

08– 11 – 2023

News: Deep Ocean Mission

- India is gearing up for a historic Deep Ocean Mission to explore and harness the depths of the ocean, a frontier that remains largely uncharted and holds immense potential for scientific and economic benefits.
- Countries such as the U.S.A., Russia, China, France, and Japan have already achieved successful deep-ocean crewed missions.

Deep Ocean Mission

- The Deep Ocean Mission proposes to explore the deep ocean like the space exploration started by ISRO about 35 years ago.
- The estimated cost of the mission will be Rs. 4077 crores for a period of five years to be implemented in a phase-wise manner.
- The estimated cost for the first phase for the 3 years (2021-2024) would be Rs.2823.4 crore.
- The deep ocean mission will be a mission mode project to support the Blue Economy Initiatives of the government.
- Ministry of Earth Sciences is the nodal agency for DOM.

- The focus of the mission will be on deep-sea mining, ocean climate change advisory services, underwater vehicles and underwater robotics related technologies.
- It also includes the construction of Offshore-based desalination plant using tidal energy.
- The technology and expertise needed in such missions is now available with only five countries - US, Russia, France, Japan and China. India will now be the sixth country to have it.

Significance

- The mission will give a boost to efforts to explore India's vast Exclusive Economic Zone and Continental Shelf.
- The plan will enable India to develop capabilities to exploit resources in the Central Indian Ocean Basin (CIOB).

Potential

- India has been allotted 75,000 square kilometres in the Central Indian Ocean Basin (CIOB) by UN International Seabed Authority for exploration of poly-metallic nodules.
- CIOB reserves contain deposits of metals like iron, manganese, nickel, and cobalt.

- It is envisaged that 10% of recovery of that large reserve can meet the energy requirement of India for the next 100 years.

Polymetallic Nodules

- Polymetallic nodules (also known as manganese nodules) are potato-shaped, largely porous nodules found in abundance carpeting the sea floor of world oceans in deep sea.
- Besides manganese and iron, they contain nickel, copper, cobalt, lead, molybdenum, cadmium, vanadium, titanium, of which nickel, cobalt and copper are of economic and strategic importance.
- Deep Ocean Mission will prove to be a game changer in the future. India has 7517 km long coastline. Around 30 per cent of the country's population lives in coastal areas. Ocean is a major economic factor supporting fisheries and aquaculture, tourism, livelihoods, and blue trade. Oceans are also a storehouse of food, energy, minerals, and medicines.

There are six components to the programme.

- Under the Mission, a manned submersible will be developed to carry three people to a depth of six thousand metre in the ocean.
- An Integrated Mining System will also be developed for mining Polymetallic Nodules. The exploration studies of minerals will pave the way for commercial exploitation soon.

- A research vessel for deep ocean exploration would be built in an Indian shipyard which would create employment opportunities.
- The second component involves developing Ocean Climate Change Advisory Services, which entails developing a suite of observations and models to understand and provide future projections of important climate variables on seasonal to decadal time scales.
- The next component is searching for deep sea flora and fauna, including microbes, and studying ways to sustainably utilise them.
- The fourth component is to explore and identify potential sources of hydrothermal minerals that are sources of precious metals formed from the earth's crust along the Indian Ocean mid oceanic ridges.
- The fifth component involves studying and preparing detailed engineering design for offshore Ocean Thermal Energy Conversion (OTEC) powered desalination plants.
- OTEC is a technology which uses ocean temperature differences from the surface to depths lower than 1,000 meters, to extract energy.
- The final component is aimed at grooming experts in the field of ocean biology and engineering. This component aims to translate research into industrial applications and product development through onsite business incubator facilities.

Matsya 6000

- Matsya 6000 is a manned submersible vehicle under the Deep Ocean Mission by Ministry of Earth Sciences.
- It has been designed and developed by National Institute of Ocean Technology (NIOT), Chennai.
- Matsya – 6000 will go down deep to 6000metres (6kms) in the Ocean to search for deep – sea resources like minerals.

Significance

- The manned submersible will allow scientific personnel to observe and understand unexplored deep-sea areas by direct intervention.
- It will also boost the Central government's vision of 'New India' that highlights the Blue Economy as one of the ten core dimensions of growth.
- India has a unique maritime position, a 7517 km long coastline, which is home to nine coastal states and 1,382 islands.
- For India, with its three sides surrounded by the oceans and around 30% of the nation's population living in coastal areas and coastal regions play a major economic factor.
- It supports fisheries and aquaculture, tourism, livelihoods, and blue trade.