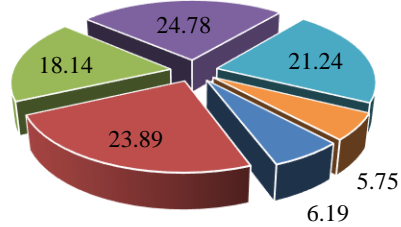
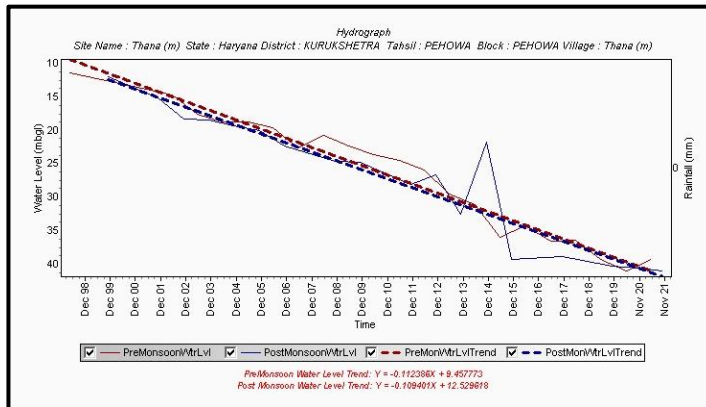
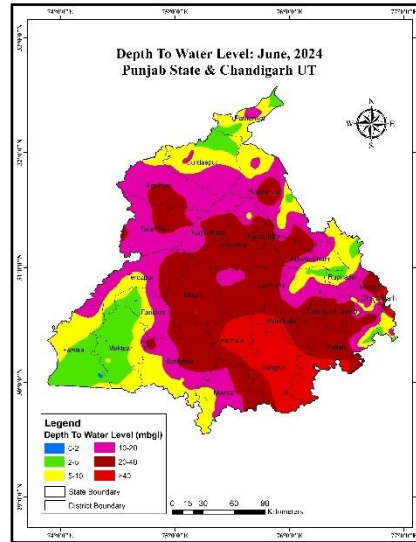


Percentage of Wells In Different Water Level Ranges In Unconfined Aquifers (Jun, 2024)



- 0-2 mbgl ■ 2-5 mbgl ■ 5-10 mbgl
- 10-20 mbgl ■ 20-40 mbgl ■ >40 mbgl



ABSTRACT

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

CGWB, NORTH WESTERN REGION, CHANDIGARH

GROUND WATER LEVEL BULLETIN HARYANA

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 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 four times a year during January, June, August and November. The regime monitoring started in the year 1969 by Central Groundwater Board. A network of 1874 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 30.04.2024, located all over the country is being monitored.

2.0 STUDY AREA

Ground water is among the Nation's most precious natural resources. Measurements of water levels in wells provide the most fundamental indicator of the status of this resource and are critical to meaningful evaluations of the quantity and quality of ground water and its interaction with surface water. Water-level measurements are made by Central Ground Water Board four times a year but the measurements in June are quite crucial as it provides the overall impact of rainfall infiltration into ground water system during monsoon season and ground water withdrawal for irrigation which counts nearly 65% of its annual irrigation demands during this period only.

The Haryana State is located between north latitudes $27^{\circ} 39'$ & $30^{\circ} 55'$ and east longitudes $74^{\circ} 27'$ & $77^{\circ} 35'$ covering an area of 44,212 sq. km. The State has been divided into four main divisions viz. Ambala, Gurgaon, Rohtak and Hissar, which are further sub-divided into 20 districts and 114 community development blocks. The state is sub-divided into nine physiographic units and is drained by two major rivers, Ghaggar and Yamuna. There are four irrigation systems in the state namely Western Yamuna Canal, Bhakra canal, Agra canal and Ghaggar

