



DAILY CURRENT AFFAIRS 17-04-2024

GS-1

1. India to access critical minerals from Congo
2. Hydrocarbon extraction

GS-3

3. Right to sleep
4. A&N Islands through a strategic lens

GS-3

5. Made in India CAR-T cell therapy

India to access critical minerals from Congo

Syllabus: GS-1: Geography - Resources – Mineral

Context:

- *India will tap into Congo for critical mineral access, mostly copper and cobalt.*
- *A draft MoU has been shared with Democratic Republic of Congo officials and a final agreement is expected in “another three months or so.”*

More about news:

- *The MoU will allow India to **conduct mineral exploration** and subsequent commercial off-take in case of successful finds.*
- ***Copper and cobalt** have been identified as critical minerals by the Indian government.*
- *Copper, a base metal, is used in power cables, wind turbines, electric vehicles, and solar panels, and it is the key material for energy transition.*
- *Because of its widespread usage, copper demand, including its price movement, is a key indicator of economic health.*
- ***Cobalt** on the other hand is a key **car battery-making metal** (used to make lithium-ion batteries), with Congo being the largest supplier globally.*
- *Mines Ministry to appoint consultant for due diligence on Australian lithium block acquisition.*
- *Cobalt sulphate to rule elevated **next 2-3 years as demand for EVs grows***
- *The second largest country in sub-Saharan Africa, Congo, is also among the key copper miners.*

Lithium in Chile

- *India is also **looking to secure lithium from Chile**, another South American nation and a key supplier of the white alkaline resource.*
- ***Chile, along with Argentina and Bolivia** forms the **world’s Lithium Triangle**, accounting for the majority of the resources globally.*
- *Lithium is a **key component in EVs, battery-making**, mobile phones and other energy storage solutions.*
- *Incidentally, the Mines Ministry had previously signed a **non-disclosure agreement (NDA) with ENAMI**, a state-owned company, to exchange information and data-sharing.*



Hydrocarbon extraction

Syllabus: GS-1: Geography – Energy Resources.

Context:

- *Recently, The Hindu published an article on hydrocarbon extraction.*

Formation of Hydrocarbons:

- *Geological processes heat and compress dead life-forms over time.*
- *Organic matter accumulates as hydrocarbons inside rock formations.*

Location of Hydrocarbons:

- *Found in subterranean rock formations, commonly as natural gas, coal, crude oil, and petroleum.*
- *Accumulate below a resistant rock layer, forming reservoirs.*

Assessment of Rock Formations:

- *Petroleum geologists use tools to check porosity and permeability of rocks.*
- *Porous rocks can hold more hydrocarbons, while permeable rocks allow easier flow.*

Sources of Kerogen:

- *Derived from lacustrine (lake), marine, or terrestrial ecosystems.*
- *Different sources yield different types of hydrocarbons.*

Accessing Hydrocarbons:

- *Production wells drilled into reservoirs to drain hydrocarbons to the surface.*
- *Drilling involves creating a hole with a drill bit and casing it with cement.*
- *Blowout preventers manage pressure to prevent eruptions.*

Extraction Process:

- *Completion stage prepares the well to drain hydrocarbons.*
- *Pressure difference or pump jacks used to bring hydrocarbons to the surface.*
- *Production profile includes primary, secondary, and tertiary phases.*

Depletion and Abandonment:

- *Wells may be abandoned if extraction is no longer profitable.*
- *Abandoned wells must be plugged to prevent emissions.*
- *Decommissioning is costly but essential to prevent environmental damage.*

Right to sleep

Syllabus: GS-2: Fundamental Rights.

Context:

- *Bombay High Court dismisses plea by a 64-year-old businessman regarding 'illegal' arrest by Enforcement Directorate (ED).*

Court's Criticism of Late-Night Statement Recording:

- *The court criticized the ED for making the businessman wait overnight and recording his statement, depriving him of the **'right to sleep' under Article 21 of the Constitution.***
- *It emphasized that the **'right to sleep' is a fundamental human need** and depriving someone of it violates their human rights, affecting their health and cognitive skills.*
- *The court directed the agency to issue guidelines on the timings for recording statements **under Section 50 of the Prevention of Money Laundering Act (PMLA).***

Response from Special Public Prosecutor:

