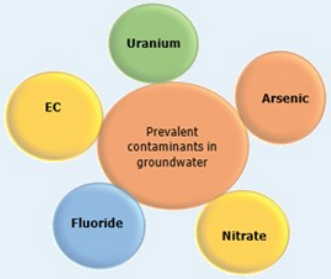
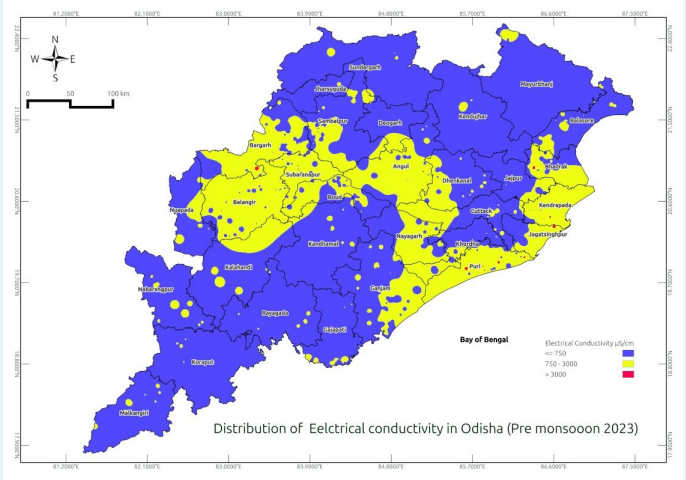
Groundwater Quality Scenario in Odisha

Parameters	No of samples	Permissible limit	No. of Samples above permissible limit	% Samples above permissible Limit
EC	625	3000 µS/cm	7	1.12
Fluoride	625	1.5 mg/L	28	4.48
Nitrate	625	45 mg/L	90	14.4
Arsenic	904	10 ppb	6	0.66
Uranium	39	30 ppb	3	0.3





Distribution of Eelctrical conductivity in Odisha (Pre monsooon 2023)

Districts with anomalous values at sporadic locations

EC (3000 µS/cm)	Anugul, Balangir, Nuapada, Puri
Fluoride (F > 1.5 mg/L)	Anugul, Balangir, Bargarh, Jharsuguda, Nayagarh, Nuapada, Puri, Sambalpur, Sonapur, Sundargarh
Nitrate (Nitrate > 45 mg/L)	Anugul, Balangir, Bargarh, Cuttack, Dhenkanal, Kendujhar, Khordha, Koraput, Mayur-bhanj, Nayagarh, Nuapada, Puri, Sambalpur, Sonapur, Sundargarh
Arsenic (As> 10 ppb)	Bhadrak, Cuttack, Ganjam
Uranium (U > 30 ppb)	Anugul, Balangir, Bargarh

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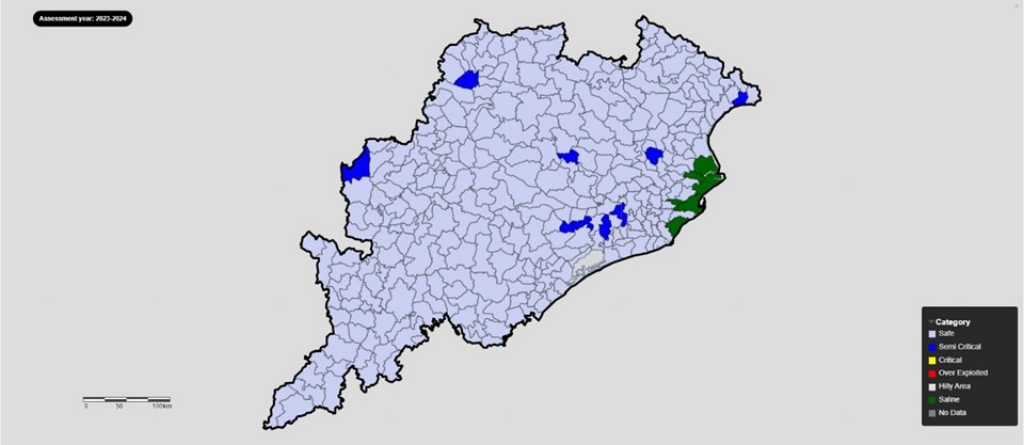
Central Ground Water Board
Department of Water Resources, RD & GR
Ministry of Jal Shakti, Government of India



