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Mars Oxygen In-Situ Resource Utilization Experiment

- NASA has announced that the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) aboard the Perseverance rover was able to produce oxygen from the thin Martian atmosphere for the first time.
- MOXIE produced 5 grams of oxygen from carbon dioxide, enough for an astronaut to breathe for 10 minutes in Mars. It is designed to generate up to 10 grams of oxygen per hour.
- [In Mars' atmosphere, carbon dioxide makes up ~96% of the gas. But, oxygen is only 0.13%, compared to 21% in Earth's atmosphere.]
- To produce oxygen, MOXIE separates oxygen atoms from carbon dioxide molecules by using heat at a temperature of around 800 degrees Celsius.
- In the process, it also produces carbon monoxide as a waste product, which it releases in the Martian atmosphere.
- **Importance** - A substantial amount of oxygen supply on Mars is essential for crewed missions to Mars - Astronauts could breathe it.
- The oxygen produced could be used as liquid oxygen propellant and the rockets could use it as fuel while coming back to Earth.

Serum Institute of India

- Serum Institute of India Pvt. Ltd. is the world's largest vaccine manufacturer by number of doses produced and sold globally.
- Based in Pune, Maharashtra, it was founded by Dr. Cyrus Poonawalla in 1966 with an aim to manufacture life-saving immuno-biologicals, which were in shortage in the country and imported at high prices.
- It manufactures highly specialized life saving biologicals like vaccines using cutting edge genetic and cell based technologies, antisera, etc.
- Vaccines manufactured by the Institute are accredited by the World Health Organization. They are being used in around 170 countries across the globe in their national immunization programs.
- It sells BCG, polio vaccines, r-Hepatitis B, DTP (Diphtheria, Tetanus and Pertussis), Hib, MMR (Measles, Mumps and Rubella), Tetanus Anti-toxin and Anti-snake Venom serum.

CSIR-CMERI Oxygen Enrichment Unit

- CSIR-CMERI has invited Expression of Interest (EoI) for manufacturing CSIR-CMERI Oxygen Enrichment Units through Technology Transfer.
- [CSIR-CMERI is Council of Scientific & Industrial Research-Central Mechanical Engineering Research Institute]
- As oxygen therapy is suggested for severe illness caused by Coronavirus, the **optimised oxygen administering device,** CSIR-CMERI Oxygen Enrichment Unit, will help meet the Medical grade oxygen demand.
- It can be developed both as standalone Oxygen Enrichment Unit as well as with integrated version with 'Swasth Vayu' technology of CSIR-NAL.
- **Features** - The unit concentrates the Oxygen from the air around us by removing nitrogen to supply an oxygen-enriched air.
- The unit works on the principle of Pressure Swing Adsorption (PSA).
- It requires easily available oil free reciprocating compressor, Oxygen grade Zeolite Columns for selective removal of nitrogen from air under certain pressure, thereby increasing the Oxygen Concentration.
- **Capacity** - It is capable of delivering medical air in the range of up to 15 LPM with oxygen purity of more than 90%.
- If required, this unit can even deliver up to 70 LPM at a purity of around 30% and can safely be placed in the isolation ward of the hospital.
- **Uses** - The device may be used in Homes or Hospital type facilities for patients with chronic obstructive pulmonary diseases (COPD), chronic hypoxemia and pulmonary edema to improve Oxygenation in the blood.
- It may be used as an adjunct treatment for severe sleep apnea (in conjunction with a continuous positive airway pressure unit).
- It would minimize the supply chain problem of transportation and storage risks related to oxygen cylinders.
- The Outreach Factor of Oxygen will be multiplied through the adoption of this in-situ and decentralised generation of Oxygen.

Council of Scientific & Industrial Research

- The Council of Scientific & Industrial Research (CSIR) is the largest research and development (R&D) organisation in India.
    1. Prime Minister of India is the ex-officio President of CSIR.
    2. The Director-General is the head of the governing body of CSIR.
    3. CSIR Advisory Board is a 15-member body that provides science and technology inputs to the governing body.
- It is known for its cutting edge R&D knowledgebase in diverse Science & Technology areas, is a contemporary R&D organization.
- Established in 1942, CSIR is funded by the Ministry of Science and Technology, and it operates as an autonomous body through the Societies Registration Act, 1860.