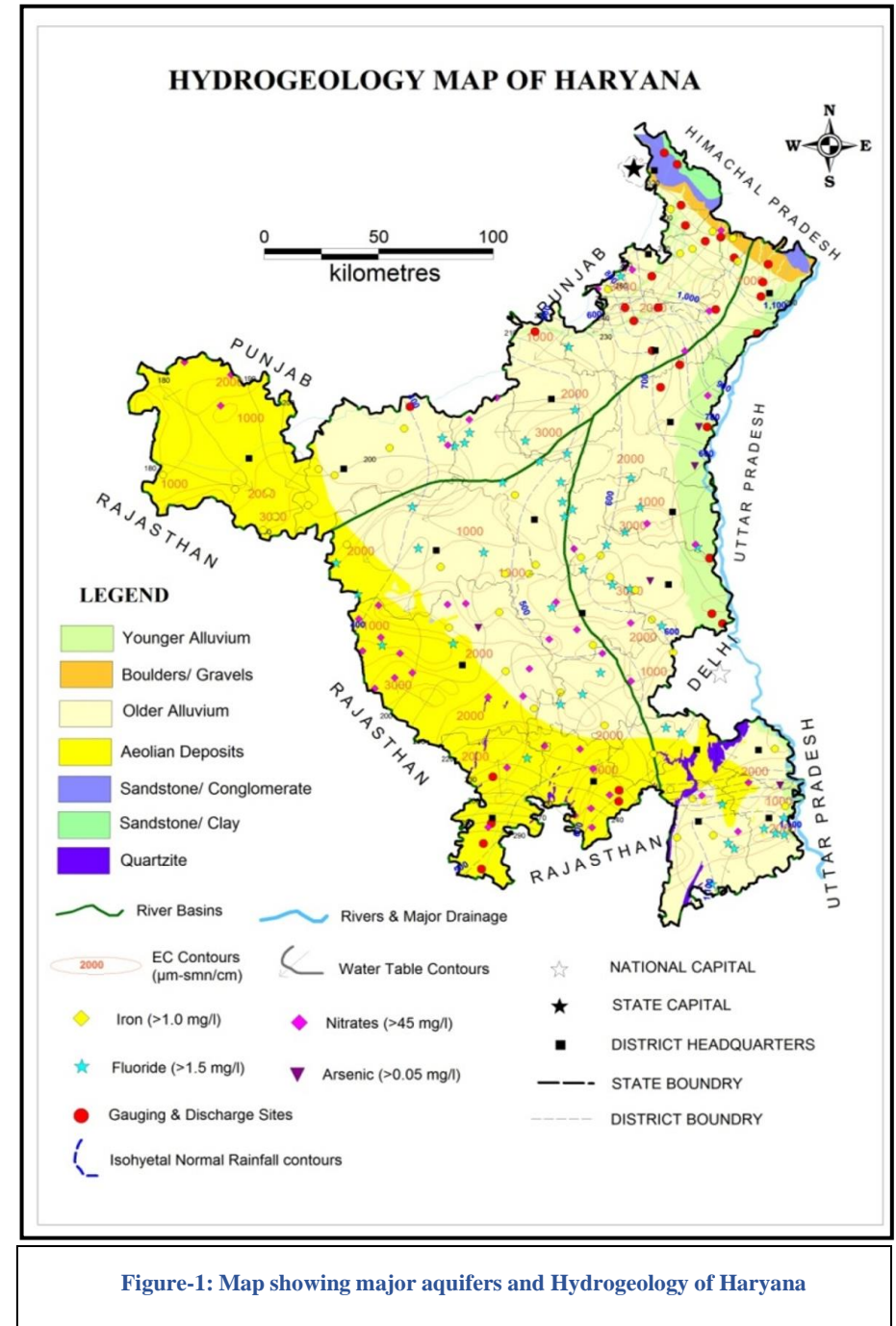


Figure-1: Map showing major aquifers and Hydrogeology of Haryana

S. No.	District	Dug Well	Tube Well	Total
1	Ambala	10	21	31
2	Bhiwani	18	15	33
3	Charkhi Dadri	4	9	13
4	Faridabad	0	14	14
5	Fatehabad	2	19	21
6	Gurugram	1	25	26
7	Hisar	17	19	36
8	Jhajjar	11	3	14
9	Jind	6	30	36
10	Kaithal	6	24	30
11	Karnal	0	38	38
12	Kurukshetra	0	24	24
13	Mahendragarh	3	8	11
14	Nuh	5	4	9
15	Palwal	1	12	13
16	Panchkula	18	7	25
17	Panipat	3	28	31
18	Rewari	0	12	12
19	Rohtak	9	0	9
20	Sirsa	21	23	44
21	Sonipat	9	26	35
22	Yamunanagar	7	26	33
23	Grand Total	151	387	538

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

4.0 GROUND WATER LEVEL SCENARIO (JUNE, 2024)

4.1 SHALLOW AQUIFER (UNCONFINED)

4.1.1 DEPTH TO WATER LEVEL

Depth To Water Level in Unconfined Aquifer (June 2024)

The behavioral pattern of water level in June 2024 along with depth to water level map (Fig.3) is discussed below.

The depth to water level lies between 1.05 mbgl in Panchkula district and 56.50 mbgl in Fatehabad district. Very shallow water levels of 0-2 m (causing water logging) occur in 6.19% of wells and 0.48% area of the state in isolated patches in Jhajjar and Ambala districts. Shallow water levels of 2-5 m have been observed in 23.89% of the wells and 18.32% of the total area that lies in central parts of state i.e Hisar, Bhiwani, Rohtak, Jhajjar and Sonipat districts. The water levels between 5-10 m are observed in Fatehabad, Jind, Hisar, Bhiwani, Charkhi Dadri, Rohtak, Jhajjar, Mahendragarh, Nuh, Palwal, Ambala and Yamunanagar districts. About 18.14% of wells and 25.90% of the area fall in this range. Moderately Deep water levels (10-20 m) are observed in 24.78% wells covering about 28.96% area of the State Sirsa, Fatehabad, Jind, Panipat, Karnal, Kurukshetra, Yamunanagar, Rewari, Gurgaon, Faridabad, Palwal, Bhiwani, Charkhi Dadri and Mahendragarh districts. Deep water levels (20-40 m) are observed in parts of Kurukshetra, Kaithal, Karnal, Panipat, Sirsa, Bhiwani, Gurgaon, Rewari, Faridabad, Sonipat and Yamunanagar districts and observed in 21.24% wells covering about 22.30% area of the state. Very deep water levels (>40 m) are observed in 5.75% wells as patches in Gurgaon, Kurukshetra, Kaithal, Fatehabad and Sirsa districts covering 4.01% area of the State.

