

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 1633
ANSWERED ON 13/03/2025

DEEP OCEAN MISSION

1633. **SHRI K.R.N. RAJESHKUMAR:**

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

- (a) the developments made under the Deep Ocean Mission, including the specific research projects currently underway, and the expected outcomes of these projects;
- (b) the details of the technologies developed and the infrastructure established under the mission to facilitate deep ocean research; and
- (c) the measures taken to promote international collaboration and knowledge sharing in deep ocean research?

ANSWER

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

- (a-b) The Deep Ocean Mission is a multi-ministerial, multi-disciplinary programme with activities encompassing six verticals, namely a) Development of Technologies for Deep Sea Mining and Manned Submersible, Underwater Vehicles and Underwater Robotics for exploring and harnessing ocean resources, b) Development of Ocean Climate Change Advisory Services, c) Technological innovation for exploration and conservation of deep-sea biodiversity, d) Deep Ocean Survey and Exploration, e) Energy and Freshwater from the Ocean, and f) Advance Marine Station for Ocean Biology. The expected outcomes of the mission include expanding the country's scientific research and technological prowess, with immediate spin-offs in underwater engineering innovations, asset inspection and the promotion of ocean literacy and human resource capacity. The technologies developed under the Deep Ocean Mission are envisaged to expand the country's capability for deep-sea man-rated vehicle development and pave the way for sustainable deep-sea exploration and harnessing of deep-sea living and non-living resources.

Technologies developed, and infrastructures established under the mission are a human submersible 'Matsya 6000' to carry three people to a depth of 6000 meters in the ocean with a suite of scientific sensors for ocean exploration and observation. The system has been designed and tested per international standards and was successfully demonstrated at Katupalli harbour near Chennai for its functionality. The deep-sea observation system of 50 Argo floats and 57 wave drifters have been deployed, and 11 gilder missions have been completed in the Bay of Bengal and the Arabian Sea, which are utilised at the modelling facility established at INCOIS, Hyderabad, for predicting ocean climate. Under exploration of deep-sea biodiversity, 19 seamounts in the Arabian Sea have been surveyed, and 1,062 samples have been collected, representing 128 species, of which 38

are new species, and 23 species were found to be new to Indian EEZ. Nearly 940 distinct heterotrophic deep-sea bacteria, 360 actinobacteria, and 101 fungal and 222 yeast isolates have been collected and characterised. A survey for potential sites of multi-metal hydrothermal sulphides mineralisation along the Indian Ocean mid-oceanic ridges using Autonomous Underwater Vehicle was conducted, leading to the identification of two active and two inactive vents. A multi-purpose ocean research vessel has been designed, and construction of the vessel has commenced at GRSE, Kolkata, which facilitates deep ocean research. A human enterprise has been established through collaborative projects involving national institutions and academia under the Advanced Marine Station for Ocean Biology as part of capacity building.

- (c) International collaboration, cooperation, and national capacity building are prioritised through national and international collaborative research projects for deep-sea research and innovation under the mission.
