

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 3064
ANSWERED ON 27/03/2025

ECOLOGICAL IMPACT ASSESSMENT FOR DEEP SEA MINING

3064. SMT. JEBI MATHER HISHAM:

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

- (a) the details of surveys and exploration activities conducted for deep-ocean mineral resources;
- (b) whether Government has conducted marine ecological impact assessment for deep sea mining, if so, the key findings, if not, the reasons therefor;
- (c) whether Government plans to ensure sustainable deep sea mining while minimising environmental damage;
- (d) whether Government has studied unknown oceanic processes producing oxygen in deep sea regions and their impact on marine ecosystems;
- (e) the efforts made to study unknown deep sea ecosystems; and
- (f) the steps taken to apply for licenses to explore deep sea minerals in the Pacific Ocean?

ANSWER

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

- (a) India has a seabed area of 75,000 km² in the international waters in the Central Indian Ocean Basin (CIOB), contracted from the International Seabed Authority (ISA) for undertaking exploration activities for polymetallic nodules (PMN). India also has an area of 10,000 km² in the international waters in the Indian Ocean, contracted from the International Seabed Authority (ISA) for undertaking exploration activities for polymetallic sulphide deposits (PMS). Extensive surveys and exploration activities have been conducted in these contracted areas to characterize mineral resources. The entire 75,000 km² of the Indian contract area in the CIOB has been sampled for nodules at an interval of 12.5 km, and the nodule resources has been evaluated. An area of ~9929 km² had been identified as First Generation Minesite (FGM) within the contract area. Survey and exploration activities are carried out in an allocated area of 10,000 km² along Central Indian Ridge (CIR) and South West Indian Ridge (SWIR) region in the Indian Ocean under the contract for exploration of PMS. A survey conducted using Autonomous Underwater Vehicle (AUV) has resulted in the identification of two active and two inactive hydrothermal vents.

Council of Scientific & Industrial Research (CSIR) - National Institute of Oceanography (NIO) has carried out multidisciplinary oceanographic surveys over the Carlsberg ridge to locate hydrothermal vents that are associated with polymetallic sulphide mineralisation. Based on ship-borne investigations carried out, hydrothermal flumes in the water column were identified, suggesting the presence of hydrothermal vents in the proximal region.

Geological Survey of India (GSI) under the Ministry of Mines has delineated prospective offshore areas within Exclusive Economic Zone (EEZ) of India for marine mineral resources like Lime Mud, Fe-Mn encrustation, hydrothermal minerals and Phosphorite/phosphatic sediments, heavy minerals, construction sand etc.

- (b) India has been conducting extensive baseline studies of the overlaying water column and the seabed of the PMN and PMS area as per the recommendation and guidelines of the ISA to understand the physical, chemical and biological conditions. As per the conditions laid down by the ISA, necessary preparatory studies have been undertaken in test mining trials in the PMN contracted area, and a comprehensive document, “Environmental Impact Statement” (EIS), has been prepared and submitted to the ISA. In addition, environmental studies are an ongoing process to understand the deep-sea environment better.
- (c) The ISA is mandated with the development of deep-sea mineral mining in international waters while ensuring effective protection of the marine environment from harmful effects. India’s activities for mineral exploration align with the ISA’s regulations and strategic plans for protecting the marine environment.
- (d) The recent reports of ‘dark oxygen’ production in the deep-sea floor and the potential role of polymetallic nodules in this process were based on observations in the northwest Pacific Ocean. As of now, MoES has not taken up any research to study this oceanic process.
- (e) Systematic sampling has been undertaken in the Indian PMN and PMS contract area in the Indian Ocean to understand the ecosystem and establish baseline data for the region. Data has been generated on baseline environmental conditions, including microbial, planktonic and benthic communities, as well as the physical and chemical factors that influence them. These datasets provide an understanding of the deep sea ecosystems.
- (f) MoES has discussed with various ministries/ departments for possible applications for licenses for exploration of PMN in the Pacific Ocean.
