

UPSC Daily Current Affairs| Prelim Bits 04-04-2025

Painted Lady Butterfly

Prelims - Biodiversity, species migration, scientific innovations, and climate change impacts.

Mains (GS - I & III) - GS I (Biogeography, species adaptation) | GS III (Biodiversity conservation, climate change, scientific advancements).

Why in News?

A recent study found that painted lady butterflies (*Vanessa cardui*) don't have significant genetic differences between short- and long-distance migrants.

- Painted Lady butterfly is a medium-sized butterfly belonging to the Nymphalidae family.
- It is renowned for its extensive migratory patterns and adaptability to various habitats.
- **Habitat** - Thrives in diverse environments, from temperate grasslands to deserts.
- They can be found on every continent except Antarctica and South America.
- **Conservation status** - Listed as Least Concern on International Union for Conservation of Nature's Red List.
- **Migratory Behaviour** - This species is a long-distance migrant, originating from areas like the desert fringes of North Africa, the Middle East, and Central Asia.
- Each year, it moves northwards, recolonizing mainland Europe and reaching Britain and Ireland.



Key findings of the study

- **Isotope Tracking** - Scientist studied about the species using the ratios of the isotopes in the wings of species.
- Wings retain hydrogen & strontium isotopes from larval food/water, revealing birthplace.
- **No genetic difference in migration** - Short- and long-distance painted lady butterflies belong to a single interbreeding population.
- **Migration driven by environment** - Distance covered depends on environmental factors, not genetics.

- **Single migratory cycle** - Painted Lady butterfly can travel up to 15,000 km in a single migratory cycle, one of the longest insect migrations on the earth.

A "**single migratory cycle**" refers an animal (like a bird) makes one round trip between two places—usually moving from a breeding area to a wintering area and back—due to seasonal changes or food needs.

- **Multi-generational migration** - The full migration cycle spans 8–10 generations.
- **Super fly Adaptations** - Thoracic muscles like "bodybuilders" enable high-speed, high-altitude flights.
- Wing shape/size doesn't predict migration distance.
- **Different from bird migration** - Butterflies don't return to a single breeding ground, unlike birds.

Phenotype

- **Phenotype** is a physical, biological, or behavioural characteristic shaped by genetics as well as environmental factors.
 - **Example** - Skin and hair colour in humans, vocal behaviour among birds, and the migratory patterns of some animals.
- Scientists use phenotyping to study migration patterns in butterflies.
 - **Example** - By examining butterfly wings, researchers can determine their place of origin based on isotopic composition.

References

1. [The Hindu | Painted Lady](#)
2. [Britannica | Painted Lady](#)

Protection of Interests in Aircraft Objects Bill, 2025

Prelims - Indian polity and Governance

Mains (GS II & III) - GS I (Government Policies & Interventions) | GS III (Infrastructure).

Why in News?

Protection of Interests in Aircraft Objects Bill, 2025, was recently introduced in Rajya Sabha.

- The Bill seeks to give **legal effect** to the following international agreements in their application to India
 - Convention on International Interests in Mobile Equipment (also known as Capetown Convention of 2001), and
 - Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Aircraft Equipment.
- India had acceded to these in **2008**.

- The Convention and the Protocol aim to bring uniformity in securing rights for high-value assets such as aircrafts, helicopters, and engines.
- They aim to ensure predictability for creditors in the event of a financial default in
 - A lease - use for a specified period
 - Conditional purchase - transfer of ownership upon completion of certain terms and conditions, or
 - Security agreement - asset given as collateral for borrowing.
- **Registry Authority** - The Bill designates Directorate General of Civil Aviation (DGCA) as the Registry Authority for the purposes of the Convention.
- The Registry Authority is responsible for registration and de-registration of aircrafts.
- **Obligations of debtors** - Debtors *must submit records of dues* to DGCA.

A debtor is a person who has taken an aviation asset under a lease or, conditional purchase agreement, or pledged an asset under a security agreement.

- **Remedies in case of default** - The Convention gives creditors certain remedies in case of default by a debtor.

A creditor is a person who has provided an aviation asset under a lease or conditional purchase agreement, or has lent under a security agreement.

- It includes the right to take back possession of the asset within a period of 2 calendar months or a mutually agreed upon period, whichever is earlier.
- The Bill states that before exercising any remedy, **the creditor must notify DGCA** about the occurrence of default.
- **Detention of assets by government agencies** - The following entities will continue to have the right to detain an asset if dues for services related to that asset remain unpaid
 - Central government,
 - Any other entity providing public services in India, or
 - An inter-governmental organization of which India is a member.
- **Overriding effect** - In case of any inconsistency between the Bill and any other law, the *provisions of the Bill* will prevail.
- **Jurisdiction of High Courts** - The High Courts will have jurisdiction over any claim under the Convention.
- **Power to make Rules** - The Bill empowers the central government to make Rules to implement the provisions of the Convention and the Protocol.

