada and Rayagada districts. Fall beyond 4 m is observed in wells of Baleshwar, Bargarh, Gajapati, Malkangiri, Nabarangpur and Sundergarh districts.

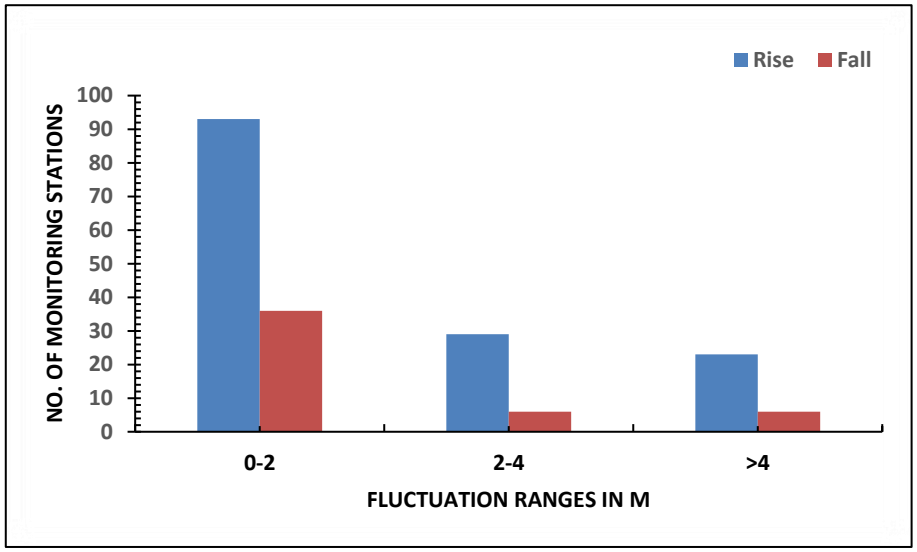

Fig.20. Wells showing rise and fall in piezometric level in confined/ semi-confined Aquifer (April 2024 to January 2025)

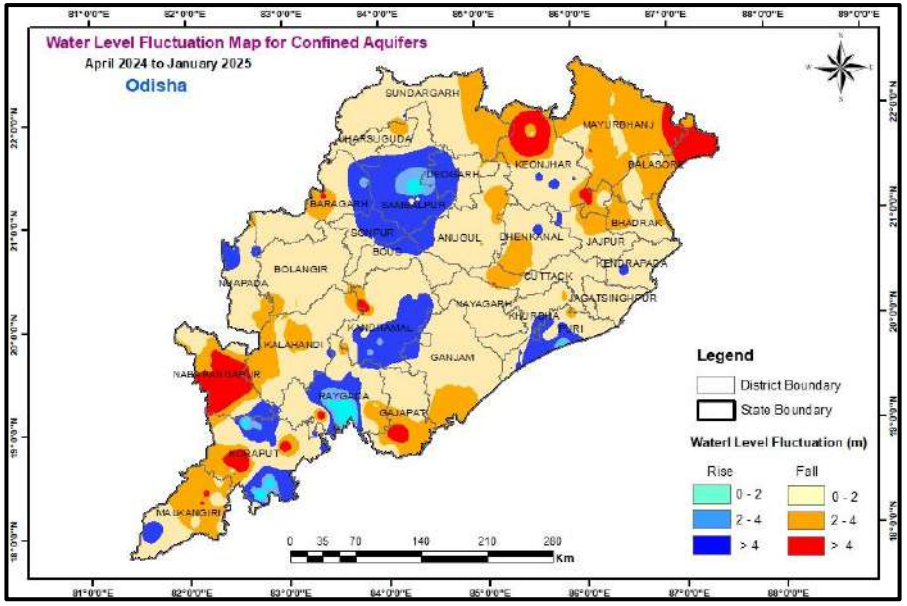

Fig.21. Annual water level fluctuation in Confined/Semi-confined Aquifer (April 2024 to January 2025)

4.2.3 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

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

Rise in piezometric level:

Out of 19 wells, piezometric level rise of less than 2 m is recorded in 78.95% wells, 2 to 4 m in 21.05% wells. Piezometric level rise of less than 2m is seen in isolated patches, significantly in Jharsuguda, Kalahandi, Kendrapara and Sambalpur districts. Piezometric level rise of 2 to 4m is observed in 4 wells in Baleshwar, Kendujhar and Sundargarh districts. None of the well shows piezometric level rise of more than 4m.