Dynamic Ground Water Resources & Ground Water Quality of Odisha, 2024

December, 2024

Groundwater Resource Scenario in Odisha

- 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 (<= 70 %), Semi-Critical (>70 % and <=90 %), Critical (>90 % and <=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	1419.20 mm
2	Hydrogeology	Nearly 80 % of the State is underlain by hard rocks. Rest of the State is underlain by Tertiary semi-consolidated formations and Quaternary alluvial formations in coastal tracts.
3	Recharge Worthy Area of the State	1.21 Lakh Sq. Km
4	Assessment Unit (AU) Type / Number	Block / 314 Numbers
5	Average area of Assessment Unit	387.24 Sq. Km

Findings

	Attribute	GWRA-2017	GWRA-2020	GWRA-2022	GWRA-2023	GWRA-2024
1	Total Annual Ground Water Recharge (in bcm)	16.74	17.08	17.79	17.35	17.46
2	Annual Extractable Ground Water Resources (in bcm)	15.57	15.71	16.34	15.94	16.04
3	Annual Ground Water Extraction (in bcm)	6.57	6.86	7.23	7.39	7.74
4	Stage of Ground Water Extraction (in %)	42.18	43.65	44.25	46.33	48.23

bcm: Biliion 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	303	96.5	302	96.17	300	95.5	299	95.22	299	95.22
2	Semi-critical	5	1.5	6	1.91	8	2.5	9	2.87	9	2.87
3	Critical										
4	Over-exploited										
5	Saline	6	2	6	2	6	2	6	1.91	6	1.91
Total number of AUs		314		314		314		314		314	

Recommendations

* The State is underlain by diverse rock types, which range in age from Precambrian to Cenozoic era. The Precambrians occupy nearly 80 % of the total geographical area of the State. The Tertiary and the Quaternary Alluvial formations are restricted mainly to the narrow coastal tracts. The Gondwana group of rocks belonging to Paleozoic and Mesozoic era occurs in isolated patches in different parts of the State.
* The Ground water resources in the state have been assessed block-wise. Total Annual Ground Water Recharge of the State has been assessed as 17.46 bcm and Annual Extractable Ground Water Resource as 16.04 bcm. The Annual Ground Water Extraction is 7.74 bcm and Stage of Ground Water Extraction is 48.23 %.
* Out of the total of 314 assessment units (blocks), 9 units (2.87 %) have been categorized as 'Semi-critical', 299 units (95.22 %) as 'Safe' and 6 units (1.91 %) as 'Saline' categories of assessment units.
* More numbers of Water Harvesting and Conservation Structures may be constructed to catch the rain as the State is blessed with more than 1400 mm annual rainfall particularly in the hard rock terrain. State may also effectively use "Master plan for Artificial Recharge" prepared by CGWB. (**https://cgwb.gov.in/cgwbpnm/publication-detail/324**).
* Restoration/rejuvenation of all the existing tanks should be taken up with the view of accommodating the available surface run off and thus augmentation of the ground water resources by artificial recharge. Periodical maintenance of these tanks is to be ensured. The "Manual on Artificial Recharge Techniques for augmentation of ground water" prepared by CGWB may be used for planning (https://cgwb.gov.in/sites/default/files/MainLinks/Manual-Artificial-Recharge.pdf).
* National Aquifer Mapping & Management Programme (NAQUIM) Reports prepared by CGWB (https://cgwb.gov.in/cgwbpnm/) 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/cgwbpnm/).
* Development of springs and their catchment in hilly areas for their sustainability.
* Increase in irrigation efficiency through adopting of micro—irrigation techniques in more areas.
* In the safe category areas of Odisha, 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%.
* Creating awareness (Mass Awareness Campaign for public and farmers, slideshows, display boards on water conservation, Water Management Training Programme for personnel related with water sector, painting/essay competition for school students etc.) regarding water conservation etc may be organized at appropriate level.
* State may review their free/subsidized electricity policy to farmers (if applicable), bring suitable water pricing policy and may work further towards crop rotation/diversification/other initiatives to reduce overdependence on groundwater.
* 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.