- *The special public prosecutor representing ED stated that the petitioner did not object to having his statement recorded after midnight, so it was done accordingly.*

Court's Disapproval and Rationale:

- *However, the court disapproved of recording the statement so late at night, even if it was done with the petitioner's consent.*
- *It emphasized that when a person is summoned under Section 50 of the PMLA, **they are not necessarily considered an accused** but could be a witness or have knowledge about the offense being investigated.*
- *Therefore, the court stated that statements of such individuals should be recorded during 'earthly hours,' assuming that the probing agency has not established sufficient reason to believe the person is guilty under the PMLA.*

Considerations for Summoning and Consent:

- *The court noted that since the petitioner had previously reported to the ED office on three occasions, he could have been summoned the next day instead of being made to wait post-midnight, regardless of his consent.*

Verdict and Conclusion:

- *The plea seeking to quash the remand orders into an alleged bank fraud was **dismissed due to no illegality found in the petitioner's arrest.***
- *Overall, the court's decision highlights **the importance of respecting fundamental human rights**, even in the context of legal procedures.*

A&N Islands through a strategic lens

Syllabus: GS-2: Geopolitics of Indian Ocean.

Context:

- *India's Look East policy is now the Act East policy, emphasizing stronger engagement.*
- *Recognizing the significance of ocean power has become crucial.*
- *The growing capabilities of the Chinese PLA Navy have heightened the need for action.*
- *There's increased attention on developing Indian island territories, especially the Andaman and Nicobar group.*
- *Recent efforts to develop infrastructure on these islands, both civilian and military, are seen as positive and long overdue.*

- *Historically, there has been neglect of these strategically important islands, indicating a lack of maritime vision since Independence.*

What is the strategic importance of the Andaman and Nicobar Islands?

- **Geopolitical Location:** *The Andaman and Nicobar Islands are situated 700 nautical miles southeast of the Indian mainland, making them strategically positioned at the crossroads of major maritime routes.*
- **Access to Key Waterways:** *The islands are close to the Malacca Strait, which is a vital passage connecting the Indian Ocean to the Pacific. This proximity enables quick access to this crucial waterway from Port Blair, the capital of the Andaman and Nicobar Islands.*
- **Proximity to Strategic Locations:** *Sabang in Indonesia is just 90 nautical miles southeast of Great Nicobar island, while Coco Island in Myanmar is only 18 nautical miles from the northernmost tip of the Andamans. Potential developments like the Kra Canal in Thailand could further enhance the islands' strategic importance.*
- **Maritime Boundary Significance:** *The islands share maritime boundaries with several neighboring countries, including Myanmar, Thailand, Indonesia, and Bangladesh. This gives India significant ocean space under international maritime laws like UNCLOS.*
- **Potential Security Threats:** *There's a possibility of security challenges arising from increased Chinese maritime presence in key choke points like the Malacca, Sunda, Lombok, and Ombai-Wetar straits, which are crucial for Indo-Pacific maritime traffic.*
- **Defensive Role:** *The Andaman and Nicobar Islands serve as India's first line of defense against any threats from the East, making them essential for safeguarding India's maritime security.*
- **Military Command:** *The Andaman and Nicobar Command (ANC), established in 2001 as a tri-services command, was an initial step to leverage the islands' strategic advantage, but subsequent efforts to fully utilize this potential have been insufficient.*

Why has the pace of developing strategic infrastructure in A&N been slow?

- **Late Recognition of Strategic Importance:** *Political decision-makers have only recently acknowledged the strategic significance of the Andaman and Nicobar Islands due to factors like the expanding Chinese naval presence.*
- **Challenges of Distance and Infrastructure:** *The islands' remote location and the associated difficulties in building infrastructure have been cited as reasons for the slow pace of development.*
- **Environmental Clearance Hurdles:** *Obtaining environmental clearances, even for small projects, has been a significant obstacle. Regulations aimed at forest conservation and protecting native tribes have complicated land acquisition processes.*

- **Complex Coordination:** *The development of islands and strategic infrastructure involves multiple ministries, departments, and agencies, leading to coordination challenges.*
- **Short-term Political Gains vs. Long-term Strategy:** *There's often a conflict between pursuing a long-term strategic vision and prioritizing immediate political gains, with the latter often taking precedence.*

What should strategic infrastructure development in these islands focus on?