Fall in Piezometric Level:

Out of 149 wells that have registered fall in piezometric levels, 40.94% have recorded less than 2 m while 40.94% of wells are in the range of 2 to 4 m and remaining 18.12% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is observed in most of the districts mainly in parts of Nayagarh, Kandhamal, Puri and Bargarh districts. Fall of 2 to 4 m is mainly observed in Balangir, Dhenkanal, Jajapur, Mayurbhanj and Khordha districts. Fall beyond 4 m is mainly observed in wells of Kendrapara, Nabarangpur, Baleshwar, Cuttack and Koraput districts.

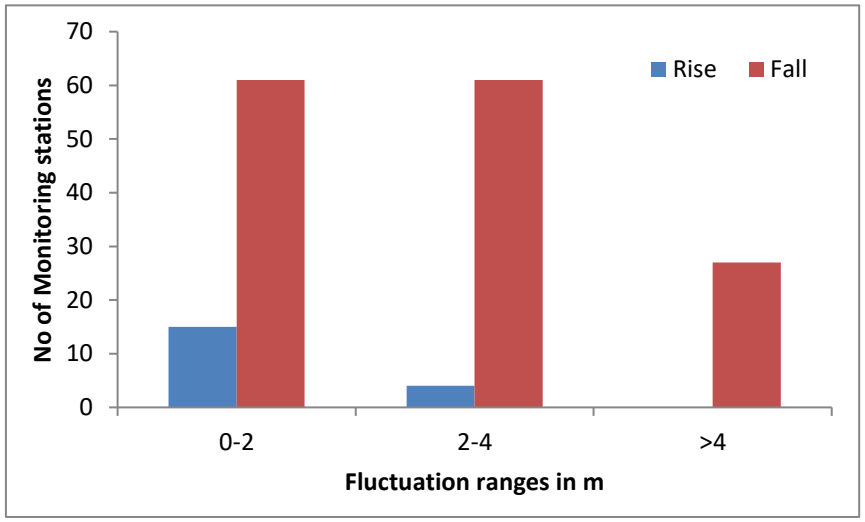

Fig.22. Wells showing rise and fall in piezometric level in confined/ semi-confined Aquifer (August 2024 to January 2025)

