GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 2944
TO BE ANSWERED ON WEDNESDAY, 5TH AUGUST, 2026

IMPACT AND ACHIEVEMENTS OF THE DEEP OCEAN MISSION

2944. SHRI RAO RAJENDRA SINGH:

Will the Minister of *Earth Sciences* be pleased to state:

(a) the details of impact of the Deep Ocean Mission in tapping ocean resources and promoting the blue economy in the country;
(b) the notable achievements made under the Deep Ocean Mission since its inception; and
(c) the details of measures taken under the Deep Ocean Mission to ensure ethical and environmentally sustainable practices in exploration and resource utilisation?

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

(a) Deep Ocean Mission (DOM) is a flagship initiative launched by the Government of India in 2021, encompassing activities across six verticals. These verticals are (1) Development of Technologies for Deep-sea mining, Human Submersible and underwater robotics, (2) Development of Ocean Climate Change Advisory Services, (3) Technological Innovations for exploration and conservation of deep-sea biodiversity, (4) Deep-ocean survey and exploration, (5) Energy and fresh water from the ocean, and (6) Establishment of Advanced Marine Station for Ocean Biology. The research and activities under the Mission aim to explore and harness ocean living and non-living resources (such as biodiversity, polymetallic nodules, polymetallic sulphides, and ocean thermal energy) as part of the pilot project for developing India's Blue Economy.

(b) The notable achievements made under the Deep Ocean Mission (DOM) are as follows:

DOM Vertical: Thematic area	**Progress**
Vertical 1: Development of technologies for manned submersible, deep-sea mining and underwater vehicles and underwater robotics	The design and system engineering for India's flagship human submersible, MATSYA-6000, are complete; subsystems have been realised; and crewed and uncrewed wet harbour trials at 8m depth were conducted from 22nd January 2025 to 14th February 2025 at Kattupalli, near Chennai. Scientists at the National Institute of Ocean Technology (NIOT), Chennai, entrusted with the development of MATSYA-6000, have gained pilot experience with the French submersible NAUTILE in August 2025. The design of the self-propelled deep-sea nodule collector/deep-sea mining machine is complete, and a successful demonstration of the collection of over 100 kg of Cobalt-rich deep-sea polymetallic nodules from a depth of 1173m was conducted in the Andaman Sea in 2024.

Vertical 2: Development of ocean climate change advisory services	A suite of ocean models for downscaling sea level, wave, storm surge, and biogeochemical projections of the Indian Ocean; prediction of 100-year extreme sea level along the coasts of the Indian subcontinent and associated coastal vulnerability maps; Genesis Potential Index for cyclones in the Bay of Bengal; and a wave model for Indian Ocean wave climate analysis have been completed. To strengthen ocean observation, the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, has successfully completed 11 glider missions in the Arabian Sea and the Bay of Bengal, and deployed 60 directional Wave Spectra Barometric Drifters and 92 physical and biogeochemical Argo floats in the Indian Ocean.
Vertical 3: Technological innovations for exploration and conservation of deep-sea biodiversity	Detailed profiling and characterisation studies, including genomic analysis, screening for industrially useful molecules, and the preservation of select deep-sea microbial samples, have been conducted. Nearly 2038 deep-sea microbes have been isolated from water and sediment samples in the Indian EEZ, and rare deep-sea microbes previously unreported from the Indian Ocean have been discovered. A Marine Microbial Repository is being established at Chittedu, Andhra Pradesh. Nearly 31 seamounts (biodiversity hotspots) in the Arabian Sea and the Bay of Bengal have been surveyed by the Centre for Marine Living Resources and Ecology (CMLRE), Kochi, which documented 201 deep-sea species, including 43 potentially new to science.
Vertical 4: Deep ocean survey and exploration (and research ship)	Deep-sea expeditions in the Central and Southwest Indian Ridges have been conducted, leading to the discovery of four hydrothermal vent fields and two inactive vents (potential mineralised zones), including India's first imaging of an active vent. A contract has been awarded to GRSE, Kolkata (a PSU under the Ministry of Defence), for the indigenous construction of a new multipurpose, all-weather ocean research vessel. The design of the new oceanographic research vessel, model tests, and keel laying have been completed.
Vertical 5: Energy and freshwater from the ocean	A detailed project report for a high-capacity offshore Ocean Thermal Energy Conversion (OTEC)-powered desalination plant has been prepared.
Vertical 6: Advanced Marine Station for Ocean Biology	Land for setting up the Advanced Marine Station in Nemmeli, Chennai, has been procured. 145 collaborative research projects with nearly 70 national institutions, including universities, colleges, and laboratories, are ongoing across various areas of ocean/marine sciences.

(c) For deep-sea resource exploration and utilisation, the draft Mining Code of the International Seabed Authority (ISA) incorporates stringent environmental safeguards, including the precautionary approach, environmental baseline studies, environmental impact assessments (EIAs), environmental management and monitoring programmes, and adaptive management measures to protect the marine environment. India participates in the consultative approach implemented by the ISA to develop these safeguards. The Mining Code has yet to be ratified by the ISA.

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