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## **Deep Ocean Mission**

### *Harnessing Blue Economy for New India*

(Ministry of Earth Sciences)

**April 26, 2022**

### **Introduction**

The depth of the seas is a treasure trove for any country. For India, with its three sides surrounded by the oceans and around 30 per cent of the country's population living in coastal areas, ocean is a major economic factor supporting fisheries and aquaculture, tourism, livelihoods and blue trade. While the huge ports help us in vibrant trade, the blue economy, inclusive of fishing and other activities is extremely beneficial for India. In addition to the above, the depths of the seas have much more to offer. India's Exclusive Economic Zone spreads over 2.2 million sq. km. and the deep sea lies "unexplored and unutilized". Understanding the seas would also go a long way in mitigating the crisis of climate change.<sup>1</sup> Considering importance of the oceans on sustainability, the **United Nations (UN)** has declared the decade 2021-2030 as the Decade of Ocean Science for Sustainable Development. India has a unique maritime position. Its **7517 km long coastline** is home to **nine coastal states and 1382 islands**. The Government of India's Vision of New India by 2030 enunciated in February 2019 highlighted the **Blue Economy** as one of the ten core dimensions of growth.<sup>2</sup>

### **Estimated Ocean Resources for India**<sup>3</sup>

- Preliminary estimates indicate that 380 Million Metric Tonnes (MMT) of Polymetallic Nodules comprising Copper, Nickel, Cobalt and Manganese are available within an allocated area of 75000 sq. km for exploration of PMN in Central Indian Ocean Basin.
- The estimated value of these metals is about 110 billion US\$. The polymetallic sulphides are expected to contain rare earth minerals including gold and silver.

India has been allotted a site of 75,000 sq. km. in the Central Indian Ocean Basin (CIOB) by the UN International Sea Bed Authority for the exploitation of polymetallic nodules (PMN). Just utilizing 10% of the PMN reserve available in the area, the country can meet its energy requirements for the next 100 years.<sup>1</sup>

<sup>1</sup> <https://www.psa.gov.in/mission/deep-ocean-exploration/39>

<sup>2</sup> <https://www.moes.gov.in/schemes/dom>

<sup>3</sup> <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1744421>

With a view to explore deep ocean for resources and develop deep sea technologies for sustainable use of ocean resources, **Cabinet Committee on Economic Affairs (CCEA)** approved the proposal of **Ministry of Earth Sciences (MoES)** on “**Deep Ocean Mission**” at an estimated cost of **Rs. 4077.0 crore** for a period of five years to be implemented in a phase-wise manner. The estimated cost for the first phase for the three years (2021-2024) would be **Rs.2823.4 crore**. Deep Ocean Mission will be a mission mode project to support the Blue Economy Initiatives of the Government of India. **Ministry of Earth Sciences (MoES)** will be the nodal Ministry implementing this multi-institutional ambitious mission. The aim of Deep Ocean Mission is to **help India in achieving target of over Rs. 100 billion “Blue Economy”** through its ocean resources.

#### **Major Objectives of Deep Ocean Mission<sup>4</sup>**

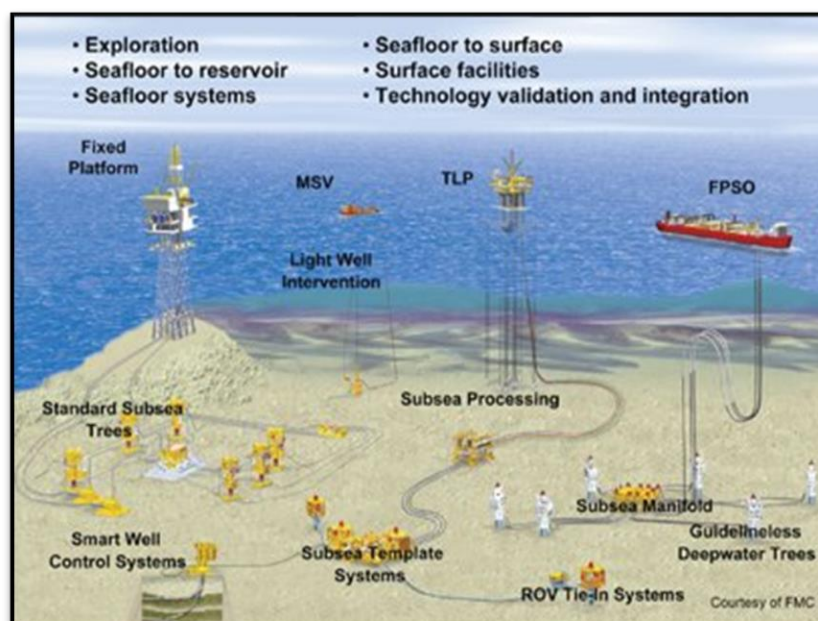
- To address issues arising from long term changes in the ocean due to climate change
- To develop technologies for deep-sea mission of living (biodiversity) and non-living (minerals) resources
- To develop underwater vehicles and underwater robotics
- To provide ocean climate change advisory services
- To identify technological innovations and conservation methods for sustainable utilization of marine bio-resources
- To develop offshore based desalination techniques
- To develop renewable energy generation techniques
- To provide clean drinking water and explore the avenues of desalination of water as well as extracting minerals from the ocean belt.

