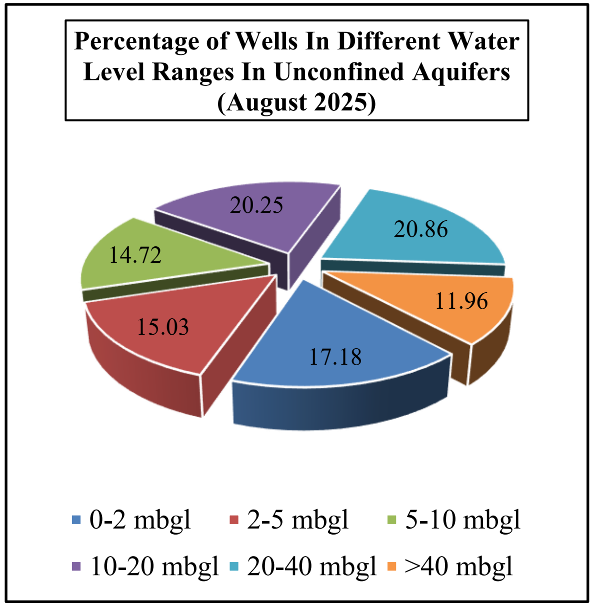


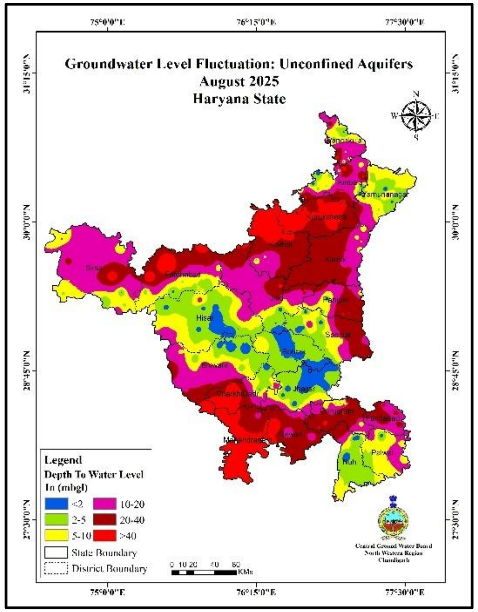


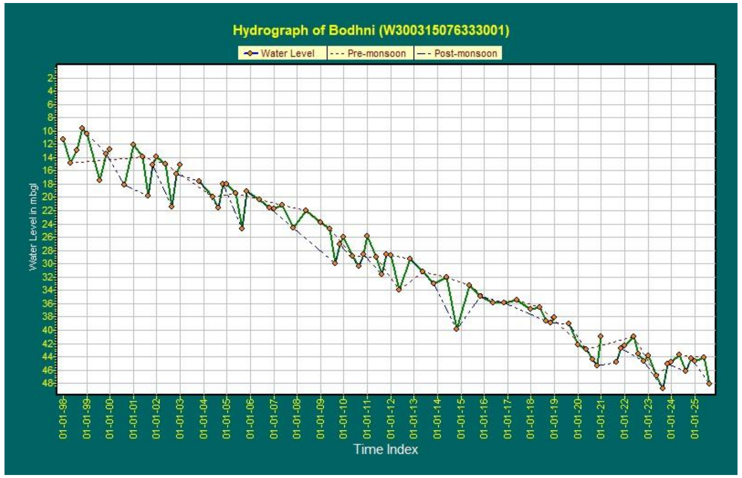


# GROUND WATER LEVEL BULLETIN

## HARYANA STATE
## AUGUST 2025

## ABSTRACT

Ground water level Scenario during August 2025 highlighting the **findings, status of ground water level in unconfined aquifers andits** annual and decadal comparison.

**CGWB, NORTH WESTERN REGION, CHANDIGARH**

**SUBMITTED BY**

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Scientist ‘B’ (Hydrogeology) & OIC (RODC),CGWB, NWR, Chandigarh

## 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 groundwater pumping from the aquifers, recharge due to irrigation systemsand other practices like waste disposal etc.

Groundwater levels are being measured by Central Ground Water Board four times a year during January, May, August and November. The regime monitoring started in the year 1969 by Central Groundwater Board. A network of 26,000 observation wells called **National Hydrograph Network Stations (NHNS)**, as on 30.04.2025, 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 May 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 $27^0$ 39' & $30^0$ 55' and east longitudes $74^0$ 27' & $77^0$ 35' covering an area of 44,212 sq. km. The State has been divided into four main divisions viz. Ambala, Gurgaon, Rohtak and Hisar, which are further sub-divided into 22 districts and 142 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

