DAILY CURRENT AFFAIRS ANALYSIS

16 NOVEMBER 2023

1 - India's Deep Ocean Mission:

GS III

Science and Technology

- **Context:**

- India is attempting a bold endeavour to discover and utilise the ocean's depths through the Deep Ocean Mission (DOM).

- **The Deep Ocean Mission (DOM): An Overview:**

- India's extensive undersea exploration initiative, known as DOM, is mostly carried out by the Ministry of Earth Sciences (MoES).
- The Union Cabinet approved DOM in 2021, approving it at a gradual five-year expenditure of about ₹ 4,077 crore.

- **Six pillars support the mission:**

- **Development of technology:**

- creation of deep-sea mining technology and a manned submersible that can descend to 6,000 metres below the ocean's surface with three people on board.
- A variety of research instruments, sensors, and an integrated system for extracting polymetallic nodules from the central Indian Ocean will be installed on the submersible;

- **Services for advice:**

- creation of advisory services for ocean climate change that use a variety of ocean measurements and models to comprehend and forecast future climate;

- **Ocean exploration and preservation:**

- technological advancements for the study and preservation of biodiversity in the deep oceans;

- **The mineralization of sulphur:**

- The objective of the deep-ocean survey and exploration is to locate possible locations for the mineralization of multi-metal hydrothermal sulphides along the mid-oceanic ridges of the Indian Ocean.

- **Hydrology and energy:**

- utilising the ocean's freshwater and energy.
- **Marine Ocean Biology Station:**

- establishing a cutting-edge Marine Station for Ocean Biology as a centre for developing talent and advancing new directions in blue biotechnology and ocean biology.
- The sixth primary goal for India's development is a blue economy, according to the "New India 2030" whitepaper.
- The United Nations has declared 2021–2030 to be the "Decade of Ocean Science."
- The Prime Minister's Science, Technology, and Innovation Advisory Council (PMSTIAC) has nine missions, including DOM.

- **Development of Samudrayaan, the first pillar of DOM:**

- It calls for the creation of crewed submersibles and deep-sea mining technology.
- The development of indigenous technology has been committed to the National organisation of Ocean Technology (NIOT), an autonomous organisation within MoES.
- The Minister of Earth Sciences launched India's premier deep ocean project, "Samudrayaan," in 2021 as part of DOM.
- India is setting off on a historic crewed mission in "Samudrayaan" to reach the ocean floor in the middle Indian Ocean at a depth of 6,000 metres.
- The deep-ocean submersible Matsya6000, which can hold a three-person crew, will make this historic voyage.
- The operational duration of Matsya6000 is 12 hours, and in an emergency, it can be extended to 96 hours.

- **Look for nodules that are polymetallic:**

- In addition, the Ministry is developing an integrated system to extract valuable minerals from polymetallic nodules found in the bed of the central Indian Ocean.
- We have been granted access by the United Nations International Seabed Authority (ISA) to mine copper, manganese, nickel, and cobalt from the ocean floor in the central Indian Ocean region.

- With our underwater mining equipment, "Varaha," NIOT has successfully carried out deep-sea locomotion testing on the seabed at a depth of 5,270 metres.
- Reaching this milestone will help with future deep-sea resource exploration and extraction.

- **Why was 6,000 metres chosen as the depth?**

- India has made a commitment to the sustainable exploitation of precious minerals, such as polymetallic sulphides and nodules.
- In the middle Indian Ocean, ISA has allotted 75,000 square kilometres and a further 10,000 sq. For this, km at 26° S to India.
- Polymetallic sulphides occur at around 3,000 m in the central Indian Ocean, while polymetallic nodules, which contain precious metals including copper, manganese, nickel, iron, and cobalt, are found at a depth of about 5,000 m.
- India's interests therefore extend to depths of 3,000–5,500 metres.
- We can serve the middle Indian Ocean as well as the Indian Exclusive Economic Zone by outfitting ourselves to function at a depth of 6,000 metres.
- **Problems facing India's DOM:**

- **Elevated pressure beneath:**

- It has turned out that exploring the ocean's depths is more difficult than exploring space.
- The deep ocean's enormous pressure is what makes a basic difference.
- Although space is like an almost perfect vacuum, an item one metre below the surface experiences the same pressure as if it were 10,000 kg heavier.
- Working under such high pressure necessitates the use of carefully planned apparatus made of robust metals or materials.
- Instruments and electronics perform better in vacuums or in space.
- On the other hand, shoddy constructions implode or collapse inside of water.

- **Seas' supple surface:**

- Because the ocean floor is so muddy and squishy, landing on it might be difficult.
- Because of this, big vehicles are very difficult to manage or land because they will always sink.

