

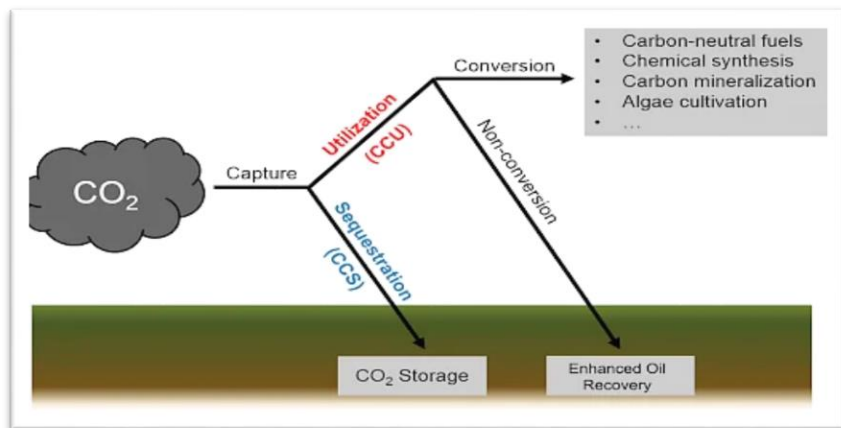
Carbon Capture and Utilization

❖ Context

- Recently, a group of scientists from Indian Institute of Chemical Technology, IICT, Hyderabad have designed a hybrid material which can absorb greenhouse gas methane and convert it to clean hydrogen.

❖ Key Highlights

- They have simulated a process of capturing carbon dioxide and converted it to high purity hydrogen from non-fuel grade bioethanol.
- These scientists have also designed a facility that can test such materials and help further carbon capture research at the institute.
- As per govt these new materials and processes for carbon capture and utilization could show new light for the global warming challenge.



❖ Carbon Capture and Utilization (CCU)

- Carbon capture and utilization (CCU) is the process of capturing carbon dioxide (CO₂) to be recycled for further usage.
- CCU differs from carbon capture and storage (CCS) in that **CCU does not aim nor result in permanent geological storage of carbon dioxide.**
- CCU aims to convert the captured carbon dioxide into more valuable substances or products such as:
 - Plastics.
 - Concrete or biofuel.
 - Other alternative and renewable sources of energy etc.
- It retained the carbon neutrality of the production processes.
- **Significance:**
 - It may offer a response to the global challenge of significantly reducing greenhouse gas emissions from major stationary (industrial) emitters.
 - It can play an important role in achieving net-zero targets.
 - It would be helpful in meeting the Paris Agreement's aims of restricting global warming to 2 degrees Celsius.

Megalithic Jars

❖ Context

- A number of megalithic stone jars discovered in Assam's Dima Hasao District.

❖ Key Highlights

❖ Discovery & Characteristics

- First sighted in 1929 by British civil servants James Phillip Mills and John Henry Hutton.
- Their presence was recorded in 6 sites in Dima Hasao.
- Mills and Hutton had suggested that they were associated with mortuary rituals.
- They referred to the practice of ancestral bone repository of tribes like Mikir, Sakchips, Hangkals, Kuki, Khasi and Synteng and evidence of bone fragments in jars.
- The discovery was followed up in 2014 only with discovery of two sites in 2016 and four sites in 2020.
- At Nuchunglo site in Dima Hasao, 546 jars have been found making it possibly the largest site in the world.
- Jars have three distinct shapes – biconical, cylindrical and bulbous top with conical end.
- Researchers in India will undertake additional surveys across Assam as well as Meghalaya and Manipur to understand the extent of this culture.



❖ Link with SE Asia

- The only two other places in the world where similar jars have been found are Laos and Indonesia.
- The jars have been found at no other place in India except North east.
- This may imply that people having similar cultural practice occupied the same geography between Laos and NE India.
- Dating of Laos jars suggest they were positioned around second millennium BC.
- Laos researchers also say that there was strong association between stone jars and mortuary practices, with human skeletal remains found inside and buried around jars.



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News in Between the Lines

CALM System



❖ Context

- The Army recently issued a Request for Information for the **Cannister Launched Anti-Armour Loiter Ammunition (CALM)** System.

❖ What is it ?

- The system is a pre-loaded canister with loiter ammunition or a drone.
- Once fired, it can **remain aloft for a period of time** over the area of operation, and when a target is sighted it **can be guided down to destroy the target** with the explosive payload that it carries.
- Usually, loiter ammunition carry a camera which is nose-mounted and which can be used by the operator to see the area of operation and choose targets.
- The Army has specified that it intends to procure **150** such systems for **Infantry Mechanised Fighting vehicles** especially modified for the purpose.
- The systems are being procured under the 'Make in India' & 'Atmanirbhar Bharat' programmes.

Dornier-228 (Made in India)



❖ Context

- The **first commercial flight** (civilian operation) of **Made in India Dornier-228 aircraft** to take place between **Dibrugarh (Assam) and Pasighat (Arunachal Pradesh)**.

