

GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
**RAJYA SABHA**  
**UNSTARRED QUESTION NO. - 978**  
ANSWERED ON – 10/02/2022

**DEEP OCEAN MISSION**

978. Dr. Santanu Sen:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether Government has taken up the Deep Ocean Mission in collaboration with the Indian Space Research Organisation (ISRO);
- (b) if so, the details thereof;
- (c) the funds allocated for this mission and its estimated revenue generation according to timeline; and
- (d) the details of the objective of the mission?

**ANSWER**

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

- (a) Yes, Sir. Indian Space Research Organisation (ISRO) is one of the collaborators of the Ministry of Earth Sciences for implementation of Deep Ocean Mission (DOM).
- (b) National Institute of Ocean Technology (NIOT), an autonomous institute under the Ministry of Earth Sciences is developing a manned submersible with a capacity to carry three human beings to 6000 m ocean depth. The Vikram Sarabhai Space Centre (VSSC) of ISRO is involved in developing a titanium alloy human sphere of 2.1 m diameter for the manned submersible.
- (c) The overall estimated cost of the Deep Ocean Mission is 4077 crores for a period of five years (2021 to 2026). Rs. 150 crores and Rs. 650 crores are allocated during 2021-22 and 2022-23. This being purely research and technology development activities, direct revenue generation is not relevant for this mission.
- (d) The objective of the mission are as follows:
  - To develop technologies for mining of deep sea resources like Polymetallic nodules from the Central Indian Ocean at a water depth of 5500 m.
  - Design, and develop one working prototype and one final manned Submersible rated for 6000metre water depth along with technologies for underwater vehicle and underwater robotics
  - To provide the future projections or predictions on the trends in sea level along the Indian coast, cyclone intensity and frequency, storm surges, wind waves, biogeochemistry and ecosystem that affect the fishery, at seasonal to decadal time scales for the north Indian Ocean under the climate change scenario. To install deep ocean observations (below 2 km depth) over the Indian Ocean.

- Inventorization, archival of specimens and development of DNA bank of deep-sea fauna of Northern Indian Ocean through systematic sampling using Remotely Operated Vehicle.
- Development of technology for isolation of deep-sea piezotolerant and piezophilic microbes, symbionts and screening for novel biomolecules using culture-based and meta genomic approaches.
- Exploration of formation of life friendly molecules and organismal components in deep sea.
- To explore and identify potential sites of multi-metal hydrothermal sulphides mineralization along the Indian Ocean mid-oceanic ridges.
- To acquire new all-weather multidisciplinary research vessel for Indian Ocean operations.
- Detailed engineering design document for high capacity offshore OTEC powered desalination plant
- Performance assessment of critical components such as deep-sea cold-water conduit and mooring system by demonstration of scaled down components in deep sea.
- Integrating the ongoing advanced basic and applied research in marine biology, marine ecology and related marine engineering through the establishment of an advanced Marine Station for Ocean Biology.
- Translate research in marine biology and engineering into industrial application and product development through establishment of on-site business incubator facilities.
- Capacity building with French Institutes. Excellent Indian candidates, stringently selected at a national level, will be deputed to the French institutes to be trained in all areas of marine biosciences.
- National and International collaboration in education, research and excellence in the field of marine science and ocean science and Ocean Technology.

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