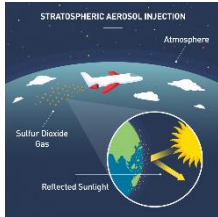


WHAT IS STRATOSPHERIC AEROSOL INTERVENTION (SAI)?



A recent study looked at the impact of stratospheric aerosol intervention (SAI) in mitigating global warming effects in West Asia (also known as the Middle East) and North Africa (MENA).

- Stratospheric Aerosol Intervention (SAI), also known as Stratospheric Aerosol Injection, is a **geoengineering or climate engineering approach** that uses **tiny reflective particles or aerosols to reflect sunlight into space** in order to **cool the planet** and reverse or stop global warming.
- It aims to **mimic the cooling effects of volcanic eruptions** by **injecting Sulphur dioxide (SO₂)** directly into the stratosphere, where it **forms sunlight-reflecting sulphate aerosols**.
 - The 1991 eruption of **Mount Pinatubo** in the Philippines, often cited as the inspiration for this concept, deposited massive amounts of particulate matter and Sulphur dioxide (SO₂) into the atmosphere.
 - This aerosol layer was reported to have lowered average temperatures around the world by about 0.5 °C (0.9 °F) over the following few years.

Key Facts about Aerosols:

- They are tiny **solid or liquid particles suspended in air or gas**.
- Aerosols can be **natural**, such as fog or gas from volcanic eruptions, **or artificial**, such as smoke from burning fossil fuels.
- Aerosol particles are **either emitted directly into the atmosphere (primary aerosols) or produced in the atmosphere from precursor gases (secondary aerosols)**.
- Aerosol particles are **tiny**, but numerous, and **often comprise** a number of **inorganic and organic substances**.
- **Visible forms** of atmospheric aerosol plumes **include smoke, smog, haze, and dust**.

MISSION UTKARSH - INITIATIVE FOR ANAEMIA CONTROL AMONG ADOLESCENT GIRLS USING AYURVEDA INTERVENTIONS

- Ministry of Ayush and Ministry of Women and Child Development have signed a MoU for the nutritional improvement in adolescent girls through Ayurveda Interventions.
- It will be a Joint Public Health Initiative for **Anaemia Control among adolescent girls using Ayurveda interventions** in the five districts **under Mission Utkarsh**.

What is Anaemia?

- According to the WHO, anaemia is a condition in which the number of red blood cells or the haemoglobin concentration within them is lower than normal.
- Haemoglobin is needed to carry oxygen.
- If there are too few red blood cells, or not enough haemoglobin, there will be a decreased capacity of the blood to carry oxygen to the body's tissues.
- This results in symptoms such as fatigue, weakness, dizziness and shortness of breath among others.
- **Factors**
 - The most common nutritional cause of anaemia is iron deficiency although deficiencies in folate, vitamins B12 and A are also important causes.
 - Certain chronic diseases, such as kidney disease, liver disease, cancer, or autoimmune disorders, can interfere with the production of red blood cells.
 - Inherited conditions, such as sickle cell anemia or thalassemia, affect the structure or function of red blood cells, leading to chronic anemia.

Why should there be focus on Anaemia?

- **Impact on morbidity and mortality**
 - Anaemia is related to morbidity and mortality in the population groups usually considered to be the most vulnerable — pregnant women and children under five.
- **Effect on reproductive health**

- A prevalence study on anaemia is useful to monitor the progress of reproductive health.
- **Impact on economy**
 - Iron-deficiency anaemia reduces the work capacity of individuals and entire populations.

India's anaemia burden

- India's anaemia burden has grown alarmingly with NFHS-5 (2019-21) finding that:
 - 57% of women in the age group 15-49 and 67% children between six months and 59 months are anaemic (from the corresponding 53% and 58.6% respectively in NFHS-4 (2015-16)).
 - The Health Ministry has noted that **anaemia is a public health challenge**.
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WHAT IS INDRA RV25: 240N?

Hyderabad-based Raghu Vamsi Machine Tools Private Limited recently launched its fully indigenous Micro Turbojet Engine "INDRA RV25: 240N".



INDRA RV25: 240N is a micro turbojet engine.

- It is designed and developed **indigenously** by Hyderabad-based firm **Raghu Vamsi Machine Tools** with **support from IIT Hyderabad**.
- It has **primarily been developed for** unmanned aerial vehicles (UAVs) or **drones**.
- The engine has applications in UAVs, air taxis, jetpacks, auxiliary power units, range extenders, and power generation in the future.

