Earth Sciences Minister Dr Jitendra Singh explains El Nino and its Monsoon impact in Lok Sabha reply

AI-powered prediction system indicates El Nino likely to persist till February 2027; Monsoon impact depends on multiple climate factors, says Dr. Jitendra Singh

“INCOIS has developed indigenous AI/ML-based ENSO prediction system with probabilistic forecasts and uncertainty estimates”

“Indian Ocean Dipole, Madden-Julian Oscillation and regional ocean-atmosphere interactions also influence Indian monsoon”

Government strengthens Ocean State Forecasting, early warning systems and coastal preparedness through advanced technologies: Dr. Jitendra Singh

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Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, Dr. Jitendra Singh today said that the latest assessment by the Indian National Centre for Ocean Information Services (INCOIS) indicates that El Nino conditions, which developed during May 2026, are likely to persist from June 2026 to February 2027, with forecast probabilities ranging between 70 and 90 per cent. The assessment is based on INCOIS' indigenous Artificial Intelligence and Machine Learning (AI/ML)-based El Nino Southern Oscillation (ENSO) prediction system together with the Global Ocean Data Assimilation System.

Dr. Jitendra Singh explained that while El Nino has historically been associated with weaker Indian Summer Monsoon rainfall over parts of the country, it is not the sole determinant of the monsoon. The Indian monsoon is influenced by several interacting climate drivers, including the Indian Ocean Dipole (IOD), Madden-Julian Oscillation (MJO) and regional ocean-atmosphere interactions.

Dr. Jitendra Singh said that while the current outlook points to the persistence of El Niño, its eventual impact on the Indian monsoon will depend on the evolution of associated ocean-atmosphere conditions, including the Indian Ocean Dipole and prevailing wind patterns during the monsoon season. Therefore, the situation continues to be closely monitored through advanced forecasting systems.

The Minister said the evolving El Nino may influence atmospheric circulation over the Arabian Sea and Bay of Bengal and could increase the likelihood of marine heatwaves because of persistent warming over these regions. These changes may affect ocean mixing, nutrient availability and biological productivity, with implications for fish distribution and coastal marine ecosystems. Variations in wave and swell conditions may also impact navigation, offshore operations and coastal activities.

Highlighting the Government's preparedness, Dr. Jitendra Singh said INCOIS has continuously strengthened Ocean State Forecasting and marine multi-hazard early warning services through high-resolution forecasting models for storm surge, high waves, swell surge and high currents. The forecasting capability has been enhanced through an expanded ocean observation network comprising ocean gliders, moored buoys, Argo floats, tide gauges and satellite observations integrated with advanced data assimilation systems.

Dr. Jitendra Singh said the Government has also strengthened round-the-clock operational monitoring, multi-platform dissemination of advisories and impact-based forecasting while conducting stakeholder training programmes, mock exercises and awareness campaigns to improve preparedness and resilience among coastal communities.

Dr. Jitendra Singh further informed that under the Deep Ocean Mission, ₹145.06 crore has been allocated during the current financial year for mapping marine resources. Biodiversity surveys of seamounts in the Indian Exclusive Economic Zone are being expanded, while advanced Autonomous Underwater Vehicles and Remotely Operated Vehicles are being deployed for exploration of hydrothermal vents, mineral-rich zones and marine resources.

The Minister said that for coastal States, including Tamil Nadu, INCOIS provides Ocean State Forecast services with forecasts of waves, winds, swells, currents and sea surface temperature up to ten days in advance. High-wave, swell surge and high-current advisories are regularly issued to State authorities to support disaster preparedness and marine safety. The Centre has also established tide gauge stations, Coastal Wave Rider Buoys and tsunami preparedness programmes in collaboration with State Governments to strengthen coastal resilience and community preparedness.

Dr. Jitendra Singh reiterated that the Government continues to invest in indigenous forecasting technologies, advanced ocean observations and scientific decision-support systems to improve the accuracy of climate and ocean predictions, enabling timely advisories for governments, coastal communities, fishermen and other stakeholders while strengthening India's resilience against evolving climate variability.

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