References

1. [Economic Times | Protection of Interests in Aircraft Objects Bill, 2025](#)
2. [PRS India | Protection of Interests in Aircraft Objects Bill, 2025](#)

Saturn

Prelims - General Science

Why in news?

Astronomers have discovered 128 new moons around Saturn, increasing its total count to 274 moons.

- Saturn is the **second-largest planet** in the solar system.
- **Position**- 6th planet from the Sun.
- **Type**- Gas giant.
- It is surrounded by a beautiful ring system.
- **Size** - With an equatorial diameter of about 74,897 miles (120,500 kilometers), Saturn is 9 times wider than Earth.
- **Distance** - Saturn is 9.5 Astronomical Units (AU) away from the Sun.

One astronomical unit (abbreviated as AU), is the distance from the Sun to Earth.

- **Mass**- 95 times the mass of Earth.
- **Composition**- Mostly hydrogen and helium, similar to Jupiter.
- **Density**- The **least dense planet** in the Solar System (it could float in water).
- **Orbit & Rotation** - One day on Saturn takes only **10.7 hours**.
- **Orbital Period**- Takes **29.5 Earth years** to complete one orbit around the Sun.
- **Moon system of Saturn**
 - **Total Moons**- 274 (after the recent discovery of 128 new moons).
 - **Largest Moon**- Titan (2,159 miles across).
 - **Other Major Moons**- Enceladus is known for its subsurface ocean and icy plumes.
 - Many newly discovered moons are small (as tiny as 2 miles across) and follow irregular, retrograde orbits.
- **Discovery - Observation in 2023** - Conducted using the Canada-France-Hawaii Telescope at **Mauna Kea, Hawaii**.
- **Tracking Technique**- Scientists observed patches of space near Saturn and tracked the motion of small moon-like objects over time.
- **Characteristics of the new moons**
 - All are irregular moons - meaning they have highly inclined orbits and travel backward (retrograde motion).
 - Some moons are as small as 2 miles across.
 - The discovery suggests these moons are remnants of cosmic collisions that happened 100 million years ago.
- The **International Astronomical Union (IAU)** has officially ratified the newly identified moons.

- **Established in** - 1919.
- **Mission**- Promote and safeguard astronomy through research, education, and international cooperation.
- **Headquarters** - Paris, France.
- **Governance**
 - **General Assembly (Every 3 years)** defines long-term policy
 - **Executive Committee** implements decisions
 - **IAU Officers & Secretariat** handle day-to-day operations
- ***India is an active member in IAU.***

Reference

[Indian Express| Newly discovered moons of Saturn](#)

Government e-Marketplace

Prelims (GS - I) - *Public Policy.*

Mains (GS III) - *Economic Development and Inclusive Growth.*

Why in the news?

Government e-Marketplace (GeM) aims to boost start-up participation through upcoming events like Startup Mahakumbh 2025

- It is India's **public procurement portal** for purchasing goods and services by central and state government ministries, Departments, Public Sector Units (PSUs), and affiliated entities.
- **Launched in** - 2016
- **Aim** - To make the public procurement process transparent, efficient, and inclusive.
- **Developed by** - Directorate General of Supplies and Disposals (DGS&D) in collaboration with MeitY (Ministry of Electronics and Information Technology) and National e-Governance Division (NeGD).
- GeM is now managed by GeM SPV (Special Purpose Vehicle), a 100% government-owned company under the Ministry of Commerce & Industry.
- **Three Pillars of GeM**
 - **Efficiency** - Ensures cost and time savings
 - AI-driven procurement reduces process time.
 - **Transparency** - Digital footprint ensures no manipulation in transactions.
 - AI tools prevent fraudulent activities.
 - **Inclusion** - Focus on women-led MSMEs, artisans, Farmer Producer Organizations (FPOs).
 - 50% of businesses on GeM come from MSMEs.
- **Advantages of GeM**
 - **Centralized Platform** - Unified portal for government buyers & suppliers.
 - **Policy Reforms** - Modernized regulations ensure compliance & efficiency.
 - **MSME Boost** - Supports small businesses & startups in government contracts.

- **Automation & Transparency** - Tech-driven system reduces delays & enhances accountability.
- **Achievements**
 - Business transactions increased from its first year to 2024.
 - Contributed to major government projects, including India's lunar mission (Chandrayaan 3).

References

1. [GeM| GeM and its advantages](#)
2. [Economics Times | Pillars of GeM](#)

Naini Lake's water crisis

Prelims - Current events of National Importance

Mains (GS- I) - Location-changes in critical geographical features (including water-bodies and ice-caps).

