GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 3219
TO BE ANSWERED ON WEDNESDAY, 19TH MARCH, 2025

IMPLEMENTATION OF DEEP OCEAN MISSION

3219. SHRI APPALANAIDU KALISETTI:

Will the Minister of Earth Sciences be pleased to state:

(a) the specific milestones achieved so far under the Deep Ocean Mission (DOM) since its approval along with the details of any delays or challenges faced in its implementation;
(b) the current status of the development of deep-sea mining technologies, including the manned submersible and integrated mining system along with the expected timeline for their operationalization;
(c) the progress made in the exploration of polymetallic nodules and hydrothermal sulphides along with the details of any findings or setbacks encountered;
(d) the extent to which research collaborations with private industries and academic institutions have been established for indigenizing critical technologies under the Mission; and
(e) whether the Government has formulated a concrete strategy for the sustainable commercial utilization of deep-sea resources and if so, the details thereof?

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

(a to c) The Deep Ocean Mission is a multidisciplinary initiative of the Government of India, launched in 2021, to be chiefly implemented by the Ministry of Earth Sciences. The mission has 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 design, realisation of components, and integration of India's flagship human submersible named 'Matsya 6000' aimed to carry three humans to a depth of 6000 meters with a suite of scientific sensors for ocean exploration and observation are complete. The system has been designed and tested per international standards and is successfully demonstrated with three crew onboard at the Katupalli harbour near Chennai for its functionality (including floatation, stability, manoeuvrability, power and control devices, and human support and safety). The Matsya 6000 is to operationalise for scientific exploration after demonstration in deep waters. For deep-sea mining, a self-propelled seabed nodule mining system has been developed, and exploratory mining trials for polymetallic nodules were successfully conducted in the Andaman Sea EEZ.

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 sulphide mineralisation along the Indian Ocean mid-oceanic ridges using autonomous underwater vehicles 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.

To harness Ocean Thermal Energy Conversion (OTEC) for generating power and fresh water on a pilot scale for offshore set-up, an Expression of Interest was floated by the National Institute of Ocean Technology to understand the capability of such technology demonstration within India.

For capacity building, a human enterprise has been established through collaborative projects involving national institutions and academia under the Advanced Marine Station for Ocean Biology. Courses in ocean sciences at recognised universities and research fellowships have been initiated.

Several mission activities are being done as a first in the country, prioritising indigenous development and collaboration within national institutes. Involvement of human crew further necessitates international-level adherence to standards and certification.

The challenges faced in the implementation of the mission include issues related to the supply chain due to COVID-19 in the import of certain components and identification of the shipyard for building the new research vessel, which are addressed to complete the activities of the mission with an extended time period.

(d) The Titanium alloy personnel sphere for Matsya 6000 meters operations is being developed indigenously with ISRO. The welding facility for the Matsya 6000 titanium alloy personnel sphere (using an electron beam source) by ISRO is a first-of-its-kind for such 80 mm thickness welding in the country. The bio-vest for the submersible crew members and select underwater applications, such as the inertial navigation system, are being developed with DRDO. Environmental impact assessment relating to surveys and exploration is conducted with CSIR-NIO. Further, collaborative research projects have been initiated under thematic areas of all six verticals of Deep Ocean Mission with leading national government and academic institutes where industry is involved.

(e) Survey and exploration activities in the Central Indian Ocean Basin Central and South West Indian Ridges and exploratory mining are conducted as part of India’s contract with the International Sea-bed Authority. Further, the Union Cabinet has approved India to sign the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement or the ‘High Seas’ Treaty, which sets mechanisms for the sustainable use of marine biological diversity through international cooperation and coordination. It follows an inclusive, integrated, ecosystem-centric approach based on the precautionary principle and promotes using traditional knowledge and the best available scientific knowledge. It helps minimise impacts on the marine environment through area-based management tools and establishes rules for conducting environmental impact assessments. The Ministry of Earth Sciences is spearheading the country's implementation of the BBNJ Agreement.

*****