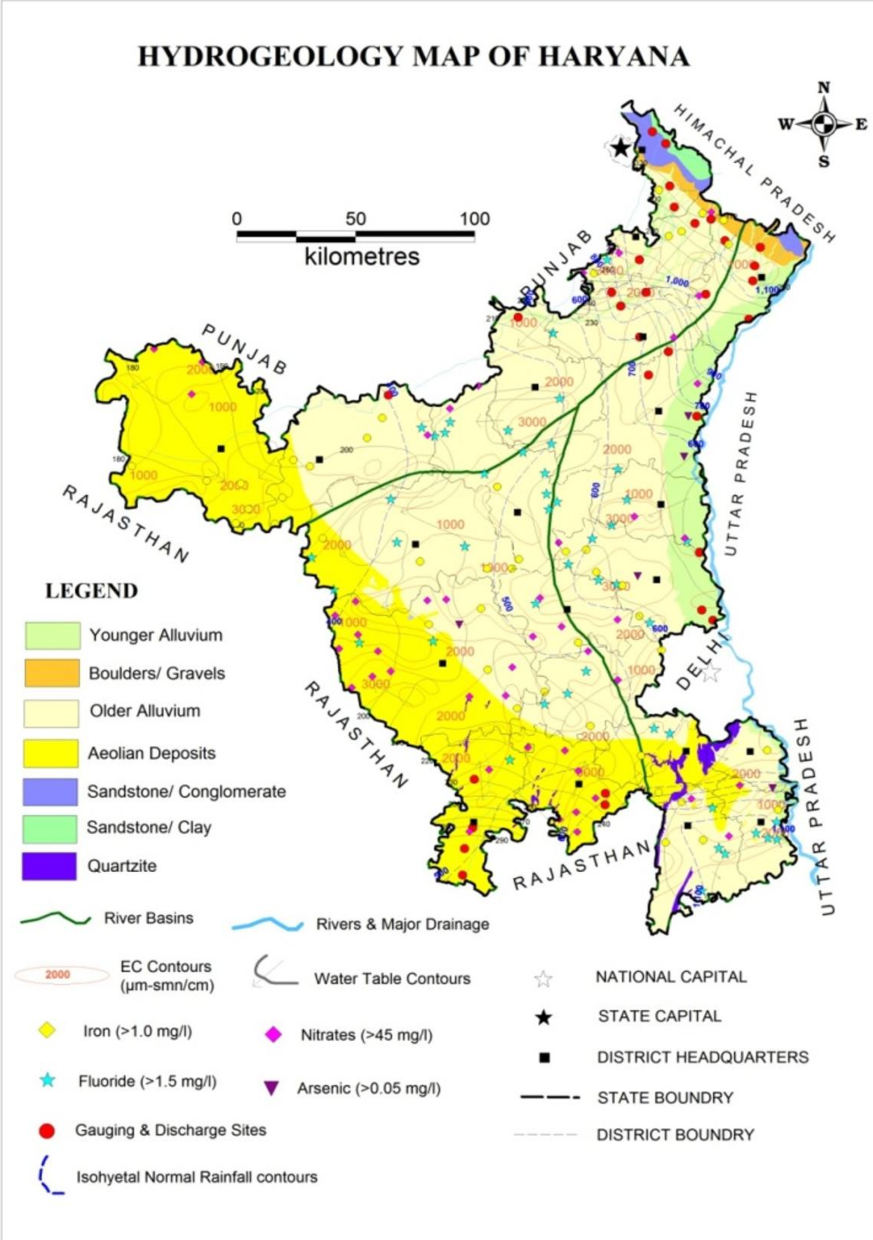



**Figure-1: Map showing major aquifers and Hydrogeology of Haryana**

state namely Western Yamuna Canal, Bhakra canal, Agra canal and Ghaggar canal. Three geological rock groups are prevalent in the state viz. Pre-Cambrian, Tertiary and Quaternary. The Quaternary Group comprises of alluvium which occupies 97% of the area of the State. The Tertiary Group is represented by the outermost zone of the Siwalik System composed mainly of sandstones, clay and boulders. The rocks of Pre-Cambrian Group which form part of the Aravalli Hill Ranges are exposed in Gurgaon, Mewat and Faridabad districts and as small outcrops in other Southern districts. The thickness of alluvium deposits decreases from North to South. The State of Haryana lies in the great Indo-Gangetic Plain. The Quaternary alluvium has been deposited at places on semi-consolidated Tertiary rocks (Siwalik Group) or on a basement of metamorphic and igneous rocks of Precambrian Era. The present and ancient rivers laid down the alluvial sediments since Pleistocene Epoch in the foredeep or a down wrap formed in front of the rising Himalayan ranges and these pediments represent the younger geological formation.

## 3.0 GROUND WATER LEVEL MONITORING

Central Ground Water Board, North Western Region, Chandigarh has established Ground Water Observation Wells (GWOW) in Haryana State for monitoring the water levels. As on 31.03.2025, there were 495 Ground Water Observation Wells which included 151 dug wells and 344 piezometers for monitoring unconfined, semi- confined & confined aquifers. The district wise details of Ground water observation wells are given in Table 1 and location of these Ground water observation wells is shown in Figure 2.

