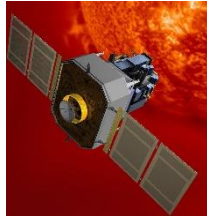


WHAT IS SOLAR AND HELIOSPHERIC OBSERVATORY (SOHO)?

Recently, a citizen scientist spotted a comet in an image from the Solar and Heliospheric Observatory (SOHO) spacecraft.

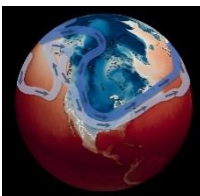


Solar and Heliospheric Observatory (SOHO) is a project of international collaboration between the **European Space Agency (ESA)** and the **U.S. National Aeronautics and Space Administration (NASA)**. It was launched in December 1995, SOHO was designed to **study the Sun**.

- In order to provide continuous observations, it was **maneuvered** to orbit the **first Lagrangian point (L1)**, a point some 1.5 million km (900,000 miles) from Earth toward the Sun where the **gravitational attraction of Earth and the Sun, combine** in such a way that a small body remains approximately at rest relative to both.
 - It carries 12 scientific instruments to study the solar atmosphere, helioseismology and the solar wind.
 - Though its mission was scheduled to run until only 1998, it has continued collecting data, adding to scientists' understanding of our closest star, and making many new discoveries, including thousands of comets. It is the **longest-lived Sun-watching satellite** to date.
-

WHAT IS POLAR VORTEX?

The polar vortex circling the Arctic is swirling in the wrong direction after surprise



warming in the upper atmosphere triggered a major reversal event recently.

The polar vortex is a **large area of low pressure** and **cold air** surrounding both of the Earth's poles. It weakens in summer and strengthens in winter.

- The term "vortex" refers to the **counter-clockwise flow** of air that helps **keep the colder air near the poles**.

- Many times, **during winter** in the **northern hemisphere**, the **polar vortex will expand**, sending cold air southward with the jet stream.
 - This occurs fairly regularly during wintertime and is often associated with large outbreaks of Arctic air in the United States and Canada.
- Portions of Europe and Asia also experience cold surges connected to the polar vortex.
- The polar vortex **extends from the tropopause** (the dividing line between the stratosphere and troposphere) **through the stratosphere and into the mesosphere** (above 50 km).

Key Facts about Jet Streams:

- Jet streams are **narrow bands of strong wind** that generally blow from **west to east** all across the globe.
- Earth has **four primary jet streams**: **two polar** jet streams, near the north and south poles, and **two subtropical** jet streams closer to the equator.

What Causes Jet Streams?

- Jet streams form **when warm air masses meet cold air masses** in the atmosphere.
- The sun doesn't heat the whole earth evenly. That's why areas near the equator are hot and areas near the poles are cold.
- So, when Earth's warmer air masses meet cooler air masses, the **warmer air rises** higher in the atmosphere while **cooler air sinks** to replace the warm air.
- This movement creates an air current or wind. A jet stream is a type of air current that forms high in the atmosphere.
- Since these hot and cold air boundaries are **most pronounced in winter**, jet streams are the strongest during both the northern and southern hemisphere winters.
- On average, jet streams move at about 110 miles per hour.
- They are located about five to nine miles above Earth's surface in the **mid to upper troposphere**, the layer of Earth's atmosphere where we live and breathe.

QUANTUM CRYPTOGRAPHY



Scientists are proposing new technology known as quantum cryptography to protect sensitive communications.

Quantum cryptography is also known as quantum encryption which uses the naturally occurring properties of quantum mechanics to secure and transmit data in a way that cannot be hacked.

- It is completely secure against being compromised without the knowledge of the message sender or the receiver.
- It is impossible to copy or view data encoded in a quantum state without alerting the sender or receiver. It uses individual particles of **light, or photons**, to transmit data over fiber optic wire.
- **Process:**
 - Quantum cryptography is not replacing traditional cryptography; rather, it allows for a **more secure transfer of the keys** used in encoding and decoding.
 - The amount of information which can be transferred using quantum cryptography is not very large or very fast, **but it is very secure.**

Benefits of quantum cryptography

- **Provides secure communication:** Instead of difficult-to-crack numbers, quantum cryptography is based on the laws of physics, which is a more sophisticated and secure method of encryption.
- **Detects eavesdropping:** If a third party attempts to read the encoded data, then the quantum state changes, modifying the expected outcome for the users.
- **Offers multiple methods for security:** There are numerous quantum cryptography protocols used. Some, like QKD, for example, can combine with classical encryption methods to increase security.