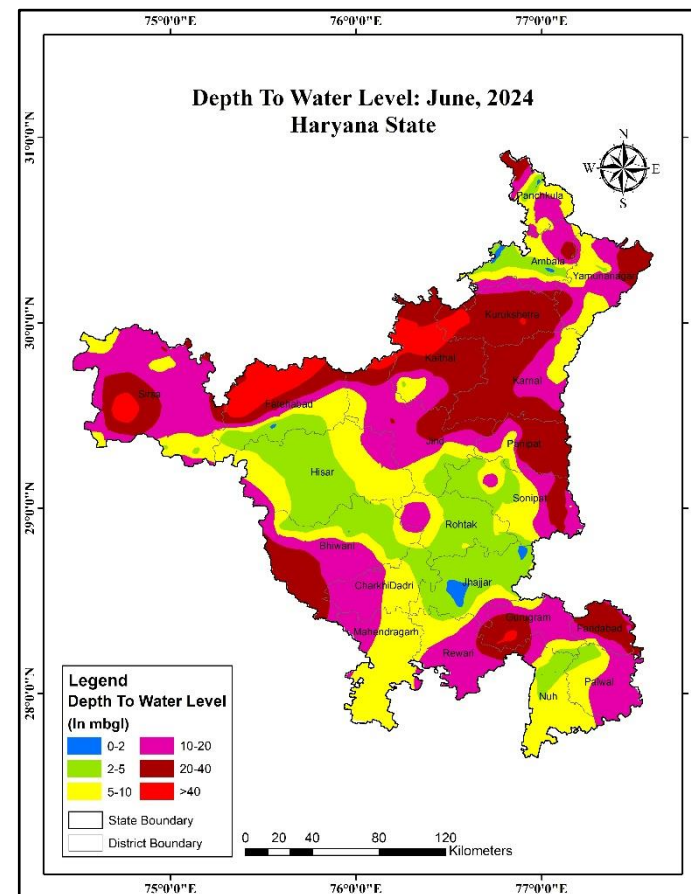


Figure-3: Depth to Water Level Map Unconfined Aquifer, June 2024

Percentage of Wells In Different Water Level Ranges In Unconfined Aquifers (Jun, 2024)

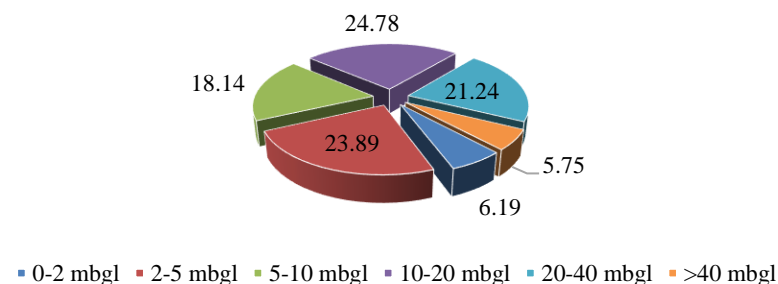


Figure-4: Percentage of wells in different water level ranges in unconfined aquifer.

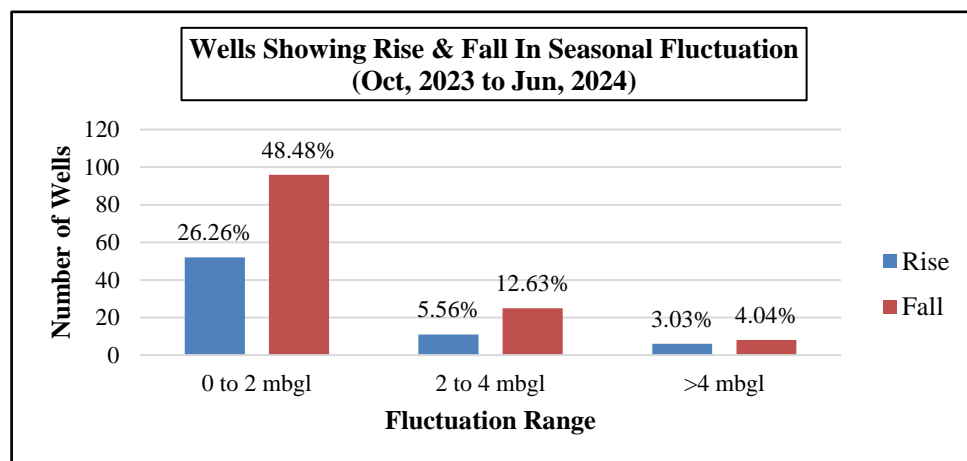


Figure-5: Percentage of wells showing rise and fall in WL in Unconfined aquifer (October 2023 to June 2024)