- **Removal of materials:**

- The process of extracting resources necessitates pumping them to the surface, which is a power- and energy-intensive operation.
- Remotely driven vehicles are useless in deep oceans because electromagnetic waves do not travel through them, unlike rovers on far-off planets.

- **Problem with visibility:**

- Another major obstacle is visibility because natural light can only reach a few tens of metres below the earth, while telescopes allow for space views.

- **Other difficulties:**

- changes in temperature
- rusting
- salt content, etc.

- **Where does this leave us in terms of the world?**

- India's premier deep-ocean human submersible, the Matsya6000, intends to descend to 6,000 metres below the ocean's surface.
- The submersible, carrying a variety of scientific instruments and apparatus for sample collection, experimentation, basic video and audio recording, and observation, is driven by a crew of three.
- Matsya6000's main objective is exploration.

- **Nations that successfully completed their DOMs:**

- America.
- Ukraine
- Asia
- French
- China

- India is about to become one of these countries.
- The most advantageous and workable aspects of autonomous remote vehicles (AUVs) and remote operated vehicles (ROVs) are combined in Matsya6000.
- It operates untethered and provides an outstanding intervention mechanism, despite its limited sub-sea durability.
- Deep-sea observation missions are a perfect fit for it.

- **Matsya 6000 Build:**

- The Matsya6000 is engineered to carry three people inside a customised sphere.

- The sphere will be roughly 28 tonnes in weight and feature a life support system that removes carbon dioxide and supplies oxygen in a short-sleeved environment.
- The sphere is made of titanium alloy and designed to sustain pressures as high as 6,000 bar.
- With three viewports that let the crew see outside, it has three propellers that allow it to travel in all six directions.
- With a 1 kWh energy budget, around 12 cameras and 16 lights will be run by lithium polymer batteries.
- There will be a modem and an acoustic phone for communication.
- It will operate as a free-floating system for energy efficiency rather than being actively lowered by sinking.
- It can move with sufficient underwater thrusters at a speed of roughly 5.5 km/h.

- **India will have the only complete ecosystem of underwater vehicles with Matsya, including:**

- ROVs in deep water
- arctic ROVs
- UAVs
- systems for coring in deep water, etc.

- ***Source → The Hindu***

2 – Mera Yuva Bharat Initiative:

GS II

Government Policies and Interventions

- **Context:**

- The Indian Prime Minister introduces the "Mera Yuva Bharat (MY Bharat)" initiative.

- **Important information:**

- **Concerning Mera Yuva Bharat, or My Bharat:**

- Youth between the ages of 15 and 29 will benefit from Mera Yuva Bharat (MY Bharat), an autonomous entity that will work in accordance with the National Youth Policy's concept of youth.
- Mera Yuva Bharat, or MY Bharat, is a 'Phygital Platform' (physical + digital) that combines the chance to connect online with physical activity.
- It will enable youth to take the lead in transforming their communities.
- They would serve as "Yuva Setu," a conduit between the people and the government.

- **Goals:**

- The objective for "Mera Yuva Bharat (MY Bharat)" is to serve as a technologically advanced intermediary for youth development and youth-led development.
- Throughout the whole spectrum of the Government, its main objective is to give young people equal opportunities to fulfil their dreams and help build a "Viksit Bharat" (developed India).
- It aims to create a structure through which our nation's kids may easily engage with mentors, local communities, and programmes.
- Through this participation, they will get a deeper grasp of local challenges and be equipped to contribute to positive solutions.

- **Such A Body Is Needed:**

- Creating a framework to unite kids from all backgrounds on a single platform is necessary for Vision 2047. This framework should be able to unite youth from rural, urban, and rurban locations on a single platform.
- The continuous changes in the urban-rural terrain have made it necessary to reassess existing methods.
- Developing a structure that places kids from rural, urban, and rurban areas on an equal footing is essential. Mera Yuva Bharat will assist in establishing this kind of structure.
- Youth can be connected to programmes that help them develop their abilities and to community activities through a technology-driven platform.
- **Goals:**

- **Youth Leadership Development:**

- Upgrade your leadership abilities through hands-on learning by switching from solitary face-to-face communication to structured programme execution.
- putting money into young people to help them become community leaders and social innovators.
- improved synchronisation between youth goals and community requirements.
- Increased effectiveness by merging already-existing schemes.
- Serve as a central resource for youth and ministries.

- **Establish a juvenile database in one place:**

- enhanced two-way communication between youth government projects and other youth-engagement-focused stakeholder activities
- establishing a Phygital Ecosystem, which combines digital and physical experiences, to provide accessibility.