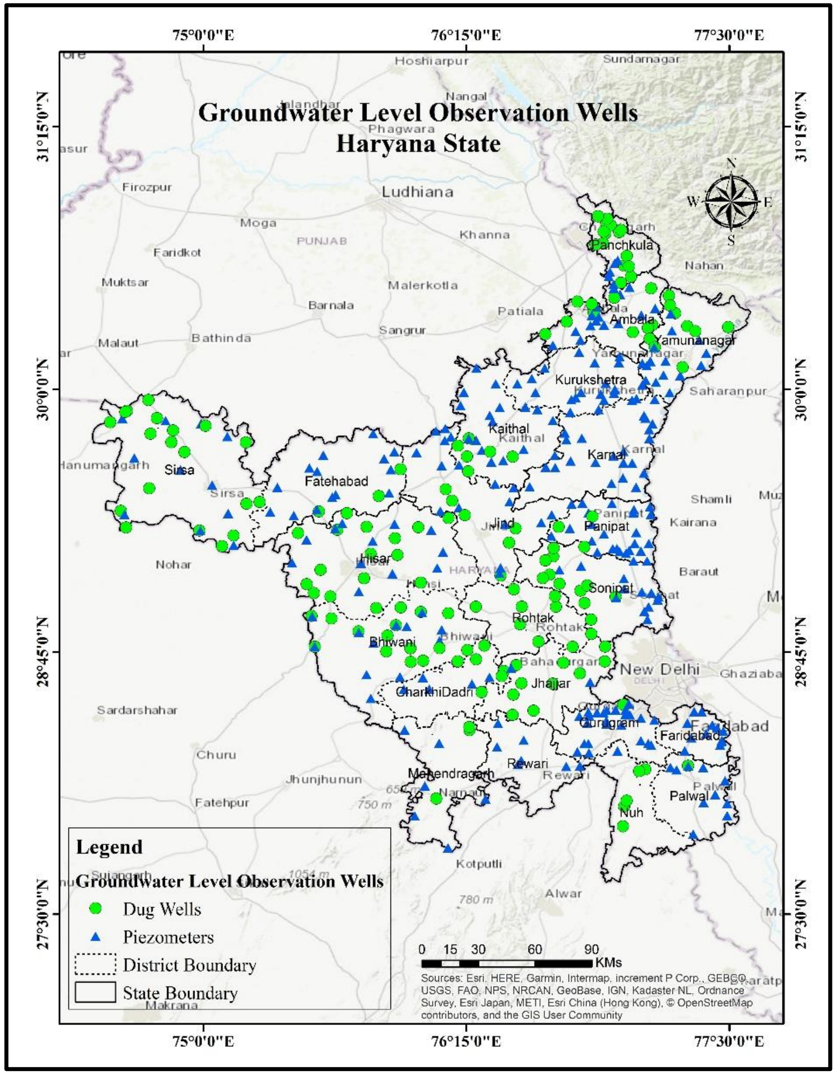



**Figure- 2: Map showing locations of monitoring wells (NHNS) in Haryana**

| S. No. | Districts | Dug Well | Piezometer | Total |
|---|---|---|---|---|
| **1** | Ambala | 11 | 25 | 36 |
| **2** | Bhiwani | 17 | 14 | 31 |
| **3** | CharkhiDadri | 5 | 7 | 12 |
| **4** | Faridabad | 0 | 12 | 12 |
| **5** | Fatehabad | 2 | 19 | 21 |
| **6** | Gurugram | 1 | 24 | 25 |
| **7** | Hisar | 17 | 18 | 35 |
| **8** | Jhajjar | 10 | 2 | 12 |
| **9** | Jind | 6 | 21 | 27 |
| **10** | Kaithal | 6 | 26 | 32 |
| **11** | Karnal | 0 | 33 | 33 |
| **12** | Kurukshetra | 0 | 26 | 26 |
| **13** | Mahendragarh | 3 | 6 | 9 |
| **14** | Nuh | 5 | 2 | 7 |
| **15** | Palwal | 1 | 10 | 11 |
| **16** | Panchkula | 17 | 7 | 24 |
| **17** | Panipat | 3 | 27 | 30 |
| **18** | Rewari | 0 | 7 | 7 |
| **19** | Rohtak | 9 | 0 | 9 |
| **20** | Sirsa | 19 | 19 | 38 |
| **21** | Sonipat | 11 | 14 | 25 |
| **22** | Yamunanagar | 8 | 25 | 33 |
| **Total** | | **151** | **344** | **495** |

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

# 4.0 RAINFALL

Haryana experiences a predominantly semi-arid to sub-humid climate, with significant variability in rainfall both spatially and temporally. The state receives most of its annual rainfall during the southwest monsoon season (June to September), accounting for approximately 75–80% of the total annual precipitation. Average annual rainfall in Haryana varies from about 300 mm in the southwestern arid districts like Sirsa and Hisar to over 1,000 mm in the northeastern regions such as Panchkula and Yamunanagar. This uneven distribution plays a critical role in influencing the recharge potential of groundwater across different parts of the state.

Despite occasional spells of heavy rain, Haryana's rainfall is characterized by high inter-annual and intra-seasonal variability, often leading to frequent occurrences of both drought and localized flooding. The limited and erratic nature of rainfall, combined with high dependence on groundwater for irrigation, has resulted in declining groundwater levels, especially in central and southern districts. Effective water management strategies must therefore account for the region's rainfall pattern to ensure sustainable groundwater recharge and usage.