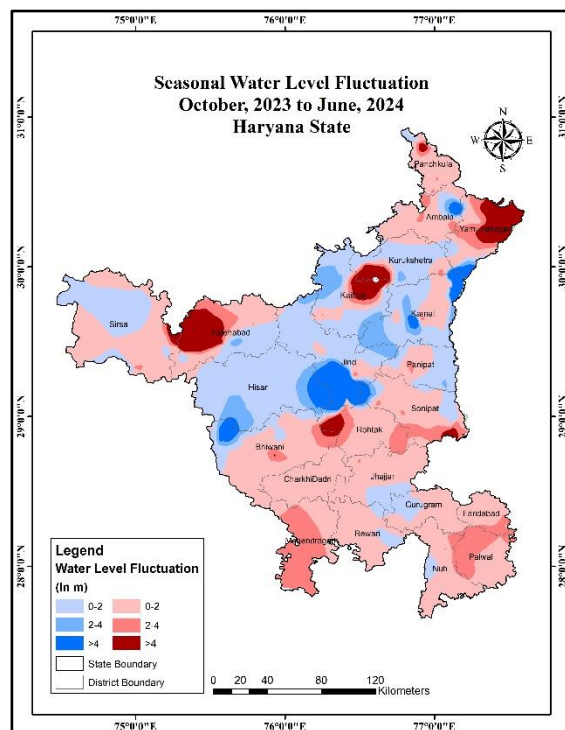


Figure-6: Seasonal water level fluctuation in unconfined Aquifer (October 2023 to June 2024)

4.1.2 SEASONAL FLUCTUATION IN WATER LEVEL

Seasonal Fluctuation of Water Level in Unconfined Aquifer (October 2023 to June 2024)

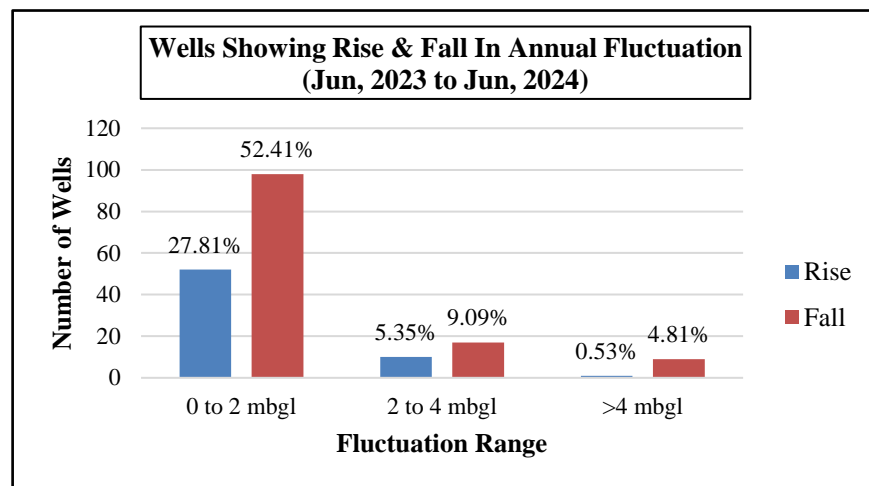
Water level data of June 2024 when compared with previous measurement data i.e. October 2023 is termed as seasonal water level fluctuations. The behavioral pattern of this seasonal fluctuation is discussed below. The map depicting seasonal water level fluctuations is shown in Fig.6.

Rise in Water Levels:

The water level rise has been recorded in 34.85% of wells monitored and covering 38.20% area of the State. Water level rise in the range of 0-2 m is observed in 26.26% of wells and 29.96% of the area. Water level rise 2-4m is observed in 5.56% of the wells & 4.80% area. Water level rise of >4m is observed in 3.03% wells and in 3.43% area as isolated patches in Hisar, Jind, Karnal and Ambala districts.

Fall in Water Levels:

The seasonal fluctuation shows that there is a general decline of water levels in 65.15% of wells monitored and covering 61.8% area of the State. The decline has been observed in all districts except some isolated patches scattered over the state. Water level decline in the range of 0-2 m is observed in 48.48% of wells and 46.75% of area. Water level decline in the range of 2-4 m is observed in 12.63% of wells and 9.98% of area. Water level decline of >4m is observed in 4.04% of wells and 5.05% of area as isolated patches in Kurukshetra, Fatehabad, Rohtak and Yamunanagar districts.



