

GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION
RAJYA SABHA

UNSTARRED QUESTION NO. 4075

ANSWERED ON 30.03.2026

GROUNDWATER CONTAMINATION IN COASTAL AREAS

4075 SHRI MASTHAN RAO YADAV BEEDHA:

Will the Minister of **Jal Shakti** be pleased to state:

- (a) whether Government has taken cognizance of the problem of groundwater contamination and salinity/seawater intrusion in coastal areas across the country, if so, the details thereof;
- (b) the details of coastal districts identified as affected by groundwater contamination, including salinity intrusion, heavy metals and chemical pollutants, State-wise, as per the latest available data; and
- (c) whether any assessments, surveys or scientific studies have been conducted by the Central Ground Water Board or any other agency to determine the extent, causes and trends of groundwater contamination in coastal regions, if so, the details thereof along with the key findings and recommendations?

ANSWER

THE MINISTER OF STATE FOR JAL SHAKTI

(SHRI RAJ BHUSHAN CHOUDHARY)

(a) to (c) Monitoring of groundwater quality in the country, which includes monitoring of salinity and sea water intrusion in coastal areas, is conducted by the Central Ground Water Board (CGWB) under this Ministry and respective State Governments on a regular basis. Salinity in groundwater in coastal areas is primarily attributed to seawater ingress due to over-extraction of groundwater, besides factors such as tidal influence, aquifer characteristics and climate variability. Studies carried out by CGWB indicate that salinity ingress/seawater intrusion has been observed in parts of coastal areas of Maharashtra, Karnataka, Gujarat, Goa, Kerala, Tamil Nadu, Puducherry, Andhra Pradesh, Odisha and West Bengal. Details of various studies conducted by CGWB in coastal areas for ground water contamination and salinity/sea water intrusion, along with causes, trends and key recommendations is provided in **Annexure -I**.

Further, as per the Ground Water Quality report 2025, of CGWB, localised exceedances of various parameters/contaminants beyond the permissible limits (IS 10500:2012) has been observed across some isolated pockets of the coastal states. The State/UT-wise parameters as per the Annual Ground Water Quality Report – 2025 is provided in **Annexure -II**.

ANNEXURE REFERRED TO IN REPLY TO PART (a) to (c) OF UNSTARRED QUESTION NO. 4075 TO BE ANSWERED IN RAJYA SABHA ON 30.03.2026 REGARDING “GROUNDWATER CONTAMINATION IN COASTAL AREAS”.

DETAILS OF VARIOUS STUDIES CONDUCTED BY CGWB IN COASTAL AREAS FOR GROUND WATER CONTAMINATION AND SALINITY/SEA WATER INTRUSION

Central Ground Water Board (CGWB) has taken up National Aquifer Mapping & Management Programme (NAQUIM 2.0) and other focused scientific studies in selected coastal areas to assess the extent, causes and trends of groundwater contamination, including salinity / seawater intrusion.

- In Maharashtra, studies have been carried out in Mumbai and Mumbai Suburban districts. The studies indicated moderate to high vulnerability to seawater intrusion in some coastal stretches, particularly during the pre-monsoon period. The recommendations include regulated groundwater abstraction, prioritization of artificial recharge in coastal stretches, mandatory EC monitoring in coastal observation wells, and restriction / prohibition of deeper groundwater development in highly vulnerable zones such as Fort area, Shivaji Park, Dadar and creek-side areas.
- In Tamil Nadu and Puducherry, NAQUIM 2.0 studies have been taken up in (i) parts of Chennai Basin, Tamil Nadu, and (ii) urban area of Puducherry and adjoining parts of Cuddalore and Villupuram districts, with seawater intrusion / saline areas as one of the major focus themes. In addition, CGWB has established 60 telemetry-based piezometers along the coastal tract of Tamil Nadu and Puducherry for real-time monitoring of groundwater level and salinity. Analysis of data from these stations indicates that about 36.67% wells fall in the highly mineralized category (EC >3000 $\mu\text{S}/\text{cm}$), while the remaining wells fall in fresh to moderately mineralized categories.
- In Gujarat, under NAQUIM 2.0, CGWB has carried out a study on the efficacy of the tidal regulator built on the Ambika River to mitigate salinity ingress in the coastal area of Navsari district. The study indicates a positive impact of the mitigation measures adopted in controlling salinity ingress.
- In Goa, a NAQUIM 2.0 study was initiated during 2024–25 in Bardez and Tiswadi taluks of North Goa district after salinity was detected in parts of three villages in an earlier special study. The study indicates that salinity zones are localized mainly in coastal and low-lying areas, whereas inland aquifers are generally fresh.