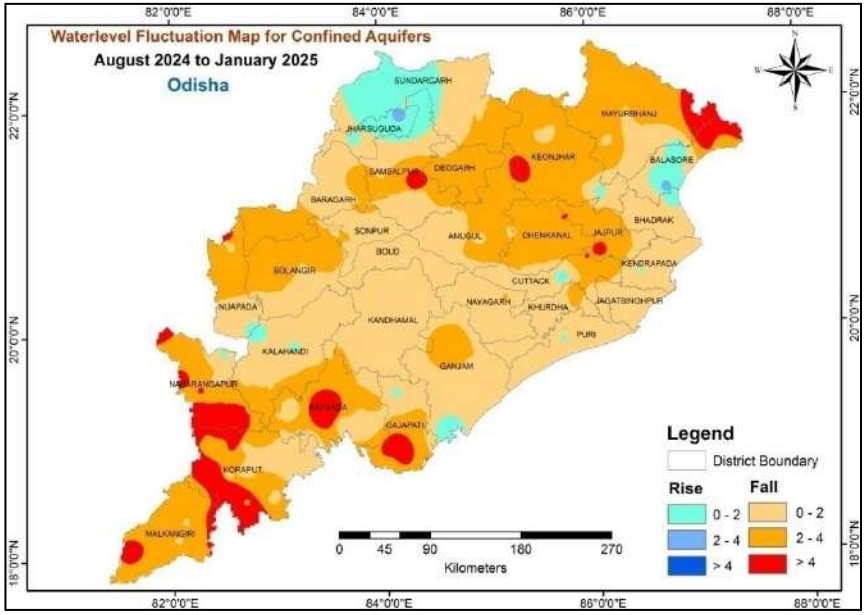

Fig.23. Annual water level fluctuation in Confined/Semi-confined Aquifer (August 2024 to January 2025)

4.2.4 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Seasonal Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (November 2024 to January 2025)

Rise in piezometric level:

Out of 54 wells, piezometric level rise of less than 2 m is recorded in 75.92% wells, 2 to 4 m in 16.67% wells and more than 4 m in 7.41% of the wells. Piezometric level rise of less than 2m is seen in most of the districts, significantly in Ganjam, Gajapati, Kendrapara and Khordha districts. Piezometric level rise of 2 to 4m is observed only in 9 wells in districts such as Ganjam, Kandhamal, Kendujhar, Malkangiri, Nuapada, Rayagada and Sundargarh districts. Rise of more than 4m is observed in 4 wells of Gajapati, Nayagarh, Kandhamal and Koraput districts.

Fall in Piezometric Level:

Out of 151 wells that have registered fall in piezometric levels, 86.09% have recorded less than 2 m while 7.95% of wells are in the range of 2 to 4 m and remaining 5.96% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is observed in most of the districts mainly in Balangir, Baleshwar, Bargarh, Jharsuguda, Mayurbhanj and Jajapur districts. Fall of 2 to 4 m is observed in isolated patches mainly in Cuttack, Dhenkanal, Kendrapara, Kendujhar and Malkangiri districts. Fall beyond 4m is observed in only 9 wells of Cuttack, Kandhamal, Koraput, Nuapada and Sambalpur districts.

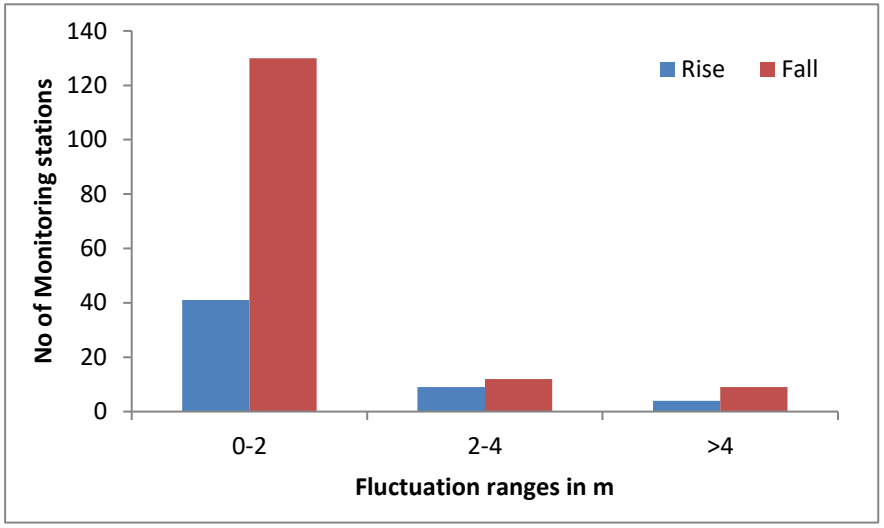

Fig.24. Wells showing rise and fall in piezometric level in confined/ semi-confined Aquifer (November2024 to January 2025)