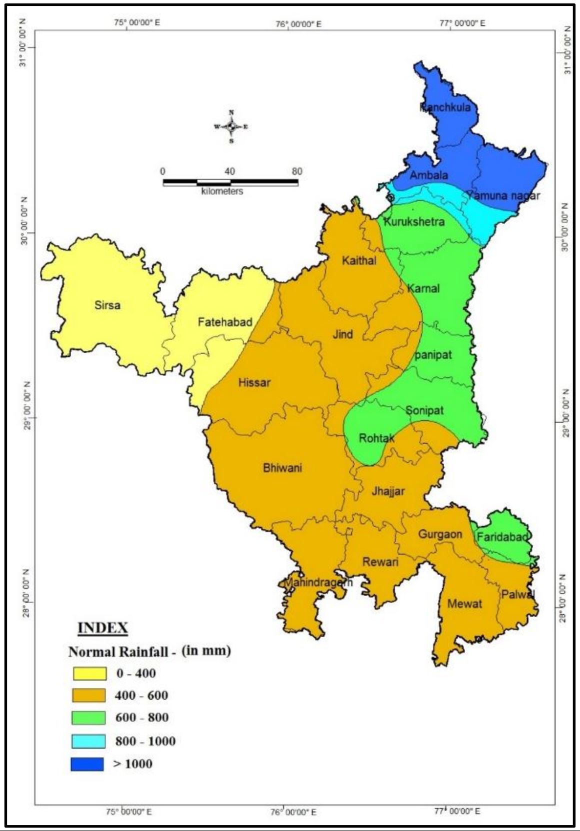



Figure-3: Isohyetal Map of Normal Rainfall In Haryana State

| District | Actual Rainfall (mm) | Normal (mm) | Departure (%) |
|---|---|---|---|
| Ambala | 674.4 | 786.5 | -14 |
| Bhiwani | 370.4 | 284.9 | +30 |
| Charkhi Dadri | 539.7 | 391.4 | +38 |
| Faridabad | 573.1 | 543.1 | +6 |
| Fatehabad | 572.9 | 249.5 | +130 |
| Gurgaon | 623.4 | 477.8 | +30 |
| Hisar | 516.6 | 287.8 | +80 |
| Jhajjar | 693.7 | 369.8 | +88 |
| Jind | 388.4 | 372.9 | +4 |
| Kaithal | 405.3 | 353.4 | +15 |
| Karnal | 467.4 | 500.1 | -7 |
| Kurukshetra | 768.7 | 399 | +93 |
| Mahendragarh | 820.1 | 385.5 | +113 |
| Nuh | 716.3 | 468.1 | +53 |
| Palwal | 526.9 | 389 | +35 |
| Panchkula | 786.8 | 834.3 | -6 |
| Panipat | 634.9 | 440.1 | +44 |
| Rewari | 683.3 | 420.6 | +62 |
| Rohtak | 626.6 | 452.5 | +38 |
| Sirsa | 346.6 | 203 | +71 |
| Sonepat | 557.3 | 464.5 | +20 |
| Yamunanagar | 1116.9 | 867.7 | +29 |

Table-2: District-Wise Rainfall (June 2025 – August 2025 of Rainfall In Haryana State

# 5.0 GROUND WATER LEVEL SCENARIO (AUGUST, 2025)

## 5.1 UNCONFINED AQUIFER

### 5.1.1 DEPTH TO WATER LEVEL DATA

The behavioral pattern of water level in August 2025 along with depth to water level map (Fig.5) is discussed below.

The depth to water level lies between 0.03 mbgl in Dugwell in Village Khanahmadpur, District Ambala and 109.6 mbgl in Piezometer in Village Satnali, District Mahendragarh. Very shallow water levels of 0-2 m (causing water logging) occur in 17.18% of wells and 4.43% area of the state in isolated patches in Jhajjar Rohtak and Hisar districts. Shallow water levels of 2-5 m have been observed in 15.03% of the wells and 16.68% of the total area that lies in central parts of state i.e Hisar, Bhiwani, Rohtak, Jhajjar, Nuh, Yamunanagar and Panchkula districts. The water levels between 5-10 m are observed in Fatehabad, Jind, Sirsa, Hisar, Panchkula, Bhiwani, Charkhi Dadri, Rohtak, Jhajjar, Mahendragarh, Nuh, Panipat, Sonipat, Palwal, Ambala and Yamunanagar districts. About 14.72% of wells and 17.98% of the area fall in this range. Moderately Deep-water levels (10-20 m) are observed in 20.25% wells covering about 25.39% area of the State Sirsa, Fatehabad, Jind, Panipat, Karnal, Kaithal, Sonipat, Panchkula, Yamunanagar, 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, Charkhi Dadri, Fatehabad, Sonipat and Yamunanagar districts and observed in 20.86% wells covering about 25.10% area of the state. Very deep water levels (>40 m) are observed in 11.96% wells as patches in Mahendragarh, Kurukshetra, Kaithal, Charkhi Dadri, Rewari, Fatehabad and Sirsa districts covering 10.42% area of the State.

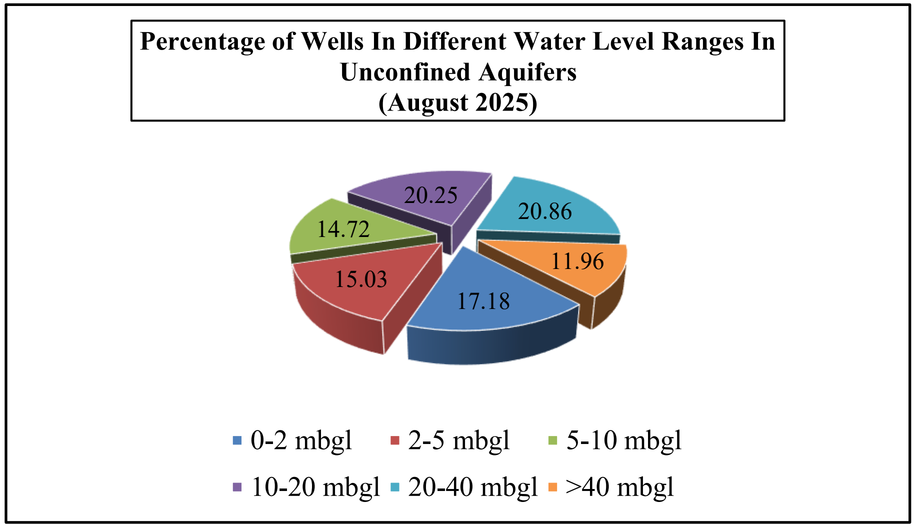



Figure-4: Percentage of wells in different water level ranges in unconfined aquifer.