For detailed objectives of Deep Ocean Mission, [Click here](#).

<sup>4</sup> <https://www.psa.gov.in/mission/deep-ocean-exploration/39>

## Components of Deep Ocean Mission<sup>5</sup>

- a. **Development of Technologies for Deep Sea Mining, and Manned Submersible:** A manned submersible will be developed to carry three people to a depth of 6000 metres in the ocean with a suite of scientific sensors and tools. Only a few countries have acquired this capability. An Integrated Mining System will be also developed for mining Polymetallic Nodules from 6000 m depth in the central Indian Ocean. The exploration studies of minerals will pave way for the commercial exploitation in the near future, as and when commercial exploitation code is evolved by the International Seabed Authority, an UN organization. This component will help the Blue Economy priority area of exploring and harnessing of deep-sea minerals and energy.
- b. **Development of Ocean Climate Change Advisory Services:** A suite of observations and models will be developed to understand and provide future projections of important climate variables on seasonal to decadal time scales under this proof-of-concept component. This component will support the Blue Economy priority area of coastal tourism.
- c. **Create awareness** amongst the public, students, academicians and user communities about the various fields of Earth system science as well as on the achievements and services rendered by MoES.



- d. **Technological innovations for exploration and conservation of deep-sea biodiversity:** Bio- prospecting of deep-sea flora and fauna including microbes and studies on sustainable utilization of deep-sea bio-resources will be the main focus. This component will support the Blue Economy priority area of Marine Fisheries and allied services.
- e. **Deep Ocean Survey and Exploration:** The primary objective of this component is to explore and identify potential sites of multi-metal hydrothermal sulphides mineralization along the Indian Ocean mid-oceanic ridges. This component will additionally support the Blue Economy priority area of deep-sea exploration of ocean resources.
- f. **Energy and freshwater from the Ocean:** Studies and detailed engineering design for offshore Ocean Thermal Energy Conversion (OTEC) powered desalination plant are envisaged in this proof-of-concept proposal. This component will support the Blue Economy priority area of off-shore energy development.
- g. **Advanced Marine Station for Ocean Biology:** This component is aimed at development of human capacity and enterprise in ocean biology and engineering. This component will translate research into industrial application and product development through on-site business incubator facilities. This component will support the Blue Economy priority area of Marine Biology, Blue trade and Blue manufacturing.

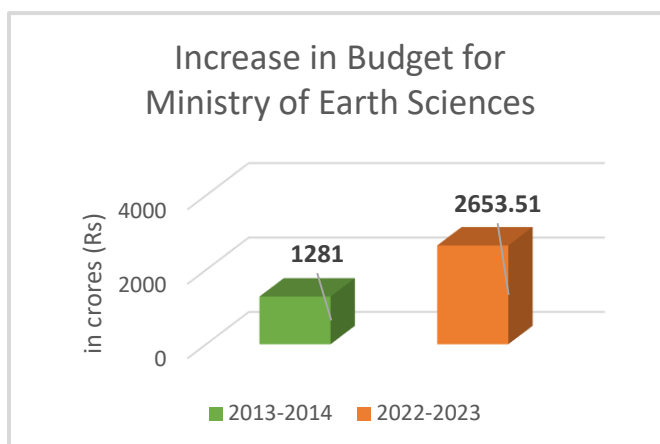
<sup>5</sup> <https://www.moes.gov.in/index.php/schemes/dom>



## Budget Estimate and Allocation<sup>6</sup>

Rs 650 crore has been allocated in Union Budget 2022-23 (up from Rs. 150 crores during 2021-22) for India's Deep Ocean Mission. The Earth Sciences Ministry's entire budget has more than doubled to Rs 2653.51 crore in 2022-23<sup>7</sup>, from Rs 1281 crore in the year 2013-14.<sup>8</sup>

The overall estimated cost of the Deep Ocean Mission is Rs. 4077 crores for a period of five years (2021 to 2026).



For year and component wise estimates of the Deep Ocean Mission, [click here](#)<sup>9</sup>.