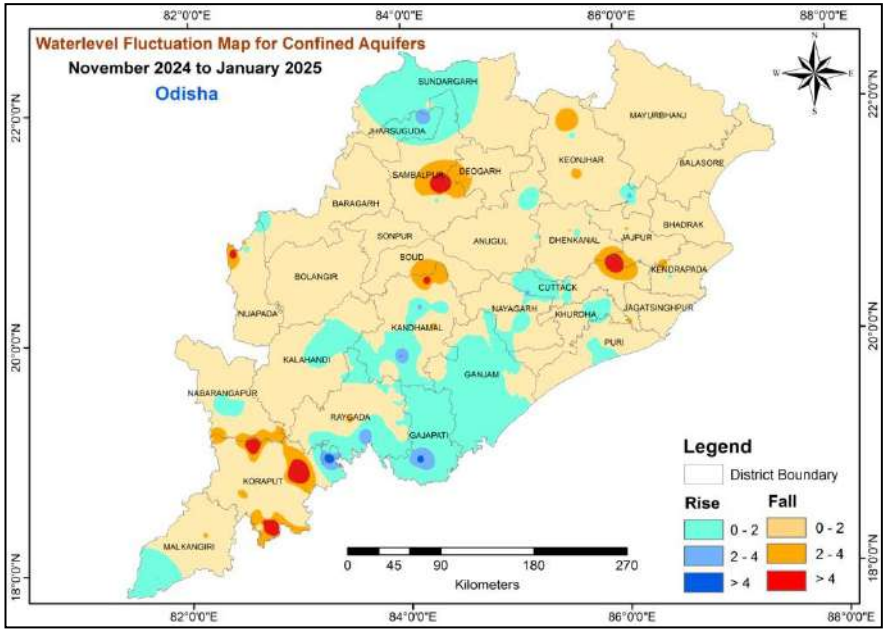

Fig.25. Seasonal water level fluctuation in Confined/Semi-confined Aquifer (November 2024 to January 2025)

4.2.5 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

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

Rise in piezometric level:

Out of 94 wells, piezometric level rise of less than 2 m is recorded in 74.47% wells, 2 to 4 m in 13.83% wells and more than 4 m in 11.70% of the wells. Piezometric level rise of less than 2m is seen in most of the districts, significantly in Ganjam, Kalahandi, Malkangiri and Puri districts. Piezometric level rise of 2 to 4m is observed mainly in districts such as Khordha, Nabarangpur, Gajapati, Kandhamal and Kendujhar districts. Rise of more than 4m is observed in Baleshwar, Sambalpur, Kandhamal, Koraput and Rayagada districts.

Fall in Piezometric Level:

Out of 70 wells that have registered fall in piezometric levels, 81.43% have recorded less than 2 m while 15.71% in the range of 2 to 4 m and remaining 2.86% wells registered piezometric level fall of more than 4 m. Fall of lessthan 2 m is mainly observed in parts of Jharsuguda, Cuttack, Nayagarh and Kandhamal districts. Fall of 2 to 4 m is observed mainly in Sambalpur, Balangir, Kendrapara and Kendujhar districts. Fall beyond 4 m is observed in 2 wells of Jajpur and Rayagada districts.