❖ Key Highlights

- Dornier 228 is a twin-turboprop short take-off and landing utility aircraft, manufactured by **Hindustan Aeronautics Limited (HAL)** for the Indian Coast Guard, Indian Air Force and the Indian navy.
- **Alliance Air**, a public sector **airline company**, had signed an agreement with the government-owned HAL in February to lease two aircraft. The airline received its first Dornier 228 plane in first week of April.
- The aircraft can accommodate **two crew members, and 17 passengers**.
- The aircraft can be used for **multiple purposes** including aerial survey, pollution prevention, search and rescue, commuter transport, transporting troops, evacuation of casualties, cargo, logistics support, among others.

Landfill Fires



❖ Context

- **Second fire** at Delhi's Ghazipur landfill site occurred in **two weeks**.

❖ Source of Fire

- The **Ghazipur dumpsite**, which covers around 70 acres in East Delhi, is **not a scientifically planned sanitary landfill**.
- The national capital generates more than 11,119 tonnes of garbage(municipal solid waste) everyday, out of which 6,473 (~58%) tonnes is dumped at landfills, 4,550 (~41%) tonnes is sent to three waste to energy plants, and the rest is composted.
- The landfills receive **mixed waste**, including organic waste as well as ignitable material and plastics. The biodegradable or food waste decomposes over time. The **anaerobic decomposition** (breakdown of organic waste in the absence of oxygen) of organic waste **generates methane gas and heat**.
- Methane is present in air only in traces. But at dumpsites, **methane can range between 3.5% and 13%**. The fire result in emission of dangerous fumes and gases including carbon monoxide, hydrogen sulphide, volatile organics,

❖ Difficulty in Dousing Fires at Landfills

- Since a lot of methane is already trapped at the dumpsite, **water** used to douse fires at these sites, in turn, **generate leachate and heat**.
- In such scenario, **soil or construction debris** are **best fire suppressants** but absence of pathways and risk of sinking in uncontrolled landfills makes their application difficult.

❖ Solutions:

- Strict implementation of the Solid Waste Management Rules issued by the

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SVANidhi se Samridh



MoEFCC in 2016.

- Scientific designing of landfills having leachate and gas collection systems.
- Waste should be compacted and a thick soil cover should be placed over it to make landfills sanitary. Pathways to be provided through the dumpsite.

❖ Context

- **Ministry of Housing and Urban Affairs (MoHUA)** launched 'SVANidhi se Samridh' program in **additional 126 cities** across 14 States/ UTs in Phase-2.

❖ About the Scheme

- For holistic development and economic upliftment of street vendors, an **additional program of PMSVANidhi - 'SVANidhi se Samridh'** - was **launched on 4th January 2021** in **125 cities** in Phase-1.
- **Quality Council of India (QCI)** is the implementing partner for the programme.
- Under the program, **socio-economic profiling** of PMSVANidhi beneficiaries and their families is conducted to **assess their eligibility** and **facilitate sanctions** w.r.t **eight Central schemes**.

Pradhan Mantri Jeevan Jyoti Bima Yojana	Pradhan Mantri Jan Dhan Yojana	One Nation One Ration Card (ONORC)	Pradhan Mantri Matru Vandana Yojana (PMMVY)
PM Suraksha Bima Yojana	Pradhan Mantri Shram Yogi Maandhan Yojana	Janani Suraksha Yojana	Registration under BOCW (Regulation of Employment and Conditions of Service) Act

e-BCAS Project



❖ Context

- The Ministry of Civil Aviation is mulling over the **implementation of 'e-BCAS project'** in order to facilitate e-governance and automation of internal processes,

❖ About e-BCAS Project

- The 'e-BCAS' project **aims to digitize the office processes**, facilitate fast approvals, and ensure ease of doing business, by technological integration across various divisions and processes.
- **Bureau of Civil Aviation Security, BCAS** establishes, develops, implements, maintains, and reviews the National Aviation Security Programme.
- It also **safeguards civil aviation operations** against acts of unlawful interference & threat, taking into account the safety, regularity, & efficiency of flights. It will **leverage the strength of existing processes & organizational structure**, with the objective to make entire activities transparent, user-friendly & efficient. Under e-Sahaj module, issuance of security clearance will be provided.

Stockpile of Usable Nuclear Weapons



❖ Context

- Recently, the Norwegian nuclear watchdog, **Nuclear Weapons Ban Monitor** warns that the **number of nuclear warheads in usable stockpiles is rising**.

❖ Key Highlights

- The world's nine nuclear-armed states had a **combined arsenal of 12,705** nuclear warheads at the beginning of 2022.
- An estimated **3,265 retired, older warheads** were awaiting dismantlement in Russia, the United Kingdom, and the United States.
- The United States' usable stockpile increased slightly in 2019 but declined again in 2020 and 2021, while France's and Israel's stockpiles have remained constant.
- Approximately, **90% of the world's nuclear warheads are owned by Russia and USA**. The report shows that **China, India, North Korea, and Pakistan increased their total arsenals last year**.

