GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 1482
ANSWERED ON 12/02/2026

PERFORMANCE OF EARLY WARNING SYSTEMS

1482 SHRI KESRIDEVSINH JHALA:
SHRI ASHOKRAO SHANKARRAO CHAVAN:
SHRI BABUBHAI JESANGBHAI DESAI:
DR. BHAGWAT KARAD:
SHRI KANAD PURKAYASTHA:
SHRI BABURAM NISHAD:
SMT. MAYA NAROLIYA;

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a) whether Government has assessed the performance of Indian Tsunami Early Warning Centre during seismic events during the last five years;
(b) whether any system upgrades or mock drills have been conducted during this period;
(c) if so, the details thereof;
(d) the manner in which advisories are being disseminated to coastal districts and fishing communities;
(e) the improvements made in ocean State and storm-surge forecasting; and
(f) the coordination mechanisms with coastal States and maritime agencies?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) Yes Sir. Following the December 2004 Indian Ocean tsunami, the Government of India established Indian Tsunami Early Warning Centre (ITEWC) at Indian National Centre for Ocean Information Services (INCOIS), Hyderabad under the Ministry of Earth Sciences (MoES). Operational since 15 October 2007, the centre uses advanced real-time seismic and sea level monitoring, computing and communication systems to detect tsunamigenic earthquakes within 10 minutes and issues tsunami advisories as per SOPs. Under the UNESCO-IOC framework, Key Performance Indicators (KPIs) are evaluated annually. The major KPIs include detection of earthquakes within 10 minutes, monitoring 100% of earthquakes of magnitude ≥ 6.5, maintaining magnitude differences within 0.3, and location, focal depth accuracy within 30 km. ITEWC has consistently met all KPIs, performing well within the prescribed limits.

During the last five years, ITEWC monitored 145 tsunamigenic earthquakes of magnitude ≥ 6.5, including eight events in the Indian Ocean region. For each event, the centre carried out detailed assessments and confirmed that there was no tsunami threat to India and the Indian Ocean. The Centre consistently issued timely and accurate tsunami early warning advisories.

(b) & (c) Yes Sir. The tsunami warning system at INCOIS is undergoing constant improvements incorporating the latest advances in tsunami science, computational methods, and Information and Communication Technology (ICT). To support advanced real-time tsunami and ocean modelling, INCOIS has commissioned High Performance Computer (HPC)–Tarang, a high-performance computing system dedicated to tsunami forecasting and operational ocean services. Tsunami services delivery perspective, SOPs for volcanic-induced tsunamis have been developed, and dissemination of tsunami bulletins to NAVAREA stakeholders has been initiated.

During the last five years, eight tsunami mock drills were conducted to strengthen tsunami preparedness and response mechanisms. Of these, two were coordinated at Indian Ocean regional level, IOWave23 in October 2023 and IOWave25 during October–November 2025. In addition, six national and state-level tsunami mock drills were conducted on 05 November 2021, 05 November 2022, 09 February 2023, 05 November 2023, 30 August 2024 and 05 November 2024. These mock exercises have enhanced tsunami preparedness, response capabilities of coastal States and Union Territories, and improved coordination at national and regional levels. The drills also facilitated the testing of SOPs of emergency services and enabled assessment of their readiness to handle tsunami emergency situations.

(d) ITEWC maintains a comprehensive database of all coastal Disaster Management Officials (DMOs) and national disaster management authorities, including National Disaster Management Agency (NDMA), Ministry of Home Affairs (MHA), and other relevant agencies. In the event of a major earthquake or tsunami, information is disseminated to all concerned government stakeholders through multiple communication. The channels such as SMS, email, fax, GTS, Electronic Display Boards (EDB), and VoIP. The information is also made available through the INCOIS website, the SAMUDRA mobile application, CAP Sachet, and other platforms. Tsunami advisories are issued in four standardized categories to support decision-making by DMOs: Warning (the public should be advised to move inland towards higher ground), Alert (the public should be advised to avoid beaches and low-lying coastal areas), Watch (no immediate action is required), and No Threat (safe). While INCOIS issues tsunami advisories, the responsibility for issuing evacuation orders rests with the respective state and local government authorities.

(e) INCOIS serves as the nodal agency for providing a wide range of ocean-based early warning and advisory services to support disaster risk reduction and coastal safety. These services include storm-surge alerts, ocean state condition advisories such as high waves, ocean currents, and swell surges. All services are delivered through the integration of real-time ocean observations, high-resolution numerical models, machine-learning–based analytics, and advanced multi-channel dissemination platforms. This robust operational framework enables timely and accurate information delivery to support preparedness, response, and decision. INCOIS continuously strengthens and upgrades its early warning and advisory systems through the adoption of emerging technologies, improved modelling capabilities, and enhanced observational networks.

(f) To enhance preparedness, awareness, and response to ocean-related hazards, INCOIS undertakes regular capacity-building activities across coastal States and UTs. These include awareness programmes, technical workshops, training sessions, tsunami mock drills, and the implementation of the Tsunami Ready programme in close coordination with State and local stakeholders. INCOIS also conducts coordination meetings and joint exercises with State Disaster Management Authorities (SDMA) and maritime agencies to strengthen operational readiness and inter-agency coordination. Feedback and operational inputs from these engagements are systematically incorporated to improve advisory products, dissemination protocols, and service delivery. This integrated coordination framework ensures seamless information flow, informed decision-making, and effective support for coastal safety and maritime operations.

*****