- **Maritime Surveillance and Security:** *Priority should be given to establishing comprehensive surveillance systems to monitor the vast area around all 836 islands, preventing unlawful activities and occupation attempts.*
- **Deterrence against Naval Threats:** *Develop infrastructure to deter any naval threats from the East, enhancing India's defensive capabilities.*
- **Economic Infrastructure:** *Focus on building infrastructure on strategically located islands in the southern group to support India's maritime economy, especially along major shipping lanes to Southeast Asia.*
- **Improved Transportation:** *Enhance transportation infrastructure to facilitate rapid movement of people and goods between islands and with the mainland, crucial for accelerating development and tapping into tourism potential.*
- **Reducing Dependence on Mainland:** *Develop local industries and infrastructure to reduce the islands' reliance on mainland support for essentials like food and maintenance services, enhancing their self-sufficiency.*

What kind of infrastructure should be prioritised on the islands?

- **Aircraft and Surface Platform Infrastructure:** *Establish separate airfields with long runways capable of accommodating Boeing 737-sized aircraft for effective surveillance and patrolling of the 420-nautical-mile sea area stretching from north to south of the islands.*
- **Ports and Fuel Storage:** *Construct ports and fuel storage facilities in both the northern and southern groups of islands to facilitate operational turnaround for ships without requiring return trips to Port Blair.*
- **Military Presence and Assets:** *Increase military forces and station a suitable mix of assets at the Andaman and Nicobar Command (ANC) to maintain island security. This includes ultimately basing surveillance and fighter aircraft on the islands and deploying frequent detachments in the interim.*
- **Galathea Bay Transshipment Port:** *Expedite the development of the Galathea Bay transshipment port on Great Nicobar Island to support maritime services such as repair and logistics for international and Indian shipping.*
- **Transportation Infrastructure:** *Develop road networks, high-speed inter-island ferry services, and a seaplane terminal to improve connectivity between islands.*

- **International Sourcing and Expertise:** *Enhance development pace by sourcing suitable material from abroad, leveraging international expertise in marine infrastructure construction, and using weather and seismic-resistant components.*
- **Streamlined Environmental Clearances:** *Simplify forest and environmental clearance processes with minimal bureaucracy, extending concessions for defense infrastructure similar to those along India's northern borders to the Andaman and Nicobar Islands.*
- **Planned Habitation and Incentives:** *Consider planned habitation of uninhabited islands by offering incentives like free or subsidized land to encourage eco-friendly entrepreneurial efforts.*
- **International Collaboration:** *Explore leveraging international arrangements like the Quad and the Indo-Pacific Oceans Initiative (IPOI) to catalyze development efforts on the islands through collaboration and support.*

Practice Question

Q. How can India strategically develop Andaman and Nicobar Islands, considering security, infrastructure, environmental concerns, and leveraging international collaborations like the Quad and IPOI? (10 marks, 150 words)

Made in India CAR-T cell therapy

Syllabus: GS-3: Science and Technology –Biotechnology.

Context:

- *Recently, President Droupadi Murmu launched India's first indigenously-developed CAR T-cell therapy for treatment of cancer, hailing it as a "major breakthrough" that provides a "new hope for the humankind" in the battle against the disease.*

About NexCAR19 Therapy:

- *Developed by the IIT Bombay and the Tata Memorial Centre, this gene-based therapy will help in curing different types of cancer.*
- **This NexCAR19 CAR T-cell therapy** *is the country's first 'Made in India' CAR T-cell therapy, which will significantly bring down the cost of cancer treatment.*
- *The launch of India's first gene therapy is a major breakthrough in battle against cancer.*

- *NexCAR19 has been rolled out at **approximately one-tenth of the price** at which it is available outside India.*
- *The treatment costs **approximately ₹4 crore abroad.***
- ***The low-cost CAR T-cell therapy** is a huge achievement for our country and for cancer patients in India, and it places India firmly on the global map of cell and gene therapy.*
- ***NexCAR19 is a historic milestone** in the field of cancer care and genetic engineering.*