- It provides significant technological intervention in many areas with regard to societal efforts which include environment, health, drinking water, food, housing, energy, and farm and non-farm sectors.
- CSIR is pioneer of India's intellectual property movement.
- CSIR has operationalized mechanisms to boost entrepreneurship, which could lead to enhanced creation and commercialization of radical and disruptive innovations.
- CSIR has put in place CSIR@80: Vision & Strategy 2022. CSIR's mission is to build a new CSIR for a new India.
- Its vision is to pursue science for global impact, the technology that enables innovation-driven industry and nurtures trans-disciplinary leadership thereby catalyzing inclusive economic development for the people of India.

Oxygen Express

- Indian Railway is running Oxygen Expresses with Liquid Medical Oxygen (LMO) tankers in response to the fight against Covid-19.
- First Oxygen Express is going to start its journey from Visakhapatnam to Mumbai through Ro-Ro service of Indian Railways.
- A green corridor was created between Lucknow to Varanasi for another Oxygen Express that started its journey from Lucknow to Bokaro via Varanasi to fulfil the requirements of Medical Oxygen.

Liquid Medical Oxygen

- Liquid Medical Oxygen is supplied and stored as a liquid at very low temperatures, in vessels and storage tanks.
- It must be supplied at the medical oxygen purity of 99.5% (min).
- In hospitals, the converted Medical Oxygen, a gas at normal temperatures, is supplied via a medical gas pipeline system.

Countercyclical Capital Buffer

- Based on the review and empirical testing of Countercyclical Capital Buffer (CCyB) indicators, the Reserve Bank of India (RBI) says it is not necessary to activate CCyB at this point in time.
- The framework on CCyB was put in place by the RBI in terms of guidelines issued in 2015.
- The 2015 guidelines advised that the CCyB would be activated as and when the circumstances warranted, and the decision to activate CCyB would normally be pre-announced.
- The framework envisages the credit-to-GDP gap as the main indicator.
- This main indicator may be used in conjunction with other supplementary

indicators like Credit-to-Deposit Ratio, Industrial Outlook Assessment Survey, Interest Coverage Ratio, and Asset Quality.

- The aim of the CCyB regime is twofold,
    1. It needs banks to build up a capital buffer in good times which may be used to maintain credit flow to the real sector in hard times.
    2. It achieves the goal of restricting the banking sector from indiscriminate lending in the periods of excess credit growth that have been associated with the building up of system-wide risk.

Capital Buffer

- Capital buffers are mandatory capital that financial institutions are required to hold in addition to other minimum capital requirements. They are put in place by regulators.
- Regulations targeting the creation of adequate capital buffers are designed to reduce the procyclical nature of lending by promoting the creation of Countercyclical Capital Buffers (CCyB).
- Both capital Buffers and CCyBs were set forth under the Basel III regulatory reforms created by Basel Committee on Banking Supervision.

National Climate Vulnerability Assessment Report

- The report, titled 'Climate Vulnerability Assessment for Adaptation Planning in India Using a Common Framework' was released by the Department of Science and Technology (DST).
- It identifies the most vulnerable states, districts and panchayats in India with respect to current climate risk and key drivers of vulnerability.
- It was coordinated by the Climate Change Program of SPLICE Division of the DST in partnership with the Swiss Agency for Development and Cooperation, Embassy of Switzerland.
- [SPLICE - Strategic Programs, Large Initiatives and Coordinated Action Enabler]
- It was part of a capacity building programme under the National Mission on Sustaining the Himalayan Ecosystem and National Mission on Strategic Knowledge for Climate Change.

Findings

- The report revealed that eight Indian states - Chhattisgarh, Jharkhand, Mizoram, Odisha, Assam, Bihar, Arunachal Pradesh and West Bengal - are highly vulnerable to climate change.
- Key vulnerability drivers are lack of forest area per 100 rural population, low road density, poor health infrastructure, lack of implementation of

MGNREGA, lack of women's participation in workforce, among others.

- Among all states, Assam, Bihar and Jharkhand have over 60% districts in the category of highly vulnerable districts.
- **States with lower-middle vulnerability** - Himachal Pradesh, Telangana, Sikkim and Punjab.
- **States with low vulnerability** - Uttarakhand, Haryana, Tamil Nadu, Kerala, Nagaland, Goa and Maharashtra.
- **Uses** - The report will aid in prioritising adaptation investment, developing and implementing adaptation programmes by the states.
- The assessments can further be used for India's reporting on the Nationally Determined Contributions under the Paris Agreement.
- They will support India's National Action Plan on Climate Change.

Source: PIB, The Hindu, The Indian Express, Economic Times, First Post