WHAT ARE TREASURY BILLS?

Recently, the Government of India, in consultation with the Reserve Bank of India notified the calendar for the issuance of Treasury Bills for the quarter ending June 2024.



- Treasury bills or T-bills are **money market instruments**. These are short term debt instruments issued by the Government of India.
- **Maturity period:** At present, treasury bills are issued in three maturities — **91-day, 182-day and 364-day**.
- These are zero coupon securities and **pay no interest**. Instead, they are issued at a discount and redeemed at the face value at maturity.
- **Who can buy?**
 - **Individuals, trusts, institutions and banks** can purchase T-Bills. But they are usually held by financial institutions.
 - Banks give treasury bills to the RBI to get **money under repo**. Similarly, they can also keep it to fulfil their **Statutory Liquid Ratio (SLR)** requirements.
- **How do T-bills work?**
 - Treasury bills are issued at a discount to original value and the buyer gets the original value upon maturity. For example, a Rs 100 treasury bill can be availed of at Rs 95, but the buyer is paid Rs 100 on the maturity date.
 - The return on treasury bills **depends on the liquidity position** in the economy. When there is a liquidity crisis, the returns are higher, and vice versa.

INDIA-PAKISTAN TRADE

Why in news?

Recently, Pakistan's Foreign Minister Muhammad Ishaq Dar said that his country may seriously examine the question of resuming trade with India.

Pakistan had stopped trade after the constitutional changes in Jammu and Kashmir in 2019.

Why was India-Pakistan trade paused?

- Pakistan suspended bilateral trade with India in August 2019, after the Indian government abrogated Article 370 of the Indian Constitution.
 - The now-scraped article gave a special status to the erstwhile state of Jammu and Kashmir, following its accession with India in 1947.
- However, experts believe an underlying reason for suspending trade was the 200 per cent tariff imposed by New Delhi on Pakistani imports earlier that year after India revoked Pakistan's MFN status.
 - India took this step in the aftermath of the Pulwama terrorist attack in February 2019.
 - India withdrew Pakistan's MFN status within 24 hours of the attack.

Why might Pakistan be reconsidering trade with India?

- **Change of government in Pakistan**
 - There has been a change of face, if not regime, since Imran Khan following elections held earlier this year.
 - While the Pakistani military remains firmly in control, a new government indicates the possibility of a new policy.
- **Economic crisis in Pakistan**
 - Devastating floods in 2022, high inflation, and political instability alongside structural issues, have led to multiple crises related to meeting the food and energy needs of the population.
- **Pakistan is approaching IMF and friendly countries for loan**
 - Pakistan has had to frequently approach the IMF or friendly countries like Saudi Arabia and China for billions of dollars in loans.
 - With the pause in trade with India, importing goods from faraway countries further depletes its low foreign exchange reserves.
- **Direct trade will increase the efficiency**

- Trade between India and Pakistan is already taking place through Dubai or other countries.
- This raises costs, and the logic of efficiency and geography demand a resumption of direct trade.
- **Pakistan's relationships with Afghanistan and Iran have become tense**
 - In fact, Pakistan's ties with India are more stable than its western frontier with Afghanistan and Iran.

Conclusion

Today, India's position is stronger, and the Indian government is not going to make any concessions. The ball then is in Pakistan's court; and there is no domestic consensus on how to reset ties with India. This is the problem: **trade with India makes economic sense for Pakistan. But the politics of doing the right thing are quite hard in Pakistan.**

MOYAR VALLEY



Moyar valley is the biggest nesting colony of critically endangered Gyps vultures in the wild.

- **Location:** It extends **from Gudalur** through the core area of **Mudumalai Tiger Reserve**. This entire stretch is an important biome in the Nilgiri Biosphere Reserve.
- It is sheltering several vital species like tiger and elephant and the critically endangered Gyps vulture. It is the **only region in peninsular India** where you have the biggest nesting colony of Gyps vultures in the wild.
- **How it supports Gyps population?**
 - This valley offers plenty of wild kills and natural deaths of wildlife from Moyar village to Bhavanisagar.
 - This provides a stable food-chain to nature's scavengers, simply because these carcasses are mostly free from NSAIDs (Non-Steroidal Anti-inflammatory Drugs) and other poisonous chemicals.