❖ UN Treaty on the Prohibition of Nuclear Weapons (TPNW)

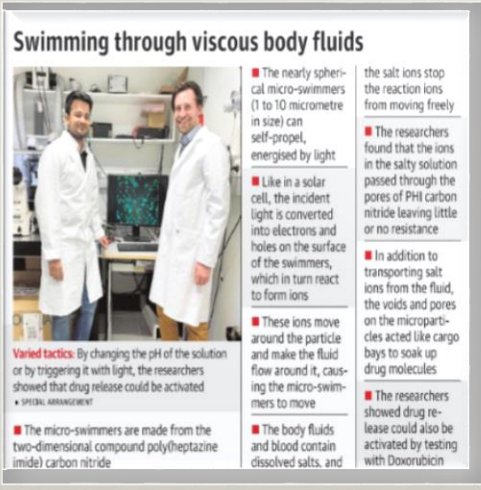
- It is the **first legally binding international agreement** to comprehensively prohibit nuclear weapons with the ultimate goal being their total elimination.
- The treaty **prohibits the development, testing, production, stockpiling, stationing, transfer, use and threat of use of nuclear weapons**, as well as assistance and encouragement to the prohibited activities.

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- It was adopted on 7th July 2017 and entered into force in 2021.
- All the **nine nuclear-armed states** remain **unwilling to adhere** to or even engage constructively with the TPNW. As of April 11th, the new Treaty had **60 state parties**, while **29 states** are signatories that have not yet ratified.

Micro-Swimmers



❖ Context

- Recent research is aiming at moving microbots/micro-swimmers into the bloodstream to deliver drugs.

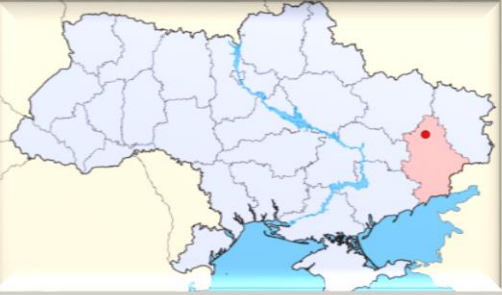
❖ Key Highlights

- These micro-swimmers are **microbots, made from two-dimensional compound poly (heptazine imide) carbon nitride.**
- They range from **1-10 micrometer in size.**
- It is possible to **use light as a fuel to move microbots** in real-body conditions with intelligent drug delivery that is selectively sensitive to cancer cells.

❖ Microbots Swimming

- The **particles are nearly spherical**, and the incident light illuminates one-half of the sphere, leaving the other dark.
- As **photocatalysis is light-driven**, it occurs only on the brightened hemisphere.
- As the ions move from the bright side to the dark side, **micro-swimmers march towards the direction of the light source.** This reaction, combined with the particle's electric field, makes the microbots (micro-swimmers) swim.

Kramatorsk



❖ Context

- Ukraine is preparing for “important battles” against Moscow’s forces in the east of the country, especially in Kramatorsk.

❖ Key Highlights

- Kramatorsk is a **city and the administrative center of Kramatorsk Raion** in the northern portion of Donetsk Oblast, in eastern Ukraine.
- Since October 11th, 2014 Kramatorsk has been the provisional seat of Donetsk Oblast, following the events surrounding the war in Donbas.
- The city is **located on the banks of the Kazennyi Torets River** which is a right tributary of the Siversky Donets.
- It is an **important industrial and mechanical engineering centre in Ukraine.**

2+2 Format of Dialogue



❖ Context

- The **fourth ‘2+2’ dialogue between India and the United States** is underway in Washington DC.
- India’s External Affairs and Defense Ministers are meeting with their American counterparts, Secretary of State and Secretary of Defense.

❖ 2+2 Talks Between India and Allies

- The 2+2 dialogue is a **format of meeting of the foreign and defense ministers of India and its allies** on strategic and security issues. **India has 2+2 dialogues with four key strategic partners: the US, Australia, Japan, and Russia.**
- Besides Russia, the other three countries are also India’s partners in the Quad.
- **Dialogue with the US:** The first 2+2 dialogue between the two countries was held during the Trump Administration, in **New Delhi in September 2018.**
 - The second and third editions of the 2+2 dialogues were held in Washington DC and New Delhi in 2019 and 2020 respectively.
- The inaugural **2+2 dialogue with Australia** was held in **September 2021.**
- India held its first **2+2 dialogue with Russia** in **December 2021.**
- The first **India-Japan talks in the 2+2 format** were held on **November 30th, 2019 in New Delhi.**
- **Significance:** It enables the partners to **better understand and appreciate each other’s strategic concerns** and sensitivities taking into account political factors on both sides.
 - It helps in **building a stronger, more integrated strategic relationship** in a rapidly changing global environment.

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