

India's Push into the Deep Sea: A Strategic and Economic Imperative

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What's in Today's Article?

- Deep Sea Technology Latest News
- Background
- Importance of Deep Sea Matters for India
- Challenges of Deep Sea Technology
- What India Needs to Do Next
- Conclusion
- India's Deep Sea Capabilities FAQs

Deep Sea Technology Latest News

- Recently, India completed wet testing of its **Matsya-6000 submersible**, capable of diving up to 6 km below the surface to look for underwater minerals off the coast.

Background

- India is steadily moving forward in its journey to explore and harness the vast potential of the deep ocean.
- A key step in this direction was the recent **wet testing of Matsya-6000**, a deep-sea submersible developed by the **National Institute of Ocean Technology (NIOT)** under the **Samudrayaan Project**.
- Capable of diving up to 6 km beneath the sea surface, Matsya-6000 is part of the broader **Deep Ocean Mission**, which aims to place India among a handful of nations with human-rated submersibles capable of operating at such extreme depths.
- However, as former naval commander **Vice Admiral Biswajit Dasgupta (Retd)** explains, developing deep sea capabilities is not just about science—it's about **economic strength, digital infrastructure, national security, and global competition**, especially with countries like **China** far ahead in this field.

Importance of Deep Sea Matters for India

- **The United Nations Convention on the Law of the Sea (UNCLOS) gives countries exclusive rights over natural resources within their Exclusive Economic Zone (EEZ), extending 200 nautical miles (about 370 km) from the coastline.**
- India's EEZ holds massive untapped potential on the seabed and in the water column.
- Some key reasons why India needs to invest in this domain include:
 - **Mineral and energy resources:** The seabed holds valuable resources like polymetallic nodules, gas hydrates, oil, and other rare-earth materials that are critical for India's growing industrial and energy needs.
 - **Food and nutraceuticals:** Fisheries and marine bio-resources offer economic and nutritional benefits.
 - **Oceanographic and climate data:** Deep ocean exploration can support climate modelling, weather forecasting, and environmental research.
 - **Digital economy infrastructure:** Over **95% of global internet traffic** passes through **undersea fiber-optic cables**. Ensuring these cables are secure, well-maintained, and possibly expanded with Indian participation is crucial to the digital economy.
 - **National security:** Deep sea is increasingly a space of **strategic competition**. China, for example, recently unveiled a **cable-cutting device** capable of damaging critical undersea infrastructure. India must prepare with **domain awareness, monitoring systems, and countermeasures**.

Challenges of Deep Sea Technology

- Developing deep sea capability is no small feat. The average depth in India's EEZ is around **3,741 metres**, nearly four-and-a-half times the height of the Burj Khalifa.
- The **pressure at such depths** exceeds **380 atmospheres**, requiring specially designed submersibles and materials.
- Some key technological challenges include:
 - **Communication underwater:** Unlike air, sound in water is affected by **temperature, pressure, and salinity**, making communication difficult. Very Low Frequency (VLF) and Extremely Low

Frequency (ELF) sound systems are essential but expensive to develop.

- **Pressure resistance:** The deeper the dive, the more robust the vessel needs to be. The **OceanGate Titan submersible tragedy in 2023** is a sobering reminder of what can go wrong without rigorous safety and engineering standards.
- **Cost and expertise:** Building these technologies demands **large financial investments**, **specialised research**, and a **highly skilled workforce**—areas where countries like **China, the US, Japan, and France** have made significant progress.

What India Needs to Do Next

- While the Deep Ocean Mission launched in **2018** is a step in the right direction, experts believe much more needs to be done. Key suggestions include:
- **Create a dedicated Ministry:** Upgrade the **Department of Ocean Development** into a full-fledged **Ministry of Ocean Affairs**, with a Cabinet-rank Minister to drive coordination and accountability.
- **Boost funding and speed:** Approve projects in **mission-mode** with clear deadlines, adequate budgets, and transparent review mechanisms.
- **Establish centres of excellence:** Invest in academic institutions and research labs focused on **deep ocean science and technology**, encouraging innovation and skill development.
- **Support industrial partnerships:** Incentivise private companies to enter deep sea mining, cable-laying, salvage, and submersible development.
- **Create a 10-year roadmap:** Formulate a long-term plan with defined milestones across technology, governance, infrastructure, and security.
- Importantly, the **dual-use nature** of deep sea technologies, serving both scientific and military goals, makes it essential for India to view ocean development as **not just a technical project but a national strategic priority**.

Conclusion

- India's ambition to be a global economic and strategic power cannot ignore the depths of the ocean.
- Whether it's for minerals, data, food, or security, the **deep sea holds the key to the future**.
- With Matsya-6000 as a starting point, India must now accelerate efforts to build a robust, well-funded, and forward-looking deep ocean capability that matches its global aspirations.

India's Deep Sea Capabilities FAQs

Q1. What is Matsya-6000?

Ans. Matsya-6000 is India's first deep sea manned submersible, capable of diving up to 6 km below sea level.

Q2. Why is deep sea technology important for India?

Ans. It helps access underwater resources, secures digital infrastructure, and supports national security.

Q3. What are the main challenges in deep sea exploration?

Ans. High pressure, communication issues, and the need for specialised vessels and materials.

Q4. What is the Deep Ocean Mission?

Ans. A government initiative launched in 2018 to promote deep sea research and exploration technologies.

Q5. Why is China's progress a concern for India?

Ans. China leads in deep sea capabilities and has developed disruptive tools like cable-cutting devices, posing strategic risks.

Source: IE

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