Key facts Mudumalai Tiger Reserve

- It is located in the Nilgiris District of **Tamil Nadu**, at the tri-junction of three states, viz, **Karnataka, Kerala and Tamil Nadu**.
 - It lies on the Northeastern and Northwestern slopes of Nilgiri hills which is a part of the Western Ghats. It is part of the Nilgiris Biosphere Reserve, the first Biosphere Reserve in India.
 - It has a common boundary with **Wayanad Wildlife Sanctuary** (Kerala) on the West, **Bandipur Tiger Reserve** (Karnataka) on the North, the Nilgiris North Division on the South and East, and Gudalur Forest Division on the South West.
-

WHY ARE ROHINGYA REFUGEES RISKING THEIR LIVES AT SEA?

Last week, a wooden boat capsized off the Indonesian coast carrying Rohingya refugees. This has once again drawn attention to the plight of the refugees who are increasingly embarking on dangerous sea journeys to seek a better life.

As per the United Nations High Commissioner for Refugees (UNHCR), over 4,500 Rohingya refugees set off on dangerous journeys across the Bay of Bengal and the Andaman Sea last year.

About Rohingya Refugees:

- The Rohingya are a Muslim minority ethnic group with their roots in the Arakan kingdom in **Myanmar**, formerly known as Burma.
- The Rohingya are culturally and religiously distinct from the majority Buddhist population in Myanmar.
- The Rohingya claim to have lived in Myanmar's **Rakhine State** for generations, but successive governments in the country have disputed their ties, labelling them illegal immigrants from Bangladesh.
- **Myanmar has refused to recognise them, denying them citizenship since 1982**, thus making them the world's largest stateless population devoid of fundamental rights and security.

- Their largest exodus began in August 2017 when a massive wave of violence broke out in Rakhine, driving more than 7.5 lakh people to seek sanctuary in Bangladesh to escape the brutality of security forces.
- A 2018 UN fact-finding commission claimed the Myanmar government had “genocidal” intent against the Rohingya.

Rohingyas in India:

- As per the Ministry of Home Affairs, there are more than **40,000 Rohingya in India**. Only 14,000 of them hold United Nations High Commissioner for Refugees (UNHCR) refugee ID cards, which offers them protection from arbitrary detention.
- There are clusters of Rohingya population in Jammu, Hyderabad, and Delhi-NCR, besides the states of Haryana, Uttar Pradesh, and Rajasthan.
- The UN says that India has an international legal obligation to provide Rohingya refugees with necessary protection.

Legal Provisions for ‘Refugees’ in India:

- In India, no legislation has been passed that specifically refers to refugees.
- Hence, Rohingya refugees are often clubbed with illegal immigrants deported by the Government under the **Foreigners Act, 1946** and the **Foreigners Order, 1948**.
- Section 3 of The Foreigners Act, 1946 gives the Central government the right to deport a foreign national.
- The power to identify and deport foreign nationals who are in India illegally has been delegated to state governments, Union Territories and the Home Ministry’s Bureau of Immigration.
- Illegal immigrants who are intercepted at the border while entering India unauthorizedly can be sent back then and there.

Why are Rohingyas Taking Sea Route?

- While over one million Rohingya have fled Myanmar since the 1990s, around **6 lakh remain in the country**.
- They mostly live in camps for internally displaced people where their movements and livelihoods are restricted.
- An estimated 9.6 lakh Rohingya, meanwhile, reside in refugee camps in Bangladesh.



- Most live near the Myanmar border in the Cox's Bazar, which has grown over the years to house some of the world's largest and most densely populated refugee camps.
- These overcrowded camps lack basic human necessities, forcing the Rohingya to live in harsh conditions.
- There is a shortage of food, access to water is inadequate, sanitation facilities are missing, healthcare is insufficient, and children are growing up without formal education.
- Security conditions also have deteriorated over the years due to gang violence and an increase in arson attacks in camps.
- Over 60 Rohingya were killed in Bangladeshi camp clashes in 2023.
- With the option of returning to Myanmar virtually impossible, an increasing number of Rohingya have been undertaking dangerous journeys across the Bay of Bengal and the Andaman Sea to Muslim-majority nations of **Indonesia** and **Malaysia**.
- However, human traffickers exploit their desperation, charging exorbitant amounts to ferry them on rickety boats from Bangladesh to Indonesia.
- The treacherous voyages with inadequate space and in the absence of basic supplies take weeks and sometimes stretch into months.
- Horrifying accounts of abuse during the journey, including violence against women, have been recorded. Many do not survive the journey.