**Figure-7: Percentage of wells showing rise and fall in WL in unconfined aquifer
(June 2023 to June 2024)**

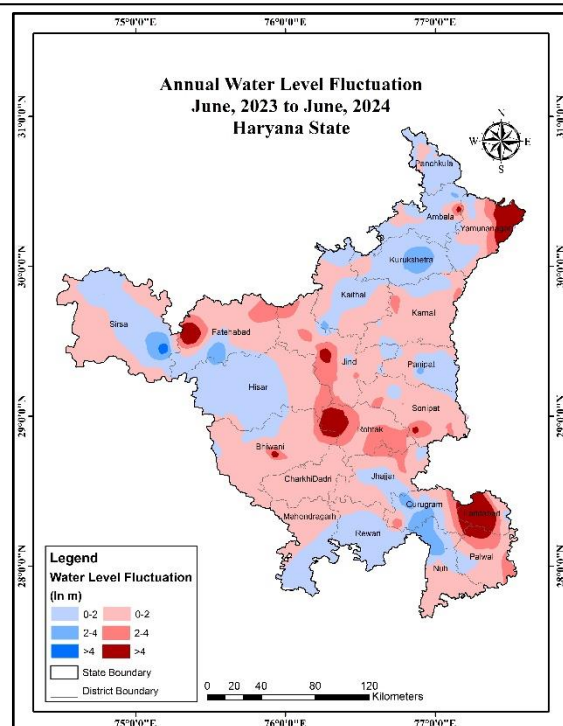


Figure-8: Annual water level fluctuation in unconfined aquifer (June 2023 to June 2024)

4.1.3 ANNUAL FLUCTUATION IN WATER LEVEL

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

In order to know the impact of rainfall and ground water withdrawal during last one year, annual water level fluctuations for period June 2023 and June 2024 are calculated. The behaviour of annual fluctuations is discussed in the following paragraph and depicted in Fig.8.

Rise in Water Levels:

The water level rise has been recorded in 33.69% of wells monitored and covering 36.09% area of the State. Water level rise in the range of 0-2 m is observed in 27.81% wells and 33.17% of area. Water level rise 2-4m is observed in 5.35% wells and 2.84% of area. The water level rise of >4m is observed in less than 1% wells and less than 1% of area as isolated patch in Sirsa.

Fall in Water Levels:

The annual fluctuation depicts general decline of water levels in 66.31% of wells monitored and covering 69.91% area of the State. The decline has been observed in all districts of the state. Water level decline the range of 0-2 m is observed in 52.41% of wells and 52.02% of the area. Water level decline in the range of 2-4 m is observed in 9.09% of wells and 8.15% of the area. Whereas, the water level decline of >4m is observed in 4.81% of wells and 3.71% of the area during the period, as isolated patches in Rohtak, Faridabad, Yamunanagar and Fatehabad districts.

4.1.4 PAST TWO YEAR FLUCTUATION IN WATER LEVEL

Past Two Year Fluctuation of Water Level in Unconfined Aquifer (June 2022 to June 2024)

In order to know the impact of rainfall and ground water withdrawal during last two years, past two year water level fluctuations for period June 2022 and June 2024 are calculated. The behaviour of annual fluctuations is discussed in the following paragraph and depicted in Fig.10.

Rise in Water Levels

The water level rise has been recorded in 52.61% of wells monitored and covering 50.93% area of the State. Water level rise in the range of 0-2 m is observed in 34.38% wells and 36.30% of area. Water level rise 2-4m is observed in 11.98% wells and 12.22% of area. The water level rise of >4m is observed in 6.25% wells and 2.4% of area as isolated patches in Sirsa, Hisar, Kaithal and Palwal districts.

Fall in Water Levels

The annual fluctuation depicts general decline of water levels in 47.39% of wells monitored and covering 49.07% area of the State. The decline has been observed in all districts of the state. Water level decline the range of 0-2 m is observed in 33.33% of wells and 39.82% of the area. Water level decline in the range of 2-4 m is observed in 11.98% of wells and 7.66% of the area. Whereas, the water level decline of >4m is observed in 2.08% of wells and 1.57% of the area during the period, as isolated patches in Yamunanagar, Sirsa, Ambala and Panipat districts.

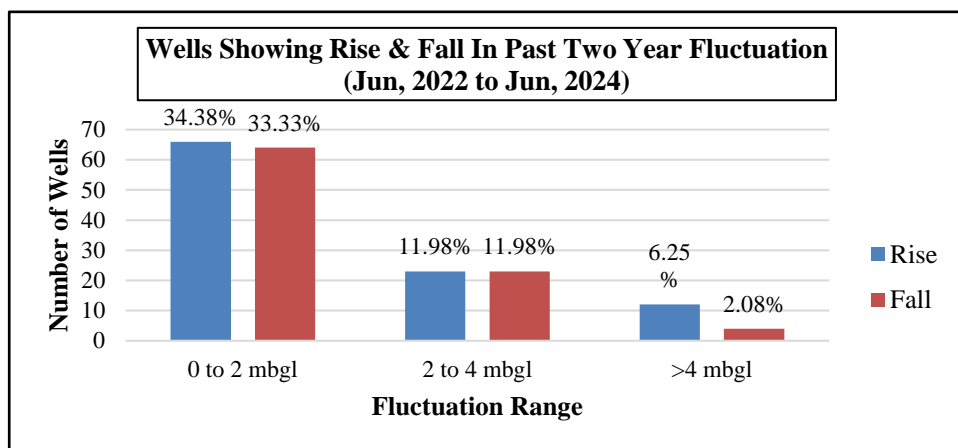


Figure-9: Percentage of wells showing rise and fall in WL in unconfined aquifers (June 2022 to June 2024)

