

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

RAJYA SABHA
UNSTARRED QUESTION NO. 693
TO BE ANSWERED ON 05.02.2026

Impact of climate change on coastal settlements

693. SHRI DHANANJAY BHIMRAO MAHADIK:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether Government has conducted any comprehensive scientific studies to evaluate the impact of rising sea levels, coastal erosion and climate-induced changes on coastal settlements across the country, particularly along the Maharashtra coastline;
- (b) if so, the details and key findings of such assessments in respect of Maharashtra; and
- (c) whether Government proposes to launch or expand any new initiatives in the State for long-term monitoring, sustainable coastal planning and community-based climate resilience to address the challenges posed by sea-level rise and if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(SHRI KIRTI VARDHAN SINGH)

(a) and (b): The Government has undertaken the following scientific studies to assess the impacts of sea-level rise, coastal erosion, and climate-induced changes on coastal settlements across the country:

- i. The Indian National Centre for Ocean Information Services (INCOIS), an autonomous institute under the Ministry of Earth Sciences (MoES), has prepared the report “Projected Changes in Extreme Sea Levels and Coastal Vulnerability along the Indian Coasts” under the Deep Ocean Mission. The study provides a comprehensive assessment of projected sea-level rise, its implications for coastal India, and associated coastal vulnerability maps.
- ii. Indian National Centre for Ocean Information Services (INCOIS) has developed a Coastal Vulnerability Index (CVI) for the entire Indian coastline as part of the Tsunami Early Warning System. The CVI, mapped at a scale of 1:100,000, is based on multiple parameters including sea-level rise, coastal slope, shoreline change rate, elevation, geomorphology, tidal range, and significant wave height.
- iii. INCOIS has also carried out Coastal Multi-Hazard Vulnerability Mapping (MHVM) for the entire Indian coastline at a scale of 1:25,000, using parameters such as sea-level change, shoreline change rate, elevation contours, extreme water levels from tide gauges, and return periods.
- iv. The National Centre for Coastal Research (NCCR), an attached office of MoES, has been monitoring shoreline changes along the Indian coast since 1990 using remote sensing data supported by field verification. NCCR has prepared 526 coastal erosion maps at a scale of 1:25,000, along with district-wise and State/UT-wise maps. For the Maharashtra coast (1990–2022), the study indicates that 27.7% of the coastline is eroding, 54.7% is stable, and 17.6% is experiencing accretion.
- v. NCCR also undertakes R&D on coastal processes and shoreline management, assists States/UTs in identifying vulnerable stretches, recommends site-specific

mitigation measures, and supports preparation of Shoreline Management Plans (SMPs). SMPs have been prepared for Kerala, Tamil Nadu, Puducherry, and Andhra Pradesh.

- vi. Under the Coastal Management Information System (CMIS), the Central Water Commission has established two coastal data collection stations in Maharashtra (Tarkarli and Satpati). Since 2019, nine coastal parameters—including waves, ocean currents, bathymetry, sediment dynamics, beach profiles, shoreline change, wind and rainfall, riverine data, and salinity—are being monitored to support coastal planning and management.
- vii. As informed by Government of Maharashtra (GoM), it has undertaken a comprehensive climatological assessment that includes sea-level rise, temperature, rainfall, and other meteorological parameters, through its revised State Action Plan on Climate Change (SAPCC).
- viii. Further as informed by Government of Maharashtra, steps are being undertaken for preparation of the Coastal Zone Management Plan under Coastal Regulation Zone (CRZ) Notification 2019, Shoreline Change Assessment, and Shoreline Management Plan for the seven coastal districts of Maharashtra—Sindhudurg, Ratnagiri, Raigarh, Greater Mumbai, Mumbai Suburban, Thane, and Palghar—and include analysis of coastal erosion and sea-level rise projections.

(c) Further, Government of Maharashtra has stated that it has proposed the project “M-SHORE: Strengthening Coastal Resilience and the Economy in the Coastal Districts of Maharashtra” to Department of Economic Affairs, Ministry of Finance, for a period of five years, with the financial assistance from the World Bank. The project aims at sustainable and productive use of coastal and marine resources, strengthening the blue economy, and building coastal resilience through integrated Coastal Zone Management and Shoreline Management Plans and will cover all coastal districts including Palghar, Thane, Greater Mumbai, Mumbai Suburban, Raigad, Ratnagiri and Sindhudurg.