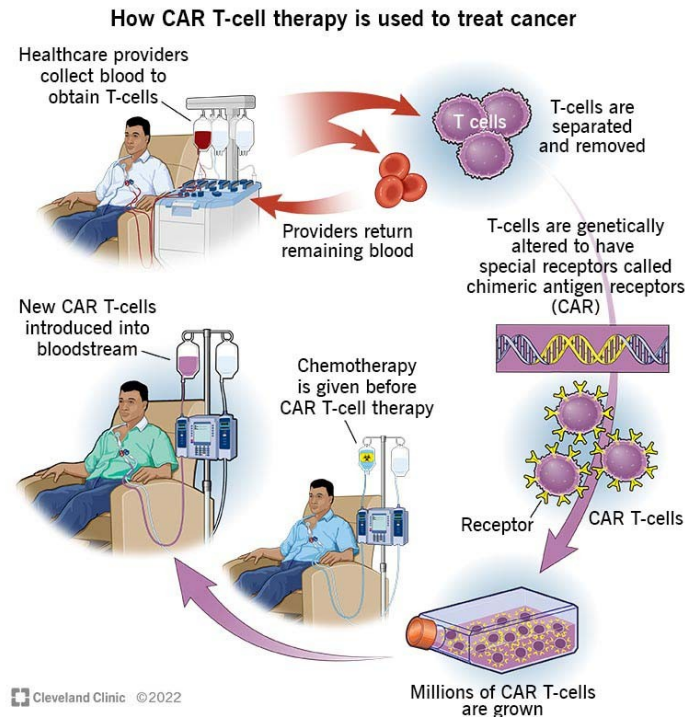
What is CAR-T cell therapy?

- ***Chimeric Antigen Receptor (CAR) T cell therapy** involves genetically modifying a patient's T cells to fight malignant tumor cells.*
- *T cells are a **type of white blood cell** developed from the stem cells in the bone marrow and are a vital part of the immune system, **defending the body against infections.***

How are CAR-T cells made?

- *T-cells (a type of white blood cell) are collected from the patient **through a process called leukapheresis.***
- *They are then modified in the lab to express proteins called **chimeric antigen receptors (CARs) on their surface.***
- *The gene responsible for encoding CAR is developed synthetically in the lab, and a vector acts as a vehicle **to deliver CAR into the patient's T-cell.***
- *Commonly, **viral vectors, such as lentiviral vectors,** are used, as seen in NexCAR19.*
- ***The re-engineered T cells** are then multiplied by millions in the lab and sent back to the hospital, where they are infused into the patient.*
- *The patient usually undergoes **chemotherapy before receiving the CAR-T cells.***
- ***The FDA has approved six CAR-T cell therapies** till now, and four of them target CD19, a protein produced on the surface of leukaemia and lymphoma cells.*
- ***NexCAR19 is similar in this aspect.** A key difference between the CAR-T cell therapies developed in the US and NexCAR19 lies in the **composition of antibody fragments.***
- *While those developed in the US **originate from murine (mice) sources,** NexCAR19 has human proteins added to the mouse antibody, **resulting in a 'humanised' CAR.***
- *This modification might have contributed **to its reduced toxicity.***
- *The CAR comprises several components that enable it to identify cancer cell antigens and stimulate an immune response.*
- *Each CAR spans across the cell membrane, with a portion **extending outside the cell and a portion inside.***

- The exterior segment is made of fragments of laboratory-generated antibodies selected for their **affinity to bind to the targeted antigen**.
- The **internal segment of CAR** consists of two components responsible for transmitting signalling once the receptor interacts with an antigen.



Clinical trials

- After successfully **developing CAR-T cell therapy**, the team had to approach the **Central Drugs Standard Control Organization (CDSCO)** for clinical trial approval.

Risks of CAR-T therapy

- While CAR-T therapy has shown remarkable progress in cases that looked hopeless, its **efficacy varies from person to person**.
- Moreover, it entails several side effects, **the cytokine release syndrome (CRS)** being the most common — an inflammatory response **triggering immune system hyperactivity**.
- **Neurotoxicity** is another common side effect but it wasn't observed in any early-stage clinical trial patients, potentially because of the 'humanised' antibody fragments used.

Practice Question

Q. Discuss the significance of CAR-T cell therapy in cancer treatment, highlighting its mechanism and potential advancements, considering its impact on improving survival rates. (10 marks, 150 words).