- ***Source → The Hindu***

3 - CAR-T cell treatment developed in India:

GS III

Biotechnology related Issues

- **Context:**

- ImmunoACT, a business housed at IIT Bombay, received market authorization for NexCAR19, the country's first domestically created CAR-T cell therapy, from the Central Drugs Standard Control Organisation (CDSCO).

- **CAR-T cell therapy: what is it?**

- CAR-T is a novel therapeutic that reprogrammes immune cells, mainly T-cells, to become powerful anti-cancer agents called CAR-T cells.
- T-cells are unique white blood cells that are mostly cytotoxic, or able to destroy other cells. They are white blood cells that identify and combat disease and infection.
- T-cells are genetically altered to become cancer-fighting cells in CAR-T treatment.
- After being reintroduced into the body, these enhanced cells target cancer cells, particularly those found in blood malignancies such as lymphomas and leukaemia.

- **What distinguishes it from immunotherapy and chemotherapy?**

- A cancer patient's life may be extended by many months or years with chemotherapy and immunotherapy.
- The goal of cell and gene therapy is to heal and offer long-term benefits.

- It simplifies treatment with a one-time therapy that, in contrast to multiple chemotherapy sessions, can genuinely revolutionise a patient's life.
- For cancer patients who are not responding, it is a lifeline.

- **Regarding NXCAR19:**

- A form of CAR-T and gene therapy called NexCar19 was created domestically in India by ImmunoACT, a business that was founded at IIT Bombay.
- The treatment's goal is to specifically target cancer cells that express the CD19 protein.
- This protein functions as a marker on cancer cells, enabling CAR-T lymphocytes to identify them, adhere to them, and initiate the eradication process.
- Not even a few developed countries have access to CAR-T treatments.
- They import them from Europe or the United States.
- One of the first developing nations with a national CAR-T and gene therapy platform is India.

- **Who is eligible for NexCAR19 treatment?**

- This medication is intended for patients with B-cell lymphomas who did not react to conventional treatments, such as chemotherapy, which resulted in a cancer relapse or recurrence.
- Blood is drawn from the patient and sent to the lab so that the T-cells can be genetically altered.
- These cells are brought back to the clinic for patient reinfusion within a week to ten days.
- All patients have to do is visit their clinic, give a blood sample, and return in seven to ten days for reinfusion.
- Recovery usually happens two weeks following a therapy cycle.
- Treatment response rates range from 70% to 70%, depending on whether the patient has lymphoma or leukaemia.
- Of these responding patients, about half get a full response.

- **Are kids also qualified for this therapy?**

- Currently approved for use in patients 15 years of age and older, ImmunoACT therapy will not change from that for youngsters.

- **Are there any adverse effects?**

- It results in much reduced drug-related toxicities.
- It is known as neurotoxic because it only slightly harms neurons and the central nervous system.
- When CAR-T cells detect the CD19 protein and penetrate the brain, neurotoxicity can occasionally happen, which might put life in danger.
- Cytokine Release Syndrome (CRS) is also minimally affected by the therapy.

- Because CAR-T cells are engineered to target and eradicate cancer cells, CRS is marked by inflammation and hyperinflammation in the body as a result of a substantial number of tumour cell deaths.

- **What is the price of this treatment?**

- CAR-T therapy currently costs between Rs 30 and 40 lakh.
- It might not be affordable even at this price for everyone.
- Reducing the cost to Rs 10-20 lakh is the ultimate aim.
- The cost is expected to decline as production techniques advance and technology advances.

- **Will insurance pay for the treatment?**

- Once a therapy has received regulatory agency approval, private insurance firms and national insurance plans should normally cover it.
- However, the level of coverage and accessibility to insurance may differ because this is a costly treatment.

- ***Source → The Hindu***

4 – Location in news: Kra Isthmus:

GS II

International Issues

- **Context:**

- The necessity of a land bridge spanning the Kra Isthmus has been emphasised by the Thai prime minister.

- **Important information:**

- The project will shorten the sailing distance between East Asian waterways and the Indian Ocean region.
- The longer and more crowded maritime route across the Strait of Malacca would be avoided by taking the planned route, which would traverse the Kra Isthmus.

- 25% of all products sold worldwide flow via the Strait of Malacca, a thin stretch of water that connects Singapore, Indonesia, and Malaysia.
- A proposed land bridge would span the 90-kilometer-wide stretch, connecting two large-capacity ports or shipping terminals on either side with an oil pipeline and an east-west commercial corridor.
- The idea to unite Thailand's two seas was first proposed in 1677 by Thai emperor Narai the Great of the Ayutthaya Kingdom.
- King Narai conceived the idea for a canal across the Isthmus of Kra over 200 years before the Suez Canal, which connected Africa and Asia, opened and completely changed the maritime trade of Europe.