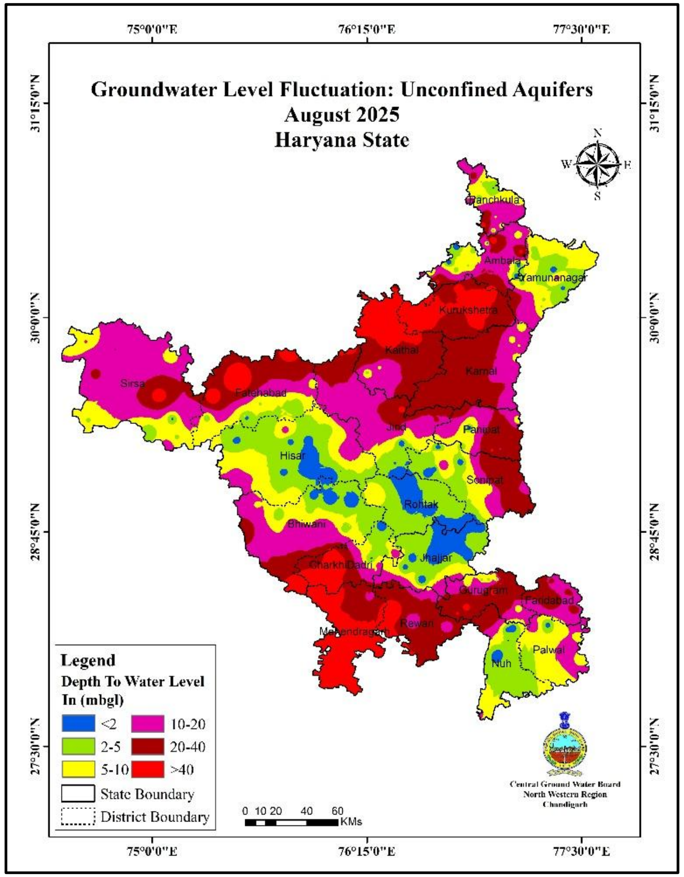



Figure-5: Depth to Water Level Map Unconfined Aquifer, August 2025

## 5.1.2 ANNUAL FLUCTUATION IN WATER LEVEL

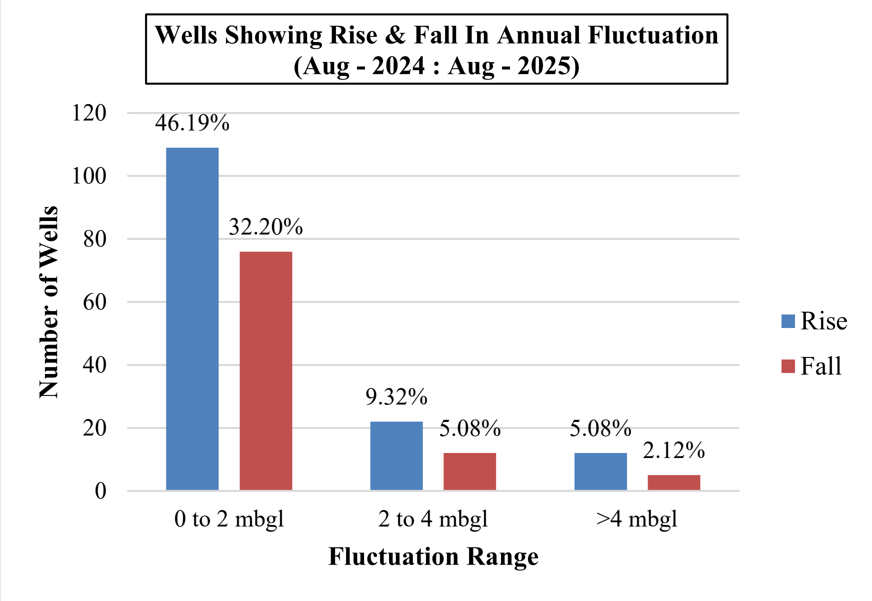



**Figure-6: Percentage of wells showing rise and fall in WL in unconfined aquifer (August 2024 to August 2025)**

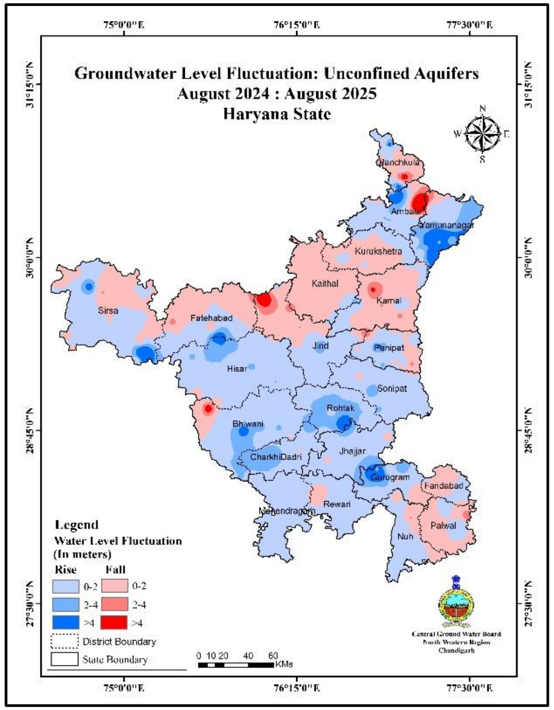



**Figure-7: Annual water level fluctuation in unconfined aquifer(Aug 2024 to Aug 2025)**

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

In order to know the impact of rainfall and ground water withdrawal during last one-year, annual water level fluctuations for period August 2024 and August 2025 are calculated. The behavior of annual fluctuations is discussed in the following paragraph and depicted in Fig.7.

**Rise in Water Levels:**

The water level rise has been recorded in 60.59% of wells monitored and covering 67.64% area of the State. Water level rise in the range of 0-2 m is observed in 46.19% wells and 56.62% of area. Water level rise 2-4m is observed in 9.32% wells and 8.73% of area. The water level rise of >4m is observed in 5.08% wells and 2.30% of area as isolated patch in Gurgaon, Yamunanagar, Ambala, Bhiwani and Sirsa districts.

