



DEEP SEA MINING - GS I AND III MAINS

Q. Deep-sea mining offers a potential source for economic growth in India. Discuss its prospects and challenges for a developing country like India. (15 marks, 250 words)

News: *India in undersea race to mine world's battery metal*

What's in the news?

- The country, which already has two deep-sea exploration licences in the Indian Ocean, has applied for two more amid increasing competition between major global powers to secure critical minerals.

Key takeaways:

- Countries including China, Russia and India are vying to reach the huge deposits of mineral resources - cobalt, nickel, copper, manganese - that lie thousands of metres below the surface of oceans.
- These are used to produce renewable energy such as solar and wind power, electric vehicles and battery technology needed to battle against climate change.

Exploration Licenses:

- The UN-affiliated International Seabed Authority (ISA) has issued 31 exploration licences so far, of which 30 are active. Its member countries are meeting in Jamaica this week to discuss regulations around giving out mining licences.
- If the ISA approves India's new applications, its licence count will be equal to that of Russia and one less than China.

Deep-sea Mining:

- Deep-sea mining is the **process of extracting minerals and metals from the seabed at depths of more than 200 metres (660 feet)**.
- The ocean floor is home to a variety of mineral deposits, including polymetallic nodules, seafloor massive sulphides, and cobalt crusts.
- These deposits can contain high concentrations of valuable metals such as **cobalt, nickel, copper, manganese, and zinc**.
- The **first commercial deep-sea mining operation** is expected to begin in 2024.
- The International Seabed Authority (ISA) has granted a test permit to **DeepGreen Metals** to mine polymetallic nodules in the Clarion-Clipperton Zone of the Pacific Ocean.



Benefits of Deep-sea Mining:

Developing countries like India, are interested in pursuing deep-sea mining as a potential source of economic growth for several reasons such as

1. Access to Mineral Resources:

- Deep-sea mining offers the opportunity to access **vast, untapped mineral resources present on the ocean floor**.
- These resources include valuable metals such as copper, cobalt, nickel, manganese, and rare earth elements, which are crucial for various industries, including technology, renewable energy, and manufacturing.

2. Economic Development and Job Creation:

- Developing countries often seek new avenues for economic development and job creation.
- Deep-sea mining projects can potentially provide employment opportunities in various sectors, including **mining operations, engineering, research, and infrastructure development**.

3. Reduced Dependency on Imports:

- By engaging in deep-sea mining, countries can reduce their reliance on imported minerals.
- This can enhance their **economic self-sufficiency and reduce the vulnerability** associated with fluctuations in global commodity prices and supply chain disruptions.

4. Technological Advancement and Knowledge Transfer:

- Deep-sea mining requires advanced technology and expertise, which can drive technological innovation and development in a country.
- Engaging in such projects can facilitate **knowledge transfer, research collaboration, and the development of indigenous capabilities** in areas such as underwater robotics, geology, and environmental monitoring.

5. Revenue Generation:

- Deep-sea mining activities have the potential to generate significant revenue through the extraction and sale of valuable minerals.
- This revenue can contribute to national budgets, infrastructure development, social welfare programmes, and poverty alleviation efforts.

6. Facilitate Energy Transition:

- Copper or nickel for batteries, cobalt for electric cars or manganese for steel production; rare earth minerals and metals are **fundamental to the renewable energy** technologies driving the world's energy transition.

7. Depleting Terrestrial Deposits:

- Expanding technology and infrastructure has fueled the global demand for resources like cobalt and nickel, whose supply is depleting fast onshore.



- Hence, more and more countries, including India and China, are moving towards the ocean for extracting these resources.

8. Advantage for India:

- India is particularly interested in the potential of deep-sea mining to provide **access to cobalt**, which is a critical mineral for the **electric vehicle industry**.
- Deep-sea mining could provide India with a secure source of cobalt.
- The Indian Ocean is home to a number of **polymetallic nodules**, which are potato-sized rocks that contain high concentrations of cobalt.

Concerns of Deep-Sea Mining:

1. Lack of Research in Deep Sea:

- The deep sea **remains understudied and poorly understood**; there are many gaps in the understanding of its biodiversity and ecosystems.
- This makes it difficult to assess the potential impacts of deep-sea mining or to put in place adequate safeguards to protect the marine environment.

2. Disturbance of the Seafloor:

- The digging and gauging of the ocean floor by machines can **alter or destroy deep-sea habitats**.
- This leads to the loss of species and the fragmentation or loss of ecosystem structure and function.

3. Loss of Undiscovered Species:

- The deep sea is **home to unique species** that have adapted themselves to conditions such as poor oxygen and sunlight, high pressure and extremely low temperatures.
- Such mining expeditions can make them go extinct even before they are known to science.

4. Sediment Plumes:

- Deep-sea mining will stir up fine sediments on the seafloor, creating plumes of suspended particles.
- This is increased by **mining ships discharging waste water at the surface**.
- Such plumes could smother animals, harm filter-feeding species, and block animals' visual communication.

5. Pollution:

- Species such as whales, tuna and sharks could be affected by **noise, vibrations and light pollution** caused by mining equipment and surface vessels, as well as potential leaks and spills of fuel and toxic products.

6. No International Agreement for Mining:

- There is **absence of a mining code**, which has been under discussion for nearly 10 years.



- The International Seabed Authority (ISA) is uncertain about the process it should adopt for reviewing applications for mining contracts.

To achieve a balanced approach to deep-sea mining, developing countries should conduct thorough **environmental assessments, establish fair revenue-sharing agreements, build regulatory capacity, and promote international cooperation.** This ensures an understanding of ecological impacts, equitable distribution of financial benefits, effective monitoring, and knowledge sharing. By implementing these measures, countries can maximise the advantages of deep-sea mining while mitigating its negative consequences for the environment and local communities.

Go back to basics:

International Seabed authority:

- The International Seabed Authority (ISA) is mandated to “organize, regulate, and control” all mineral-resource related activities in the Area (the seabed and ocean floor and the subsoil thereof, beyond the limits of national jurisdiction).

Year: 1994.

Established under:

- It was established under the **United Nations Convention on the Law of the Sea (UNCLOS) and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea.**

Headquarters: Jamaica

Members: 168; **India is a member of this forum.**

Functions:

- The ISA has the authority to **issue mineral exploration licenses** on the seafloor that lies beyond national jurisdiction.
- **Regulate the exploration** of poly-metallic nodules.

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