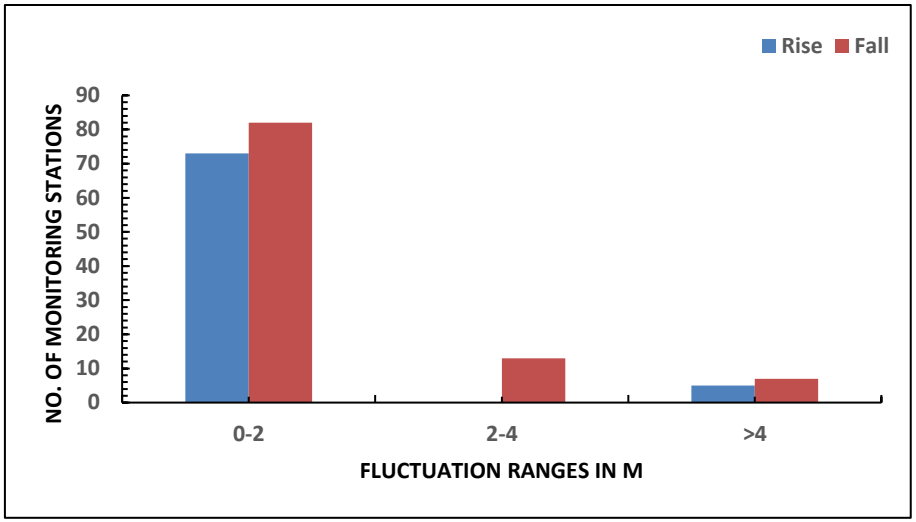

Fig.26. Wells showing rise and fall in piezometric level in confined/ semi-confined aquifer (January 2024 to January 2025)

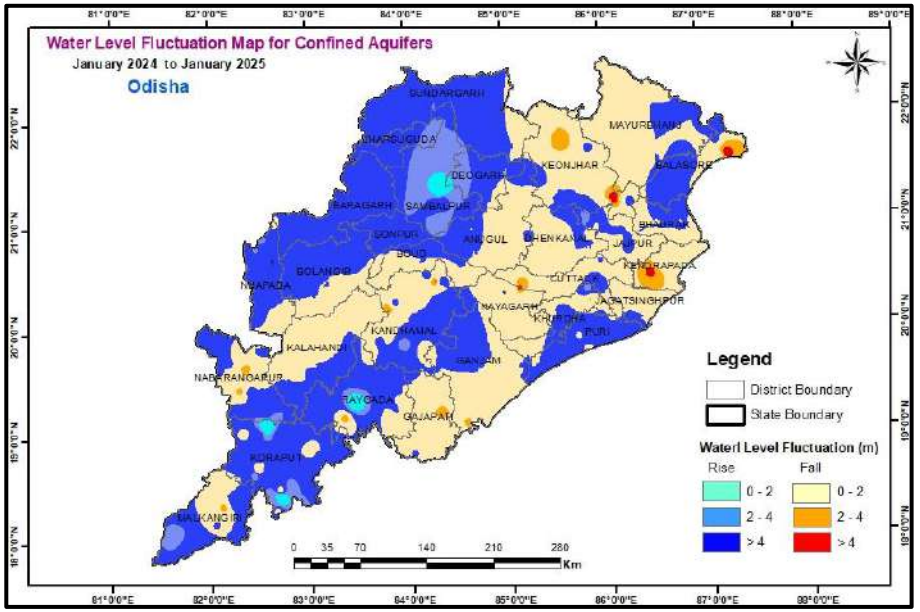

Fig.27. Annual water level fluctuation in Confined/Semi-confined Aquifer (January 2024 to January 2025)

4.2.6 SEASONAL FLUCTUATION IN PIEZOMETRIC LEVEL

Annual Fluctuation of Piezometric Level in Confined/Semi-confined Aquifer (January 2023 to January 2025)

Rise in piezometric level:

Out of 79 wells, piezometric level rise of less than 2 m is recorded in 77.21%wells, 2 to 4 m in 12.66% wells and more than 4 m in 10.13% of the wells. Piezometric level rise of less than 2m is seen in most of the districts, significantly in Nuapada, Jajapur, Ganjam, Kendujhar and Anugul districts. Piezometric level rise of 2 to 4m is observed mainly in districts such as Anugul, Baleshwar, Bargarh, Kendujhar, Koraput, Malkangiri and Rayagada districts. Rise of more than 4m is observed in 8 wells of Baleshwar, Kendujhar, Koraput, Malkangiri and Nabarangpur districts.