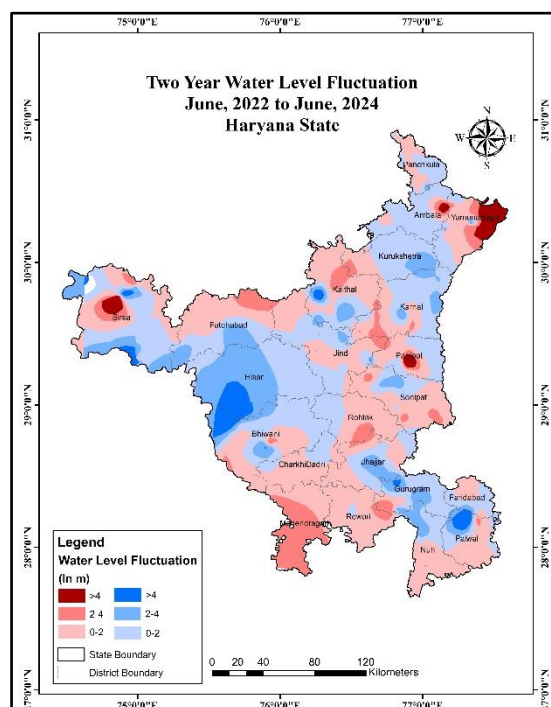


Figure-10: Water Level Fluctuation Map (June 2022 to June 2024)

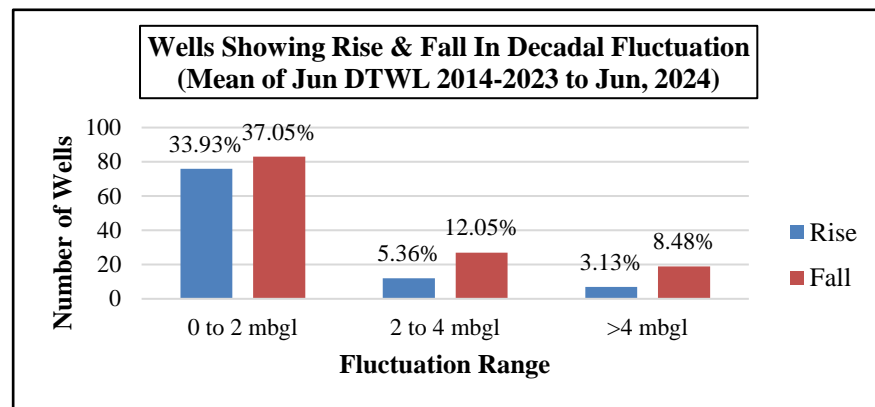


Figure-11: Percentage of wells showing rise and fall in WL in unconfined Aquifer (Decadal Mean June (2014-2023) to June 2024)

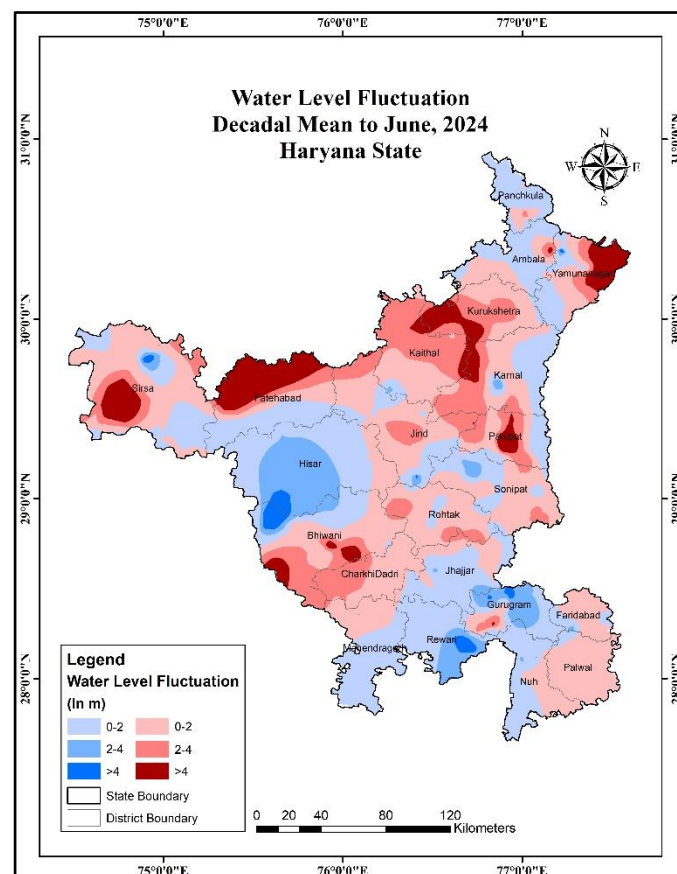


Figure-12: Water level fluctuation in unconfined Aquifer(Decadal Mean June (2014-2023) to June 2024)

4.1.5 DECADAL FLUCTUATION IN WATER LEVEL

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

Changes in water level behaviour since last one decade are determined using decadal mean data. Water level mean of past one decade (2014-2023) for each ground water observation well is computed and compared with the respective water level data of June 2024. The behaviour of water level over the period under reference is discussed in paragraph below along with Fig.12.