**Fall in Water Levels:**

The annual fluctuation depicts general decline of water levels in 39.41% of wells monitored and covering 32.36% 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 32.20% of wells and 30.11% of the area. Water level decline in the range of 2-4 m is observed in 5.08% of wells and 1.49% of the area. Whereas, the water level decline of >4m is observed in 2.12% of wells and less than 1% of the area during the period, as isolated patches in Ambala and Bhiwani districts.

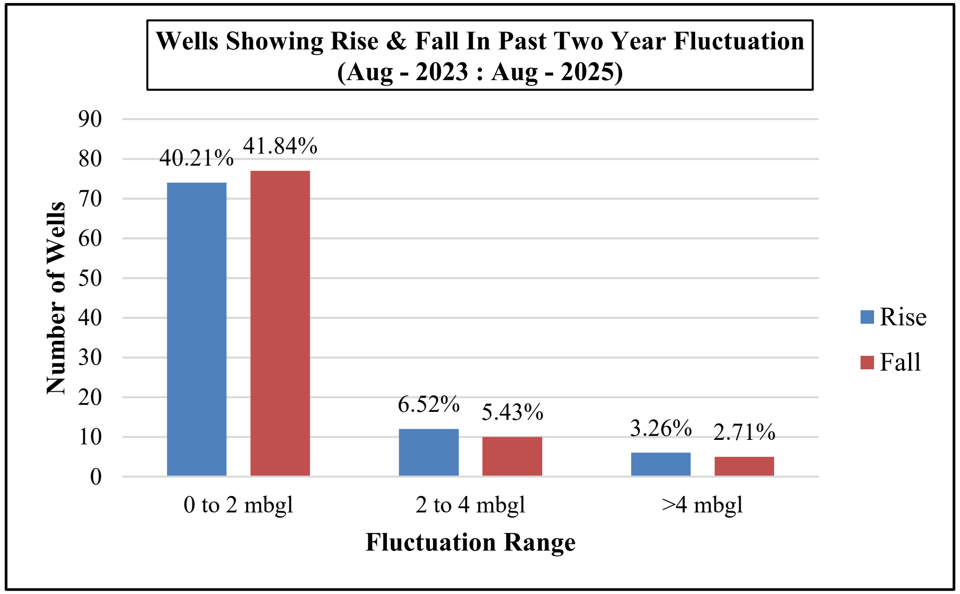



**Figure-8: Percentage of wells showing rise and fall in WL in unconfined aquifers (Aug 2023 to Aug 2025)**

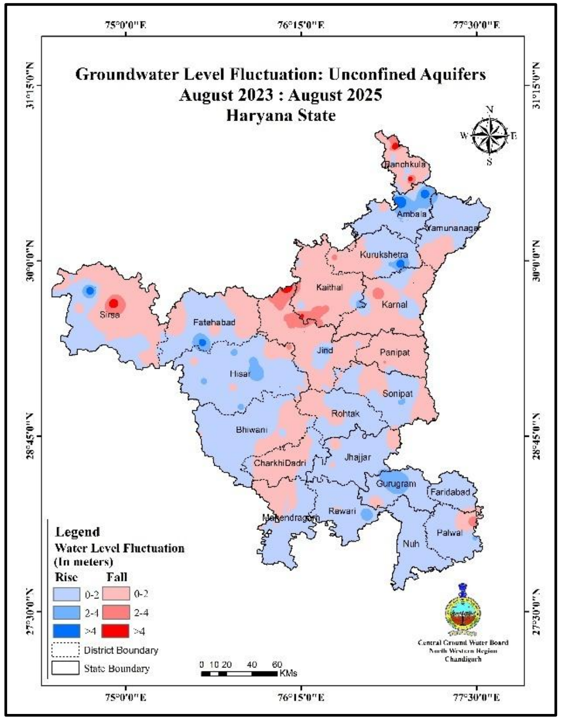



**Figure-9: Water Level Fluctuation Map (Aug 2023 to Aug 2025)**

## Past Two Year Fluctuation of Water Level in Unconfined Aquifer (August 2023 to August 2025)

In order to know the impact of rainfall and ground water withdrawal during last two years, past two-year water level fluctuations for period August 2023 and August 2025 are calculated. The behavior of annual fluctuations is discussed in the following paragraph and depicted in Fig.9.

### Rise in Water Levels

The water level rise has been recorded in 49.99% of wells monitored and covering 58.71% area of the State. Water level rise in the range of 0-2 m is observed in 40.21% wells and 55.44% of area. Water level rise 2-4m is observed in 6.52% wells and 2.90% of area. The water level rise of >4m is observed in 3.26% wells and less than 1% of area as isolated patches in Ambala, Kurukshetra and Sirsa districts.

### Fall in Water Levels

The annual fluctuation depicts general decline of water levels in 50.01% of wells monitored and covering 41.29% 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 41.84% of wells and 38.99% of the area. Water level decline in the range of 2-4 m is observed in 5.43% of wells and 2.08% of the area. Whereas, the water level decline of >4m is observed in 2.71% of wells and less than 1% of the area during the period, as isolated patches in Panchkula, Sirsa and Jind districts.