- **About the Kra Isthmus:**

- The Malay Peninsula's narrowest point is the Kra Isthmus in Thailand.
- The Gulf of Thailand borders the isthmus on the east and the Andaman Sea on the west.
- Two portions of the mountain chain that passes across the Malay peninsula and originates in Tibet are divided by the Kra Isthmus.
- The Phuket Range, a continuation of the Tenasserim Hills that stretches farther north past the Three Pagodas Pass, makes up the southern portion.
- The semi-evergreen rain forest ecoregion of Tenasserim and South Thailand is home to the Kra Isthmus.
- The most common type of trees in the area are dipterocarps.

- ***Source → The Hindu***

5 - Relationship between the United States and Israel:

GS II

International Issues

- **Context:**

- Even in the wake of Israel's excessive war on Gaza, the United States has been cautious not to condemn the country.

- **Important information:**

- Additionally, the US has vetoed a resolution from the UN Security Council that demanded an end to Israel's attacks for humanitarian reasons.
- Additionally, the United States abstained from voting on a motion at the UN General Assembly that called for a humanitarian truce and was overwhelmingly approved.
- With the exception of minor leadership disagreements, the United States has consistently supported Israel regardless of its actions—at least since 1967.

- **US-Israeli relations' beginnings:**

- Even before the state of Israel was established within historical Palestine in 1948, the United States had backed the notion of a Jewish homeland.
- 1922 and 1944 saw the U.S. Resolutions supporting the Balfour Declaration were voted by Congress.
- The British government affirmed its support for the establishment of a Jewish homeland in Palestine in the Balfour Declaration.
- In 1948, the United States became the first nation to acknowledge Israel.
- The 1967 war marked a paradigm shift in US-Israel ties when Israel destroyed Syria, Egypt, and Jordan in six days and took control of large areas of territory.
- Without significant assistance from the United States, Israel was able to beat the Arab countries, and the war ended swiftly.
- Furthermore, Egypt and Syria, two Arab nations that Israel vanquished, were supporters of the Soviet Union.
- After that, the United States began to view Israel as a reliable ally capable of limiting the Soviet Union's rise to power in West Asia.

- **The state of US-Israel relations at the moment:**

- Since 1967, the United States has provided Israel with nearly unrestricted financial, military, and political backing. Israel has been occupying Palestinian areas.

- **US assistance:**

- Israel is also the country that receives the most aid from the United States; since the end of World War II, Israel has gotten $158 billion in aid.
- Presently, the United States provides Israel with $3.8 billion in military aid annually, or roughly 16% of Israel's overall military budget.

- **Trade relationships:**

- Israel's biggest trading partner is the United States, with yearly two-way commerce of about $50 billion.

- **Military ties:**

- Additionally, there is a strong defence collaboration between the United States and Israel that includes cooperative R&D and weapons manufacture.
- For instance, the Iron Dome, Israel's renowned missile defence shield, is partially funded by the United States and incorporates pieces manufactured in the country.
- Israel has become the 10th largest military exporter in the world by developing a highly developed defence industry base with assistance from the United States.

- **Military assistance:**

- The United States has also provided Israel with strong military backing during its conflicts, starting with the Yom Kippur War in 1973.
- Following Israel's invasion of the nation in 1982, the United States dispatched Multinational Forces to Lebanon.
- The United States maintained its diplomatic ties with Israel while endorsing the Oslo process and the two-state solution following the first intifada.

- **Why does America consistently support Israel?**

- **Israel's place in the area:**

- Washington finds Israel attractive because of its strategic importance in a tumultuous but vital region.
- Israel was viewed by the United States as a potent deterrent against potential Soviet expansion into the Arab world during the Cold War.
- Israel, along with Saudi Arabia and Egypt, continued to be seen by the United States as a stabilising influence when it came to West Asia after the end of the Cold War.

- **Politics in elections:**

- Both American Jews and evangelical Christians are significant, politically engaged U.S. communities.
- They are both pro-Israel and significant voters for both parties.

- **Strong Israeli Lobby:**

- The United States has a strong Israel lobby that has a significant impact on American policies on Israel.
- The lobby seeks to muffle or neutralise comments critical of Israel while supporting pro-Israel politicians and amplifying pro-Israel voices.
- At its yearly meetings, the influential pro-Israel lobbying organisation American Israel Public Affairs Committee (AIPAC) invites dignitaries from both nations, including presidents, senators, and prime ministers.

- **Numerous associations and groups that support Israel:**

- Pro-Israel organisations also contribute financially to both US political parties.
- For instance, according to OpenSecrets.org, pro-Israel organisations contributed over $30 billion to the 2020 election, with 63% going to the Democrats and the remaining amount to the Republicans.
- Additionally, there are close connections between both nations' military industrial complexes.

- ***Source → The Hindu***