

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 4032
TO BE ANSWERED ON WEDNESDAY, 12TH AUGUST, 2026**

DEEP OCEAN MISSION

4032. SHRI BASAVARAJ BOMMAI:
SMT. D K ARUNA:

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

- (a) the details of the progress made in the development of indigenous deep-sea mining technologies under the Deep Ocean Mission;
- (b) the status of demonstration of the indigenous deep-sea mining machine VARAHA including the depth and areas where field trials have been conducted;
- (c) the details of roadmap for deep-sea resource assessment and commercial exploitation of polymetallic nodules in the Indian Ocean; and
- (d) the details of environmental safeguards put in place to ensure sustainable deep-sea exploration and mining activities?

ANSWER

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

- (a & b) The National Institute of Ocean Technology (NIOT), Chennai, under the Ministry of Earth Sciences (MoES), is entrusted with developing technologies for the reliable and sustainable harvesting of polymetallic nodules from the deep ocean. A seabed mining system has been developed, for which mobility and system-powering trials were successfully undertaken at a depth of 5270 m at the Central Indian Ocean Basin (CIOB) site allocated by the International Seabed Authority (ISA). In addition, NIOT has undertaken the development of nodule collection and crushing components in accordance with ISA guidelines.
- (c & d) Ministry of Earth Sciences has signed contracts with the International Seabed Authority (ISA) for exploration of seabed minerals, namely Polymetallic Nodules (PMN) and Polymetallic Sulphides (PMS) in the Indian Ocean in the areas beyond National jurisdiction. The Resource Assessment and the Environmental Impact Assessment studies are carried out as per the contractual obligations and guidelines set out by the ISA. Multidisciplinary Oceanographic Studies are conducted in the Indian contract areas under the exploration contract to establish baseline environmental conditions and assess the possible effects of exploration activities on deep sea ecosystems. Presently, only the activities related to exploration of deep seabed minerals in the international seabed are permitted.