Fall in Piezometric Level:

Out of 91 wells that have registered fall in piezometric levels, 73.63% have recorded less than 2 m while 12.09% in the range of 2 to 4 m and remaining 14.28% wells registered piezometric level fall of more than 4 m. Fall of less than 2 m is mainly observed in Balangir, Jharsuguda and Khordha districts. Fall of 2 to 4 m is observed mainly in Bargarh, Kendrapara, Kandhamal and Dhenkanal districts. Fall beyond 4 m is observed in Baleshwar, Koraput and Rayagada districts.

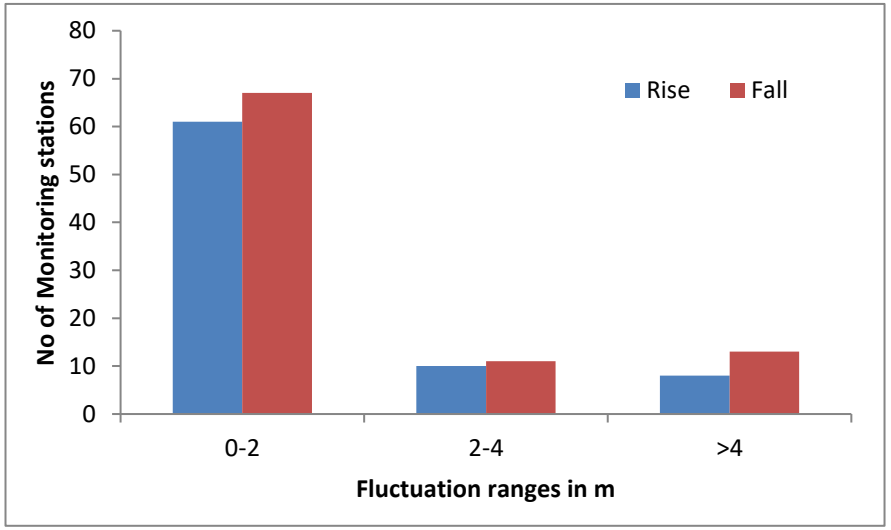

Fig.28. Wells showing rise and fall in piezometric level in confined/ semi-confined aquifer (January 2023 to January 2025)

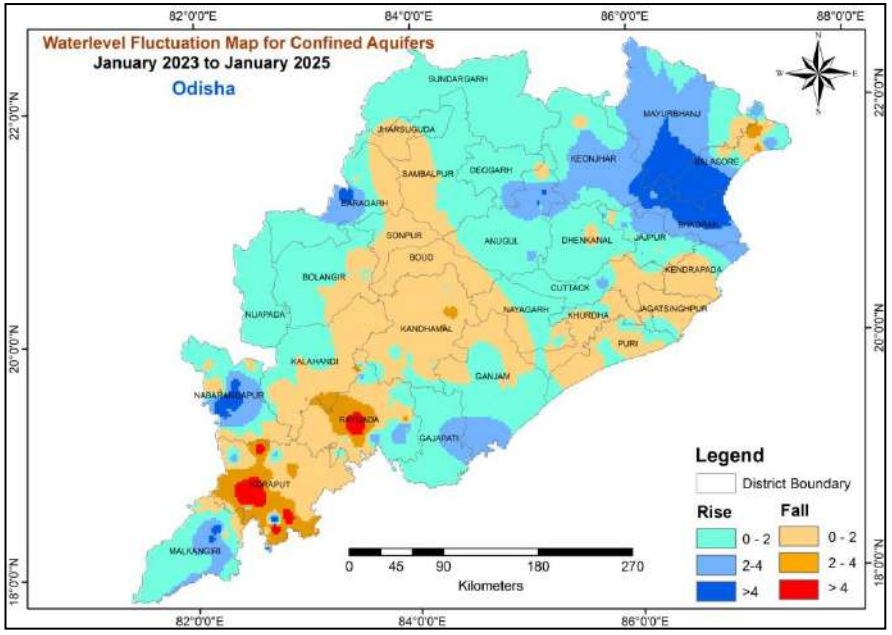

Fig.29. Annual water level fluctuation in Confined/Semi-confined Aquifer (January 2023 to January 2025)