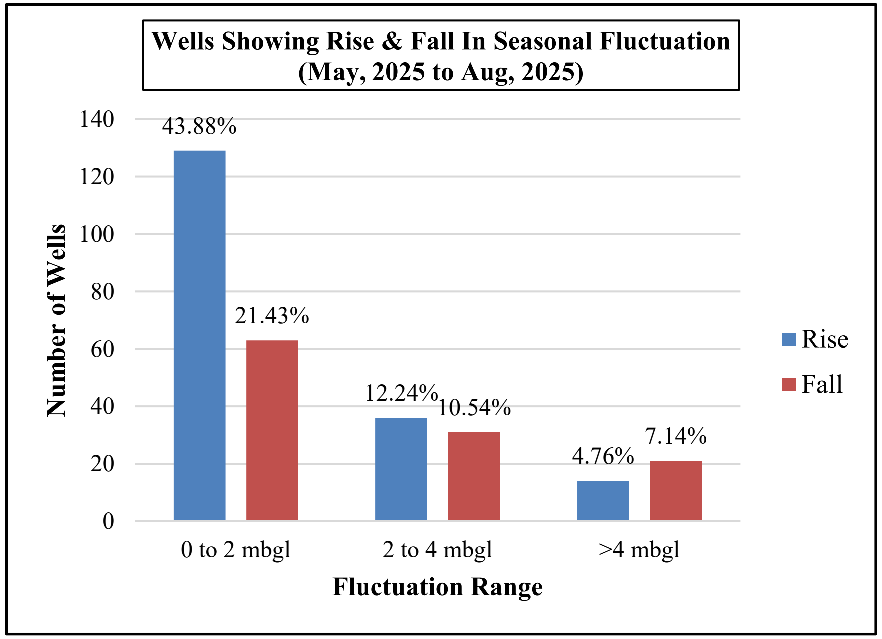



**Figure-6: Percentage of wells showing rise and fall in WL in unconfined aquifer (May 2025 to August 2025)**

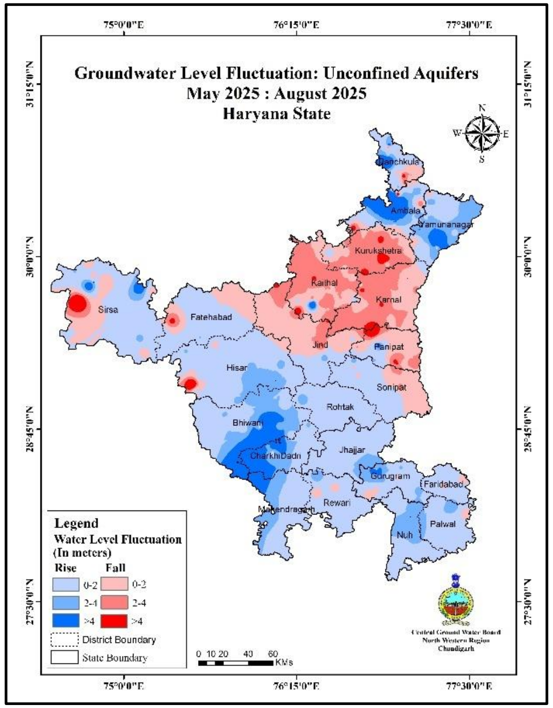



**Figure-7: Annual water level fluctuation in unconfined aquifer(May 2025 to Aug 2025)**

## 5.1.3 SEASONAL FLUCTUATION IN WATER LEVEL

### Annual Fluctuation of Water Level in Unconfined Aquifer (May 2025 – August 2025)

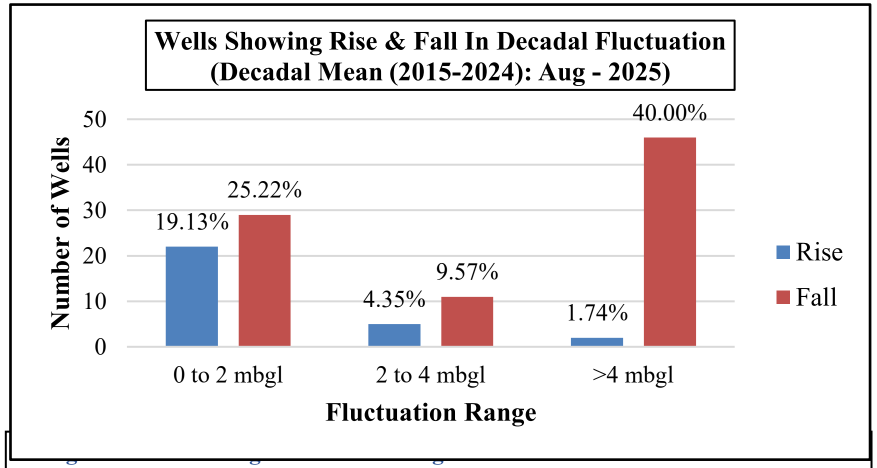
In order to know the impact of rainfall and ground water withdrawal since last monitoring season, seasonal water level fluctuations for period May 2025 and August 2025 are calculated. The behavior of annual fluctuations is discussed in the following paragraph and depicted in Fig.7.

**Rise in Water Levels:**

The water level rise has been recorded in 60.88% of wells monitored and covering 69.74% area of the State. Water level rise in the range of 0-2 m is observed in 40.89% wells and 29.74% of area. Water level rise 2-4m is observed in 3.94% wells and 2.46% of area. The water level rise of >4m is observed in 4.43% wells and 1.48% of area as isolated patch in Mahendragarh, Sonipat and Sirsa districts.

**Fall in Water Levels:**

The annual fluctuation depicts general decline of water levels in 39.12% of wells monitored and covering 30.26% 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 21.43% of wells and 17.64% of the area. Water level decline in the range of 2-4 m is observed in 10.54% of wells and 11.48% of the area. Whereas, the water level decline of >4m is observed in 7.14% of wells and 1.14% of the area during the period, as isolated patches in Kurukshetra, Karnal, Sirsa and Hisar districts.