## Progress of the Mission

### 1. Collaboration and Assistance<sup>10</sup>

- [Indian Space Research Organisation \(ISRO\)](#) is one of the collaborators of the Ministry of Earth Sciences for implementation of Deep Ocean Mission (DOM).
- [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 above manned submersible.
- Ministry of Earth Sciences through contractual agreements with the [International Seabed Authority \(ISA\)](#), is carrying out exploration activities for Poly-metallic Nodules (PMN) in the Central Indian Ocean Basin and for Poly-metallic Sulphides (PMS) in parts of Central and South-West Indian ridges.

### 2. India's First and Unique Manned Ocean Mission, [Samudrayan](#)<sup>11</sup>

- It was launched on 29 October 2021 from Chennai.
- With this step India joined the elite club of nations such as USA, Russia, Japan, France and China in having such underwater vehicles for carrying out subsea activities.
- It will facilitate MoES in carrying out deep ocean exploration of the non-living resources such as polymetallic manganese nodules, gas hydrates, hydro-thermal sulphides and cobalt crusts, located at a depth between 1000 and 5500 metres.
- Preliminary design of the manned submersible MATSYA 6000 is completed and realization of vehicle has been started with various organizations including [Indian Space](#)



<sup>6</sup> <https://pib.gov.in/PressReleasePage.aspx?PRID=1797250>

<sup>7</sup> <https://www.indiabudget.gov.in/doc/eb/sumsbe.pdf>

<sup>8</sup> <https://www.indiabudget.gov.in/budget2013-2014/ub2013-14/bag/bag42.pdf>

<sup>9</sup> <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1704840>

<sup>10</sup> <https://pib.gov.in/PressReleasePage.aspx?PRID=1797250>

<sup>11</sup> <https://pib.gov.in/PressReleasePage.aspx?PRID=1767579>

[Research Organisation \(ISRO\)](#), [Indian Institute of Tropical Meteorology \(IITM\)](#) and [Defence Research and Development Organisation \(DRDO\)](#) roped-in to support the development.

- Sea trials of 500 metre rated shallow water version of the manned submersible are expected to take place in the last quarter of 2022 and MATSYA 6000 will be ready for trials by the second quarter of 2024.

For details on Samudrayan, [click here](#)

#### References:

- PIB Press Release [Cabinet approves Deep Ocean Mission](#) Dated 16 June 2021.
- PIB Press Release [India's Exclusive Rights to Explore Polymetallic Nodules](#) Dated 21 August 2017.
- PIB Press Release [Ministry of Earth Sciences to launch 'Deep Ocean Mission' by January 2018](#) Dated 30 May 2017.
- PIB Press Release [Deep Ocean Mission](#) Dated 10 February 2022.
- PIB Press Release [India Aims to Target over 100 Billion "Blue Economy"](#) Dated 12 Jul 2021.
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- PIB Press Release [Deep Ocean Mission](#) Dated 15 March 2021.
- PIB Press Release [India's First and Unique Manned Ocean Mission Samudrayan](#) Dated 29 Oct 2021.
- <https://moes.gov.in/sites/default/files/RS-in-English-978-10022022.pdf>
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- <https://www.niot.res.in/niot1/index.php>

#### Video Links:

- Prasar Bharati : [India's Deep Ocean Mission | New developments in the unexplored region](#)
- DD News : [Cabinet approves Rs 4,077 crore Deep Ocean Mission](#)
- DD News : [Deep sea explorers reveal new images of bacteria-eaten Titanic wreckage](#)
- MoES GoI: [Deep Ocean Exploration and Deep Sea Mining by NIOT MoES](#)

#### Twitter Links

- <https://twitter.com/PrinSciAdvOff/status/1371402269065834501/photo/1>
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- [https://mobile.twitter.com/search?q=deep%20ocean%20mission&src=typed\\_query](https://mobile.twitter.com/search?q=deep%20ocean%20mission&src=typed_query)
- <https://mobile.twitter.com/DrJitendraSingh/status/1414610592145371137>
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- <https://twitter.com/i/status/1405105447426674688>

#### News Articles

- [Big financial push for Deep Ocean Mission in Union Budget](#)
- [Deep Ocean Mission gets massive push in Budget](#)
- [How Deep Ocean Mission will further government's vision of 'blue economy'](#)
- [India to launch ₹4,000 cr 'deep sea mission' to explore minerals, marine life, energy](#)
- [Mission to explore genomic diversity of Indian Ocean](#)

#### Year-End Review 2021 (M/o Earth Sciences):

<https://pib.gov.in/PressReleasePage.aspx?PRID=1786052>

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