4.2.7 FIVE YEAR FLUCTUATION IN PIEZOMETRIC LEVEL

Five Year Fluctuation of Water Level in Confined Aquifer (Five Year Mean January (2020-2024) to January 2025)

Rise in Water Level:

Out of 210 wells, 88 wells have registered rise in water level. Water level rise of less than 2 m is recorded in 34.29% wells, 2 to 4 m in 4.29% wells and more than 4 m in 3.33% of the wells. Water level rise of less than 2 m is seen in all the districts, significantly in Rayagada, Anugul, Nabarangapur, Jajapur, Koraput and Nayagarh districts. Water level rise of 2 to 4 m is observed mainly in Balasore and Kandhamal districts and rise of more than 4 m is observed in 2 wells of Balasore district and one well in Kendujhar, Koraput, Malkangiri, Nabarangpur and Nayagarh districts.

Fall in Water Level:

Out of the 210 wells 122 that have registered fall in water levels, 43.33% have recorded less than 2 m while 9.05% in the range of 2 to 4 m and remaining 5.71% 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 Koraput, Kandhamal, Nabarangpur, Kendujhar and Puri, districts. Fall of 2 to 4m, recorded in Kandhamal, Jajapur, Kendujhar, Nuapada, Rayagada and Sambalpur districts. Fall beyond 4m recorded mainly in Koraput and Rayagada districts and in one well of Khordha, Nuapada and Sambalpur districts.

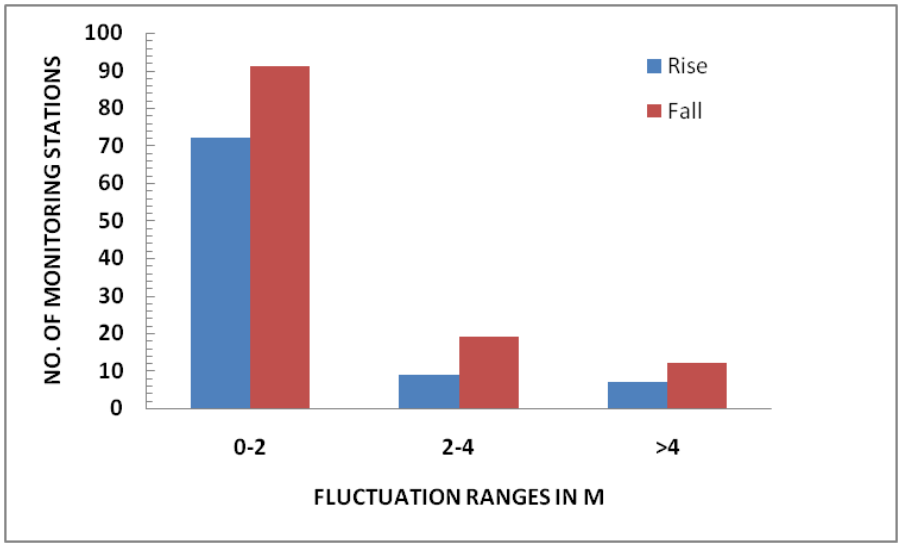

Fig.30. Wells showing fall in water level fluctuation in confined Aquifers (Five Year Mean January (2020-2024) to Jannuary 2025)

