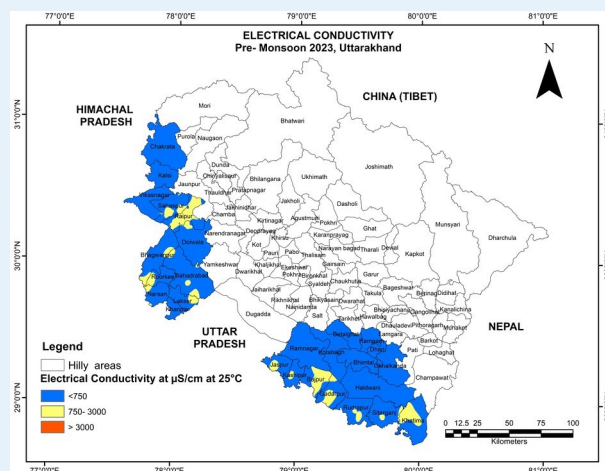


Groundwater Quality Scenario in Uttarakhand

Parameters	No of samples	Permissible limit	No of Samples above permissible limit	% Samples above permissible Limit
EC	207	3000 $\mu\text{S/cm}$	0	0
Fluoride	207	1.5 mg/L	1	0.48
Nitrate	207	45 mg/L	36	17.39
Arsenic	207	10 ppb	8	3.86
Uranium	206	30 ppb	1	0.5



Districts with anomalous values at sporadic locations

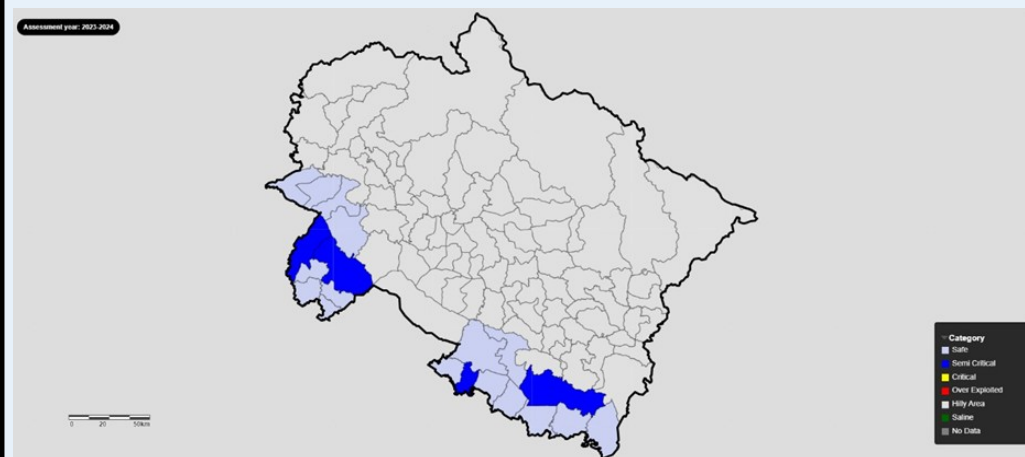
EC (3000 $\mu\text{S/cm}$)	Not Any
Fluoride ($F > 1.5 \text{ mg/L}$)	Almora
Nitrate (Nitrate $> 45 \text{ mg/L}$)	Almora, Dehradun, Haridwar, Nainital, Udham Singh Nagar
Arsenic ($As > 10 \text{ ppb}$)	Almora, Haridwar, Udham Singh Nagar
Uranium ($U > 30 \text{ ppb}$)	Haridwar

For Further Information, Contact to :
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Central Ground Water Board
Department of Water Resources, RD & GR
Ministry of Jal Shakti, Government of India



