Deep Sea Metals and its Mining

Why in news?

Recently International Sea Bed authority elected new chief and held discussion on international moratorium on extraction of deep sea metals until clear research on their impacts.

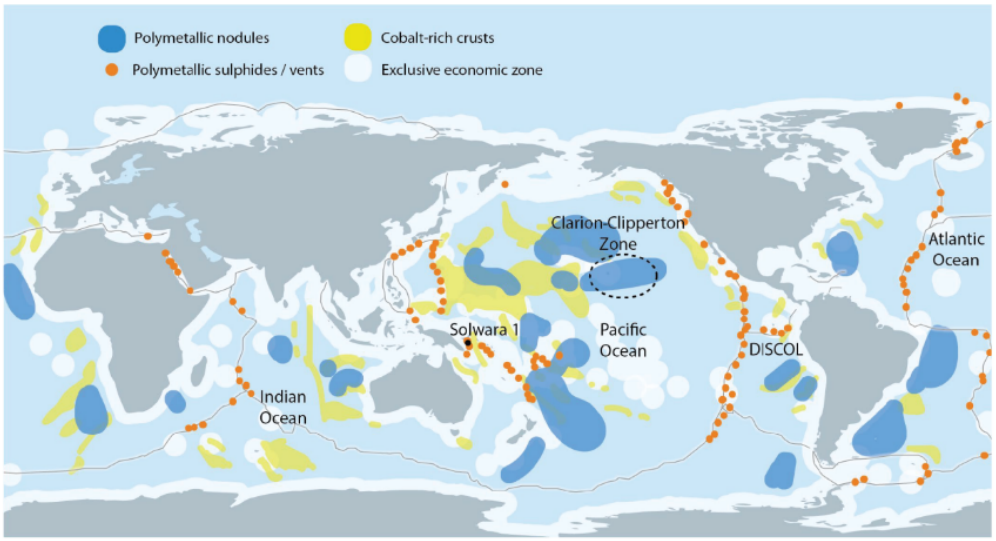
What are deep sea metals?

- It refers to the metallic and non-metallic ores present in Deep sea ocean floor.
- **Occurrences** - Deep sea minerals are *found at high seas* that accounts for *more than 50% of the world's oceans*.
- They occur in different forms in different parts of the ocean.

> ***The high seas*** *are defined by international law as all parts of the ocean that aren't included in the exclusive economic zone, the territorial sea, or the internal waters of a country, or in the archipelagic waters of an archipelagic country.*

- **Polymetallic nodules** - These are potato-sized lumps formed over millions of years from sediment deposits and are composed mainly of manganese, cobalt, copper and nickel .
- They are found at depths of 4–6 km in all major oceans.
    - **Example** - Clarion-Clipperton Zone between Hawaii and Mexico holds vast amounts of manganese nodules.
- India is trying to explore Carlsberg Ridge & Afanasy-Nikitin Seamount for polymetallic nodules.
- **Polymetallic sulfides** - It contains large amounts of copper, zinc, lead, iron, silver and gold.
- **Cobalt-rich crusts -** CRCs form on sediment-free rock surfaces around oceanic seamounts, ocean plateaus, and other elevated features.

Distribution of critical mineral resources in the deep sea



How deep sea mining are regulated?

- Common rights – Deep Sea mineral areas in High Seas are classified as the "common heritage of mankind".
- Raw materials found here belong to everyone, not one particular country.

Deep Sea Mining
• Deep sea mining includes three stages. • **Prospecting** - Searching for minerals and estimating their size, shape and value. • **Exploration** - Analysing the resources, testing potential recovery and potential economic/environmental extraction impacts. • **Exploitation** - Recovering of these resources. • **Countries opposing the mining** - Germany, Brazil and the Pacific island nation of Palau • **Countries supporting the mining** - China, Norway, Japan and the microstate Nauru in the Central Pacific.

To know more about deep sea mining, click here.

- Responsible authority – Potential mining activities in these regions are the responsibility of the International Seabed Authority (ISA), as outlined in the United Nations Convention on the Law of the Sea (UNCLOS).
- The ISA has *so far issued 31 licenses for exploration* and *no licenses for extraction yet*.

What are the impacts of deep sea mining?

- **Benthic disturbance** - Removing parts of the sea floor disturbs the habitat of benthic organisms.

Benthic Organisms *include animals that live on the sea floor are called benthos. Most of these animals lack a backbone and are called invertebrates. Eg. sea anemones, sponges, corals, sea stars, sea urchins, worms, bivalves, crab.*

- **Reduce dissolved oxygen -** Recent study showed that the minerals present in manganese nodules are able to produce oxygen
- **Affect deep sea biodiversity** – It might affect more than 5,000 different species present in the region.
- *Species that have adapted to live in extreme conditions* like food scarcity, absence of sunlight and high water pressure become highly vulnerable.
- These creatures are affected by the mining robots.
- **Pollutes the region** – It can create *light and noise pollution* at deep seas and the possible leaks and spills of fuels and other chemicals used in the mining process can cause *chemical pollution*.
- **Toxicity of sediment plumes** - Once valuable materials are extracted, slurry sediment plumes are sometimes pumped back into the sea.
- It may *transport metal complexes* trapped in the sediments (e.g., copper, cadmium) that can be released to the water column in concentrations *toxic to marine biota.*
- **Impact fishing activity** - Areas above the mining areas could be permanently disrupted.
- **Ecosystem damage** - It could permanently damage fragile marine systems.

What lies ahead?

- Comprehensive studies are needed to improve our understanding of deep-sea ecosystems and the vital services.

The United Nations Environment Programme (UNEP) emphasizes the need for a comprehensive assessment of the environmental impacts of deep-sea mining. To date, researchers have explored only around 1% of the deep sea area and it's potential.

- Understand the risks of mining comprehensively and ensure effective protection.
- Conduct transparent impact assessments based on comprehensive baseline studies.
- Incorporate circular economic principles to reuse and recycle minerals.
- Create global consensus on sharing the benefits from deep sea mineral resources.

References

1. Indian Express | Deep sea metals
2. IUCN | Deep sea mining

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