What is a turbojet engine?

- A turbojet engine is a jet engine which **produces all of its thrust by ejecting a high-energy gas stream from the engine exhaust nozzle**.
- In contrast to a turbofan or bypass engine, **100% of the air entering** the intake of a turbojet engine **goes through the engine core**.

- **Components:** The component parts of a turbojet engine are the **inlet**, the **gas turbine engine**, consisting of a **compressor**, a **combustion chamber** and a **turbine**, and the **exhaust nozzle**.

Working:

- **Air is drawn** into the engine **through the inlet** and **compressed and heated** by the **compressor**.
- **Fuel is then added** to the combustion chamber and **ignited**.
- The **burning fuel adds energy to the exhaust stream** by heating and expanding the air.
- Sufficient **energy to drive the compressor** is **extracted from the exhaust stream** by the turbine.
- The **remainder of the exhaust energy** is used to **produce thrust**, a process which is enhanced by the geometry of the exhaust nozzle.
- **As the exhaust gas passes through the nozzle**, it is **accelerated to high speed** as it expands, thus **providing propulsion**.
- The thrust produced by the engine can be selectively increased by incorporating an afterburner or re-heat into the engine design.
- Turbojet aircraft **work on the principle of accelerating** a relatively **small mass of air to a high speed**.
- As **optimum efficiency** is achieved **when the speed of the accelerated air approximates that of the aircraft**, turbojet engines do not reach peak efficiency until speeds approach Mach 2.
- Thus, turbojets have **relatively poor propulsive efficiency at lower airspeeds**, limiting their usefulness to high-speed aircraft.

WHAT ARE LARGE LANGUAGE MODELS (LLMs)?

The ability of Generative AI models to “converse” with humans is due to something known as the Large Language Model, or LLM.



- A large language model (LLM) is a **type of artificial intelligence (AI) program** that can **recognize and generate text**, among other tasks.
- LLMs are **trained on huge sets of data**—hence the name "large."
- LLMs are **built on machine learning**: specifically, a type of neural network called a transformer model.
- In simpler terms, an **LLM is a computer program** that has been fed enough **examples** to be able to **recognize and interpret human language or other types of complex data**.
- Many LLMs are **trained on data** that has been **gathered from the Internet**—thousands or millions of gigabytes' worth of text.
- However, the **quality of the samples impacts how well LLMs will learn** natural language, so an LLM's programmers may use a more curated data set.
- LLMs use a **type of machine learning called deep learning** in order to understand how characters, words, and sentences function together.
 - Deep learning involves the **probabilistic analysis of unstructured data**, which **eventually enables** the deep learning model to **recognize distinctions** between pieces of content **without human intervention**.
- LLMs are then **further trained via tuning**: they are fine-tuned or prompt-tuned **to the particular task** that the programmer wants them to do, such as interpreting questions and generating responses, or translating text from one language to another.

What are LLMs used for?

- LLMs can be trained to do a number of tasks. One of the most well-known uses is their **application as generative AI**: when given a prompt or asked a question, they can produce text in reply.
- The publicly available **LLM ChatGPT**, for instance, can generate essays, poems, and other textual forms in response to user inputs.

WHAT IS GARBHINI-GA2?

Researchers recently developed Garbhini-GA2, an India-specific artificial intelligence model to precisely determine the gestational age of a foetus.



- It is the first **India-specific** artificial intelligence (AI) **model** to precisely **determine the age of a foetus** in a pregnant woman **in the second and third trimesters**.

- It has been **designed by researchers at the Indian Institute of Technology Madras and the Translational Health Science and Technology Institute (THSTI), Faridabad.**
- **It is part of** an interdisciplinary group for advanced research on birth outcomes – the Department of Biotechnology (DBT) **India initiative (GARBH-Ini) programme.**
- It is the first late-trimester GA estimation model to be **developed and validated using Indian population data.**
- The Garbhini-GA2 accurately estimates the foetus' age, **reducing error by almost three times.**
- Accurate 'Gestational Age' (GA) is **necessary for the appropriate care of pregnant women** and for **determining precise delivery dates.**
- Once validated in pan-India cohorts, Garbhini-GA2 holds the potential to be widely deployed in clinics across the country, **contributing to improved maternal and infant healthcare outcomes and reducing mortality rates.**

Key Facts about Translational Health Science and Technology Institute (THSTI):

- It is an **autonomous institute of Biotechnology under the Ministry of Science and Technology**, with the prime ideology of contributing most of its work beyond discovery and research.
- It was established in 2009 in **Faridabad, Haryana.**
- It also facilitates social Innovation and entrepreneurship in the field of maternal and child healthcare.