Aquifer (Decadal Mean Aug (2015-2024) to Aug 2025)

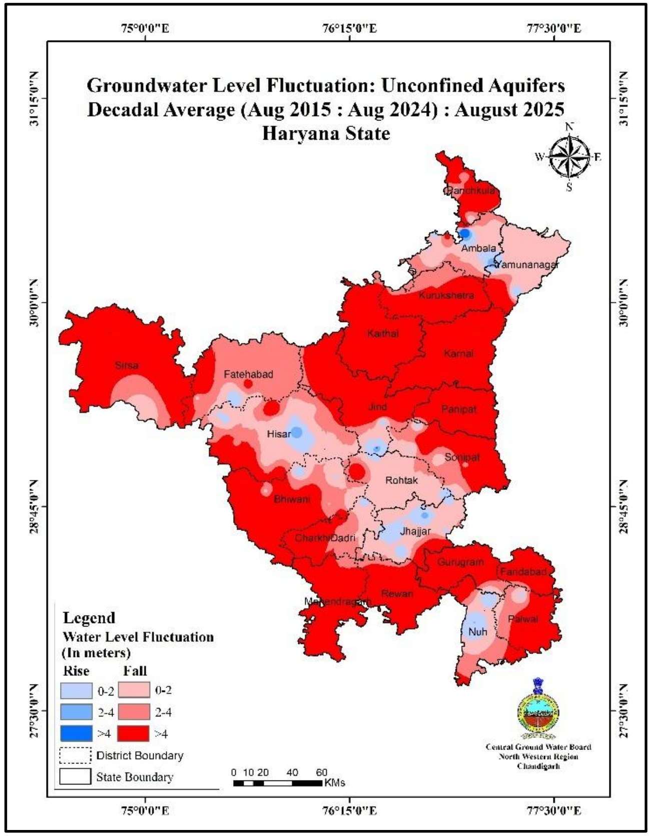



Figure-11: Water level fluctuation in unconfined Aquifer(Decadal Mean Aug (2015-2024) to Aug 2025)

## 5.1.4 DECADAL FLUCTUATION IN WATER LEVEL

**Decadal Fluctuation of Water Level in Unconfined Aquifer**
**Decadal Mean (2015-2024): August - 2025**

Changes in water level behavior since last one decade are determined using decadal mean data. Water level mean of past one decade (2015-2024) for each ground water observation well is computed and compared with the respective water level data of August 2025. The behavior of water level over the period under reference is discussed in paragraph below along with Fig.11.

**Rise in Water Levels**:

The decadal mean fluctuations show that rise in 25.22% of observation wells monitored covering about 4.18% area of the state. Water level rise in the range of 0-2 m is observed in 19.13% of wells and 3.85% of the area. Water level rise of 2-4m is observed in less than 1% of wells and 5.32% of the area. Water level rise of >4m is observed in 1.74% of wells and less than 1% of the state area as isolated patch in Ambala districts.

**Fall in Water Levels**:

The decadal mean fluctuations show that decline in 74.78% of observation wells monitored covering about 95.82% 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 25.22% of wells and 19.09% of area. Water level decline of 2-4 m is observed in 9.57% of the wells and 17.83% of the area. Water level decline of >4m is observed in 40.00% of the wells and 58.90% of area during the period, in almost all the districts of Haryana State except Ambala district.

## 6.0 SUMMARY

The Groundwater Level Bulletin for Haryana, published by the Central Ground Water Board, North Western Region, Chandigarh presents an assessment of the groundwater scenario as of August 2025, focusing on unconfined aquifers and comparing annual and decadal trends. Groundwater monitoring across 495 observation wells reveals significant spatial variations in water table depths, ranging from less than 1 meter to over 109 meters below ground level. Annual and two-year analyses indicate a general decline in groundwater levels across more than half the state, with localized rises in certain districts. The decadal comparison shows a similar trend, with over 55% of wells recording declining levels, though some areas exhibit improvement. Rainfall variability, excessive groundwater extraction for irrigation, and limited recharge are major contributing factors. To address this, recommendations include a mix of demand-side measures like crop diversification and smart irrigation, alongside supply-side strategies such as artificial recharge, wastewater reuse, and rainwater harvesting.

## 7.0 RECOMMENDATIONS

The declining trend of ground water level in Haryana can be improved by Demand and Supply-Side Interventions for Water Conservation which are as given below:

1. **Demand Side Interventions**
   - Change in Paddy Variant – Switching from PUSA-44 (150 days maturity) to PR-126 (117 days maturity) can save 25% of groundwater.
   - Use of AI and Tensiometers – AI-based irrigation and tensiometers help optimize water usage, reducing irrigation needs from 1102 mm/acre to 820 mm/acre.
   - Reduction of Standing Water Column – Lowering the water column from 145 cm to 120 cm in rice cultivation reduces water consumption.

2. **Supply Side Interventions**
   - Artificial recharge structures in government buildings can aid groundwater conservation. Lining of Unlined Channels – Converting unlined irrigation channels to lined ones can reduce groundwater overdraft.
   - Underground Pipelines – Expanding underground pipeline coverage can decrease groundwater development.
   - Canal Water for Irrigation – Maximizing canal water usage can improve groundwater recharge and reduce dependence on groundwater.
   - Artificial Recharge in Paleochannels – Excavating ponds and constructing recharge trenches in paleochannels can enhance groundwater recharge.
   - Reuse of Wastewater – Treating and reusing pond water through the 3-pond system or Thapar model, with solar-powered lifting, helps conserve groundwater.
   - Construction of Injection Wells – Injection wells at minor canal outlets can use surplus canal water to recharge groundwater.
   - Rainwater Harvesting – Installing rainwater harvesting structure after sufficient scientific study.