- In Karnataka, under NAQUIM 2.0, a study was carried out in Baikampady Industrial Area, Mangaluru taluk, Dakshina Kannada district, covering about 78 sq. km. The study indicated that groundwater is generally fresh, but localized contamination by iron, manganese and nitrate was observed in some pockets.
- In Kerala, CGWB has carried out detailed scientific studies on seawater ingress in coastal aquifers. During 2022–23, CGWB, Kerala Region conducted a study titled “Sea Water Ingress Studies around Coastal Tracts of Kollam District, Kerala” in the coastal belt of Kollam district. Based on seasonal groundwater level and quality monitoring, the study indicated that salinity in coastal aquifers is minimal, localized and seasonal in nature, mainly due to tidal ingress along river mouths and backwater channels during the pre-monsoon period, and no widespread or permanent seawater intrusion was observed. The study further indicated that monsoon rainfall and recharge help restore groundwater quality by flushing out the seasonal saline influence. Earlier, CGWB had also carried out hydrogeological studies along the coastal tracts of Thiruvananthapuram district, which indicated that while most of the area falls under low to moderate vulnerability, certain locations, particularly near Meriyanadu and Kadinakulam Lake, are more vulnerable to seawater intrusion due to local hydrogeological conditions and anthropogenic influences.
- In Odisha, under NAQUIM 2.0, studies have been carried out in Balasore Sadar and Remuna blocks of Balasore district. The studies indicate that salinity in the coastal aquifers is primarily due to saline water entrapped within the pore spaces during the original deposition of sediments. Thus, the observed salinity is considered to be inherent to the depositional environment and not due to active seawater intrusion. The studies also indicate that the depth of occurrence of saline water-bearing aquifers is not uniform throughout the coastal tract.

ANNEXURE-II

ANNEXURE REFERRED TO IN REPLY TO PART (a) to (c) OF UNSTARRED QUESTION NO. 4075 TO BE ANSWERED IN RAJYA SABHA ON 30.03.2026 REGARDING “GROUNDWATER CONTAMINATION IN COASTAL AREAS”.

PARAMETER/CONTAMINANT-WISE DETAILS OF GROUND WATER SAMPLE ANALYSIS FOR COASTAL STATES AS PER ANNUAL GROUND WATER QUALITY REPORT-2025

S No	State	EC		Fluoride		Nitrate		Uranium		Arsenic		Iron		Mn		Zn	
		No. of Samples analysed	% of Samples with EC > 3000 μ S/cm	No. of Samples analysed	% of Samples with F > 1.5 mg/L	No. of Samples analysed	% of Samples with NO ₃ > 45 mg/L	No. of Samples analysed	% of Samples with U > 30 ppb	No. of Samples analysed	% of Samples with As > 10 ppb	No. of Samples analysed	% of Samples with Fe > 1 mg/L	No. of Samples analysed	% of Samples with Mn > 0.3 mg/L	No. of Samples analysed	% of Samples with Zn > 15 mg/L
1	Andaman & Nicobar Islands	115	0	115	0	115	0	27	0	28	0	28	28.57	28	50	28	0
2	Andhra Pradesh	1135	9.78	1135	8.99	1135	24.23	-	-	-	-	-	-	-	-	-	-
3	Dadra & Nagar Haveli and Daman & Diu	16	0	16	0	16	0	-	-	-	-	-	-	-	-	-	-
4	Goa	7	0	7	0	7	14.29	6	0	6	0	6	0	6	16.67	6	0
5	Gujarat	618	18.28	618	9.06	618	18.93	126	2.38	114	0	132	1.52	132	1.52	132	0
6	Karnataka	398	15.08	398	16.83	398	45.48	118	8.47	118	1.69	118	2.54	118	13.56	118	0
7	Kerala	361	0	361	0.55	361	10.8	185	0	185	0	181	11.6	185	0	-	-
8	Maharashtra	1565	2.56	1565	1.79	1565	33.93	331	0.6	-	-	-	-	-	-	-	-
9	Odisha	654	1.07	654	1.07	654	12.84	413	0.24	413	1.45	413	14.04	413	19.85	413	0.97
10	Puducherry	9	0	9	11.11	9	11.11	7	0	7	0	7	0	7	28.57	7	0
11	Tamil Nadu	929	10.55	929	7.75	929	36.28	286	1.75	286	1.75	286	3.5	286	9.09	286	0.35
12	West Bengal	875	1.49	875	0.91	875	8.91	235	0	236	19.49	236	38.98	236	22.46	236	0.42