KNOW YOUR CUSTOMER (KYC)



The government of India has formed an expert committee headed by Finance Secretary T V Somanathan to make its recommendations to bring out uniform Know Your Customer (KYC) norms.

About the Know Your Customer:

- It is a **comprehensive process** that **financial and non-financial institutions** follow to verify the authenticity and identity of their customers.
- The KYC process is mandatory for every customer before investing in any instruments or starting a bank account.
- In India at present, **separate KYCs are needed for different financial products** such as opening a bank account, investing in mutual funds, buying a life cover or investing in retirement-savings funds.
- Multiple KYCs, regular updates and even the exact specifications often prove to be a deterrent for new investors.
- To **eliminate the need to do repeated KYC** for investing across financial assets, the central government launched the **Central KYC Records Registry**.

What is the Central KYC Records Registry?

- It was launched by the central government of **India in 2016**.
- It has been **limited only** to the **capital markets**.
- In fact, while dealing in securities markets, once KYC is done through a Securities and Exchange Board of India (SEBI) registered intermediary such as a broker, depository participant or mutual fund, customers do not have to undergo the same process again for fresh investments.
- The government authorised the **Central Registry of Securitisation Asset Reconstruction and Security Interest of India (CERSAI)** to perform the functions of the CKYCR.

AEGIS GRAHAM BELL AWARDS

Recently, the Centre for Development of Telematics (C-DOT), the premier Telecom R&D centre of the Government of India, strikes a hat-trick by securing top position in three awards at 14th Annual Aegis Graham Bell Awards.



AEGIS
GRAHAM BELL
AWARDS

Aegis Graham Bell Awards was initiated in 2010 by the **Aegis School of Data Science**.

- It is a tribute to the father of telephony and **great innovator, Alexander Graham Bell**.
- The Aegis School of Business, Data Science and Cyber Security has initiated this award to promote innovations and recognise the outstanding contributions by innovators in various fields including education, Information and Communications Technology (ICT), Artificial Intelligence (AI) and data science.
- This award in India is supported by the **Ministry of Electronics and Information Technology** (MeitY), Skill India and the National Informatics Centre.

Following are the projects of C-DOT which received this award:

- **ASTR Project:** ASTR (AI & Facial Recognition-powered Solution for Telecom SIM Subscriber Verification) is a game-changer in the fight **against cybercrimes**.
- Designed to analyse, identify, and eliminate fake/forged mobile connections, it's a crucial step towards ensuring a secure telecom environment.
- **CEIR (Central Equipment Identity Register) solution:** CEIR helps revolutionise mobile **security** by **detecting clone IMEIs**, restricting the import of counterfeit mobile devices and also enabling the blocking and tracing of lost or stolen phones.
- **Quantum Key Distribution (QKD) product:** India employs quantum mechanics to create an **unbreakable cryptographic protocol** even with Quantum computers.

THIRD-PARTY APPLICATION PROVIDER

The Reserve Bank of India has asked the National Payment Council of India to examine the request of One97 Communications, which owns Paytm, to become a Third-Party Application Provider for continued Unified Payments Interface operation of the Paytm application.



About the Third-Party Application Provider (TPAP):

- It is an entity that provides **UPI-compliant app(s)** to the end-user customers to facilitate UPI-based payment transactions.
- These applications could be **mobile wallets, merchant apps**, or any other platform that utilises UPI for payments.
- NPCI, the umbrella organisation for operating retail payments and settlement systems in India, owns and operates the UPI platform.
- **Working of TPAPs**
 - TPAPs **leverage the UPI infrastructure provided** by NPCI and work with payment service providers (PSPs) and banks to facilitate transactions.
 - They are responsible for ensuring that their applications adhere to security standards and compliance guidelines set by NPCI.
 - As per the current regulations, payment service providers (PSPs) need to obtain a **TPAP licence from NPCI** to run UPI services and facilitate merchant transactions through partner banks.
- Currently, there are 22 NPCI-approved 3rd party Unified Payments Interface (UPI) apps that can be used to send and receive money from other UPI users by using UPI IDs.
- They include Amazon Pay, Google Pay, Groww, Jupiter Money, Mobikwik, Phonepe, Samsung Pay, TataNeu and Whatsapp.