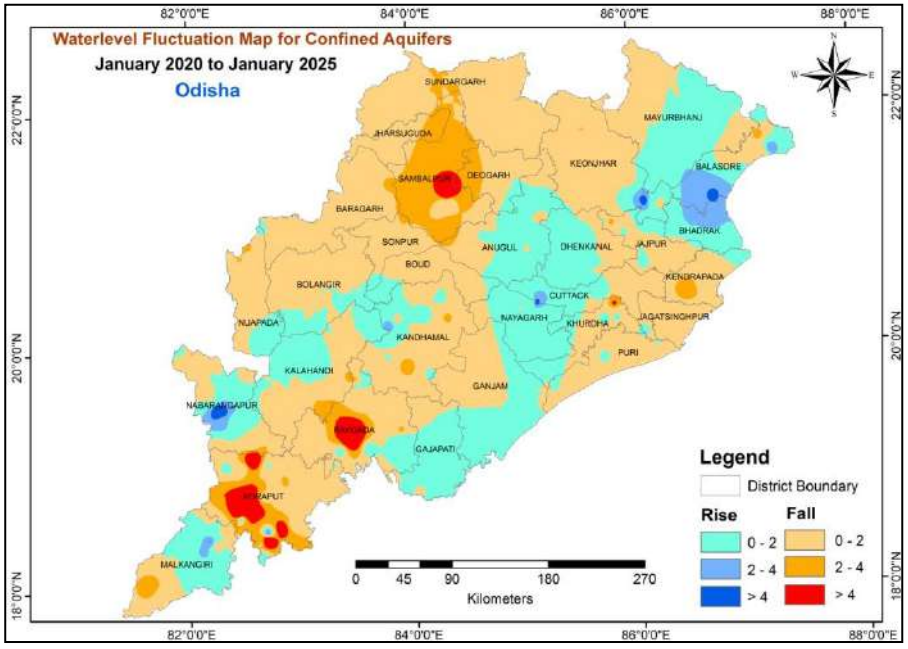

Fig.31. Five Year water level fluctuation in unconfined Aquifer (Five Year Mean January (2020-2024) to Jannuary 2025)

5.0 SUMMARY

The Central Ground Water Board (CGWB), South Eastern Region, Bhubaneswar, monitors groundwater levels in Odisha through a network of 1,760 observation wells. The data is collected quarterly (January, April, August, and November) to assess seasonal, annual, and decadal groundwater fluctuations.

As of January 2025, 1,565 observation wells (1337 dug wells and 228 piezometers) were monitored. Groundwater depth varied from 0.10 m below ground level (bgl) in Sambalpur to 15.12 m bgl in Mayurbhanj. Shallow water levels (<2m bgl) were observed in 21.02% of wells, while 2-5m bgl was the most common range (59.61% of wells). Deep water levels (>10m bgl) were recorded in only a few wells in Mayurbhanj, Kandhamal, Gajapati, Koraput, and Sundargarh. 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. Seasonally, 995 wells recorded a rise in water level, with most rising by <2m. 212 wells showed a fall in water level, mostly by <2m whereas annually 699 wells experienced a rise, while 541 wells saw a fall in water levels. The decadal fluctuation recorded 533 wells showing rise in water levels (mostly <2m) and 689 wells experiencing a fall, primarily in coastal districts. Piezometric levels ranged from 0.53m bgl (Ganjam) to 43.85m bgl (Rayagada). Shallow piezometric levels (<2m bgl) were found in Ganjam, Puri, Nayagarh, and Balasore. Deep piezometric levels (>40m bgl) were recorded in Kandhamal and Rayagada. Monsoon rainfall improved seasonal groundwater levels, with 93.68% ofwells showing a rise. Annual comparison: 52.51% of wells recorded a rise, and 47.49% a fall. Decadal trend: 56.38% of wells showed a decline, indicating long-term groundwater depletion.

The January 2025 bulletin highlights groundwater fluctuations in Odisha, showing seasonal improvements due to monsoon rains but a long-term decline in many areas. Continuous monitoring is essential to address groundwater sustainability in the state.

6.0 RECCOMENDATIONS

Shallow water level with less than 2 mbgl is mostly observed in coastal districts covering Balasore, Bhadrak, Jajpur, Kendrapara, Jagatsinghpur, Ganjam and Malkangiri districts. Besides these districts, water level with less than 2 mbgl is also observed in small patches in almost all the districts. 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 these areas.

Water level between 2 to 5 mbgl is observed in more than 70% 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 Kandhamal, some parts of Mayurbhanj and Koraput 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.