**Dynamic Ground Water Resources &
Ground Water Quality of Uttarakhand, 2024**

December, 2024

Groundwater Resource Scenario in Uttarakhand

- ◆ Ground Water Resources Assessment (GWRA)- jointly carried out by Central Ground Water Board and State Nodal/Ground Water Department periodically as per the Ground Water Resource Estimation Committee (GEC) methodology.
- ◆ Carried out under the guidance of the respective State/UT Level Committees (SLCs) and overall supervision of Central Level Expert Group (CLEG).
- ◆ As part of the assessment, 'Annual Extractable Ground Water Resource' as well as 'Annual Ground Water Extraction are assessed for each assessment unit (Block).
- ◆ The 'Stage of Ground Water Extraction' is computed as the ratio of 'Annual Ground Water Extraction' with respect to 'Annual Extractable Ground Water Resource' and is usually expressed in percentage. Based on the stage of extraction, the assessment units are categorized as Safe ($\leq 70\%$), Semi-Critical ($>70\%$ and $\leq 90\%$), Critical ($>90\%$ and $\leq 100\%$) and Over-Exploited ($>100\%$).
- ◆ GWRA-2024, 2023, 2022 and 2020 has been carried out through a software/web-based application "INDIA-GROUNDWATER RESOURCE ESTIMATION SYSTEM (IN-GRES)" developed by CGWB through IIT-Hyderabad.

Salient Features

1	Rainfall	1,537.59 mm
2	Hydrogeology	About 85 % of the State is mountainous and underlain by hard rock. Around 15 % of the geographical area is underlain by semi-consolidated and unconsolidated formations (Tarai and bhabar).
3	Recharge Worthy Area of the State	6.49 Thousand Sq. Km
4	Assessment Unit (AU) Type / Number	Block / 20 Numbers
5	Average area of Assessment Unit	324.59 Sq. Km

Findings

	Attribute	GWRA-2017	GWRA-2020	GWRA-2022	GWRA-2023	GWRA-2024
1	Total Annual Ground Water Recharge (in bcm)	3.04	2.02	2.01	2.02	2.14
2	Annual Extractable Ground Water Resources (in bcm)	2.89	1.85	1.86	1.85	1.96
3	Annual Ground Water Extraction (in bcm)	1.64	0.87	0.89	0.95	1.05
4	Stage of Ground Water Extraction (in %)	56.83	46.8	48.04	51.69	53.54

bcm: Billion Cubic Meters

Categorization of Assessment Units based on the 'Stage of Ground Water Extraction

Sl. No	Category	GWRA-2017		GWRA-2020		GWRA-2022		GWRA-2023		GWRA-2024	
		Number of AUs	% of AUs	Number of AUs	% of AUs	Number of AUs	% of AUs	Number of AUs	% of AUs	Number of AUs	% of AUs
1	Safe	13	72	14	78	14	78	14	77.78	16	80
2	Semi-critical	5	28	4	22	4	22	4	22.22	4	20
3	Critical										
4	Over-exploited										
5	Saline										
Total number of AUs		18		18		18		18		20	

Recommendations

- * Uttarakhand State has a distinct geological attribute with wide variety of rock units ranging in age from Archean to Quaternary. About 85 % of the geographical area of the state is mountainous and underlain by hard rocks. Ground water in the hard rock area is harnessed through the springs and hand pump tapping the weathered zone. Discharge of springs in the Lesser Himalaya and Central Himalaya is variable and ranges from 60 to 600 lpm. About 15 % of the geographical area is underlain by semi-consolidated and unconsolidated formations known as Tarai and Bhabhar.
- * The ground water resources of Uttarakhand State have been assessed block-wise. Total Annual Ground Water Recharge of the State has been assessed as 2.14 bcm. The Annual Extractable Ground Water Resources is 1.96 bcm. The Annual Ground Water Extraction is 1.05 bcm. The Stage of Ground Water Extraction is 53.54 %. Out of the 20 assessment units, 4 units (20 %) lie under 'Semi-Critical' category and 16 units (80%) under 'Safe' category.
- * In the safe category areas of Uttarakhand, State Government can judiciously develop the ground water resource mainly for agricultural use, however, at no point of time the extraction level should exceed 70%.
- * Development of Springs and their catchment in hilly areas.
- * National Aquifer Mapping & Management Programme (NAQUIM) Reports prepared by CGWB (<https://cgwb.gov.in/cgwbpm/>) which are also being shared with State/District Authorities and Ground Water Year Book published by CGWB having water level & water quality data may be used in Ground water management. (<https://cgwb.gov.in/cgwbpm/>).
- * Regulation & control of Ground water Extraction: Ministry of Jal Shakti has issued the guidelines for control and regulations of ground water extraction vide notification dated 24.09.2020 which has further been amended in March 2023. Concerned departments may ensure implementations of the guidelines.