Rise in Water Levels:

The decadal mean fluctuations show that rise in 42.42% of observation wells monitored covering about 40.17% area of the state. Water level rise in the range of 0-2 m is observed in 33.93% of wells and 32.71% of the area. Water level rise of 2-4m is observed in 5.36% of wells and 6.53% of the area. Water level rise of >4m is observed in 3.13% of wells and less than 1% of the state area as isolated patch in Sirsa, Hisar, Gurgaon and Rewari districts.

Fall in Water Levels:

The decadal mean fluctuations show that decline in 57.58% of observation wells monitored covering about 85.9859.83% area of the state. The decline has been observed in all districts of the state. The decline of 0-2 m has been observed in about 37.05% of wells and 32.71% of area. Water level decline of 2-4 m is observed in 12.05% of the wells and 15.04% of the area. Water level decline of >4m is observed in 8.48% of the wells and 7.06% of area during the period, in Sirsa, Fatehabad, Kurukshetra, Karnal, Yamunanagar, Panipat, Bhiwani and Charkhi Dadri districts.

Percentage of Wells In Different Water Level Ranges In Confined Aquifers (Jun, 2024)

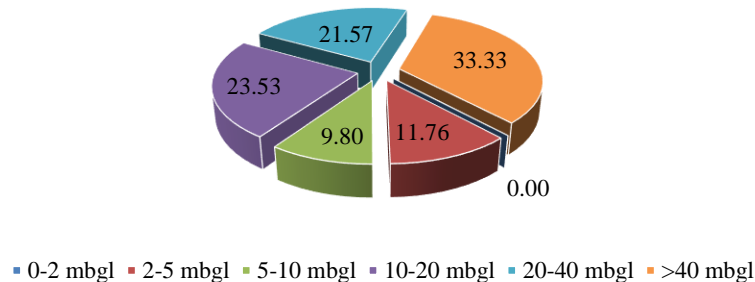


Figure-13: Percentage of wells in different water level ranges in Confined/Semi-Confined aquifer.

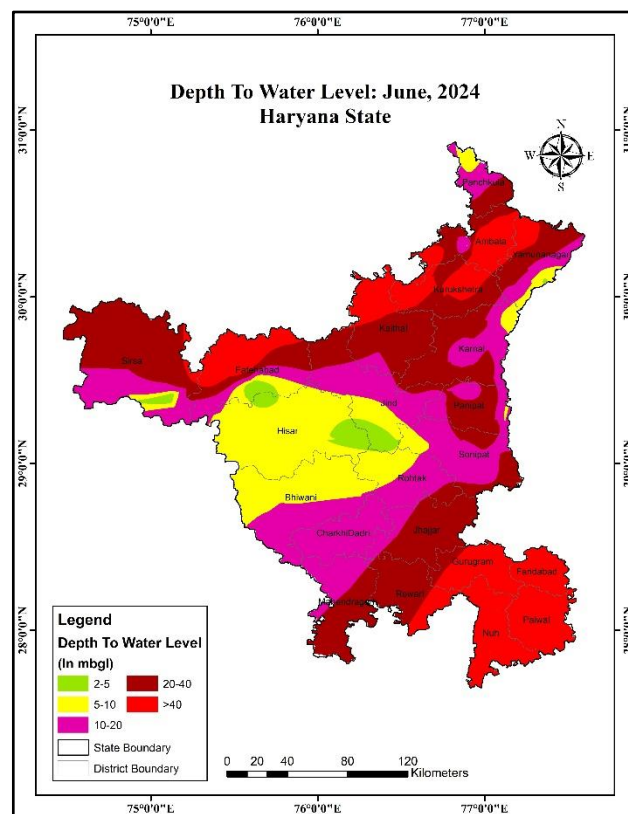


Figure-14: Depth to Water Level Map Confined/Semi-Confined Aquifer, June 2024

4.2 DEEPER AQUIFER (CONFINED/ SEMI-CONFINED)

4.2.1 DEPTH TO PIEZOMETRIC LEVEL

The behavioral pattern of water level in June 2024 along with depth to water level map (Fig. 14) is discussed here. The depth to water level lies between 2.35 mbgl in Fatehabad district and 77.46 mbgl in Ambala district. Very shallow water levels of 0-2 m (causing water logging) does not occur in any well. Shallow water levels of 2-5 m have been observed in 11.76% of the wells and 2.34% of the total area. The water levels between 5-10 m are about 9.80% of wells and 17.30% of the area fall in this range. Moderately Deep-water levels (10-20 m) are observed in 23.53% wells covering about 26.36% area of the State. Deep water levels (20-40 m) are observed in 33.33% wells covering about 34.01% area of the state. Very deep-water levels (>40 m) are observed in 11.76% covering 19.97% area of the State.

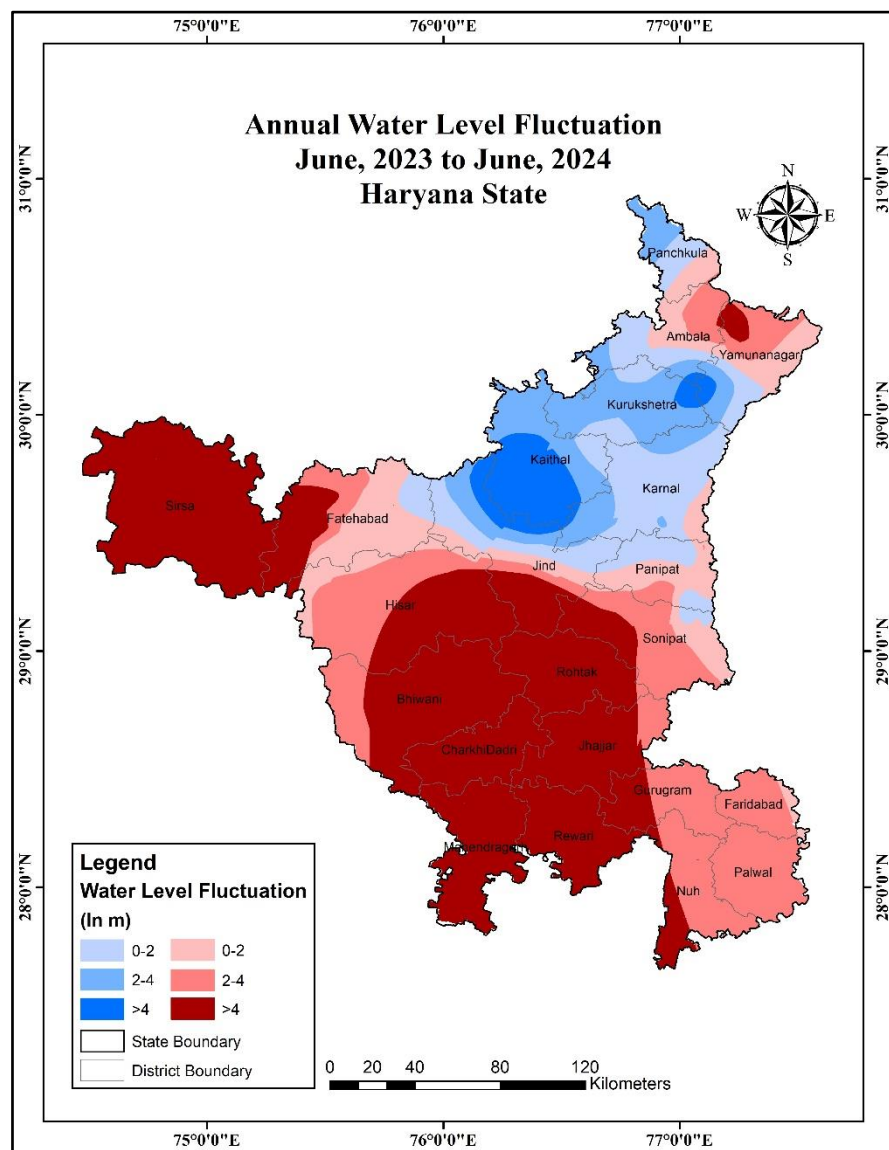


Figure-15: Annual water level fluctuation in Confined/Semi-Confined aquifer (June 2023 to June 2024)

4.2.2 ANNUAL FLUCTUATION IN WATER LEVEL

Annual Fluctuation of Water Level in Confined Aquifer (June 2023 to June 2024)

In order to know the impact of rainfall and ground water withdrawal during last one-year, annual water level fluctuations for period June 2023 and June 2024 for the confined aquifers and semi-confined aquifers are calculated. The behavior of annual fluctuations is discussed in the following paragraph and depicted in Fig 15.

Rise in Water Levels:

The water level rise has been recorded in 40.08% area of the State. Water level rise in the range of 0-2 m is observed in 18.25% of area. Water level rise 2-4m is observed in 15.10% of area. The water level rise of >4m is observed in 6.71% of area as in Kaithal, Kurukshetra, Yamunanagar districts.

Fall in Water Levels:

The annual fluctuation depicts general decline of water levels in 59.92% area of the State. The decline has been observed in most of the districts of the state. Water level decline the range of 0-2 m is observed in 17.46% of the area. Water level decline in the range of 2-4 m is observed in 34.91% of the area. Whereas, the water level decline of >4m is observed in 7.53% of the area during the period in Sirsa, Hisar, Bhiwani, Charkhi Dadri, Rohtak, Jhajjar, Rewari, Mahendragarh, Nuh, Sonipat, Jind and Yamunanagar districts.