Why in News?

Naini Lake has recorded a water level of 4.7 feet, marking a five-year low that sparked concerns over drinking water scarcity ahead of the summer season.

- It is a natural kidney-shaped lake in Nainital, Uttarakhand surrounded by seven hills.
- **Discovered by** - P. Baron, a british businessman in 1839.
- The **third largest lake** in Uttarakhand by surface area.
- **Topology** -It is connected by a bridge between Mallital (north) and Tallital (south), and this bridge houses the world's only post office on a lake bridge.

76% of the city's water demand was met by the Naini Lake in 2024.

- **Reasons for the water crisis** - Decrease in snowfall and rainfall in the winter months.
- A report from the Uttarakhand State Council for Science and Technology found that compared to other Kumaon lakes, Naini Lake is subjected to the greatest man-made manipulations.
- It cited unplanned construction, encroachment, and degradation of recharge zones as key factors.
- The construction of concrete structures nearby further causes low rainwater infiltration, worsened by the low rainfall in some years.
- Enhancing siltation, dumping debris in **Sukhatal Lake**, which is a major aquifer recharge area for Naini Lake, causing the lake to shrink.
- Pollution from the discharge of untreated wastewater, improper disposal of solid waste, and inadequate sewer systems causing sewage to overflow into stormwater drains, discharge into the Lake.

Reference

[The Indian Express | Naini Lake](#)

Mitathal and Tighrana Harappan Sites

Prelims - *History of India.*

Mains (GS I) - *Indian Heritage and Culture.*

Why in News?

The Haryana government has declared two sites of over 4,400-year-old Harappan civilization in Bhiwani district as protected monuments and archaeological sites.

- These are notified under the Haryana Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1964.

Mitathal site

- The site was first discovered in 1913 when a hoard of coins belonging to Samudra Gupta of the Gupta dynasty was found.
- Archaeological excavation conducted in 1968 has thrown light on the Copper- Bronze Age culture, a complex of the Indo-Gangetic divide of the 3rd-2nd millennia BCE.
- From 1965 to 1968, beads and copper implements were discovered at the site, yielding proto-historic material.
- Mitathal bear out the Harappan tradition in town planning, architecture and in arts and crafts.
- The pottery was well-burnt, sturdy red ware painted in black with pipal leaf, fish scale, and other geometric designs.
- The site has yielded a variety of antiquities, such as beads, bangles, and terracotta, as well as stone, shell, copper, ivory, and bone objects.

Tighrana site

- According to the Tighrana village site, the post-Harappan period remnants shed light on the development and persistence of human habitation in the area.
- Chalcolithic farming communities originally settled in the area around 2,400 BCE.
- These early settlers, often referred to as **Sothians**, resided in modest thatched-roofed mud-brick homes at Chang, Mitathal, Tighrana, and other locations.
- Some of their settlements may have been fortified and comprised 50 to 100 houses each.
- They used wheel-made ceramics decorated in **bichrome with black-and-white motifs**, domesticated cows, bulls, goats, and other animals, and engaged in agriculture.
- They used copper, bronze and stone implements as discovered in large numbers.
- The presence of **beads and green carnelian bangles** indicate a thriving industry of

bead making and jewellery production.

- Remains from pre-Siswal, pre-Harappan, and post-Harappan settlements were found in Tighrana, making it an important archaeological site.

Reference

[The Indian Express | Harappan civilization spots](#)

One Liners 04-04-2025

Polity & Governance

Poshan Tracker app

Recently, over 10.12 crore beneficiaries registered on Poshan tracker app.

- **Umbrella scheme** - Poshan Bhi Padhai Bhi (PBPB) Programme.
- **Nodal Ministry** - Ministry of Women and Child Development (MWCD).
- **Aim** - To enhance Anganwadi Worker's (AWWs) capacity to deliver optimal early childhood care and education services to all children.
- To empower Anganwadi Workers and provide them with continuous digital support and coaching.

Major Minerals

Recently, mining leases for the major minerals issued in the 5th and 6th Schedule areas.

- Major minerals include iron ore, coal, bauxite, gold, and now, Barytes, Feldspar, Mica, and Quartz
- **Mines and Minerals (Development and Regulation) (MMDR) Act, 1957** - It empowers the State Governments to grant mineral concessions for the minerals located within their respective jurisdiction.
- **Responsibility of State Government:**
 - To collect the revenue generation.
 - Rehabilitation of displaced people.
- **Madhya Pradesh** - It has been granted above 7 leases after obtaining all requisite permissions.
- Gujarat, Rajasthan and Chhattisgarh states were not granted mining lease in the past 5 years.

Mining Surveillance System (MSS)

Recently, the government has begun to use geo-spatial technologies such as Mining Surveillance System (MSS), Geographic Information System (GIS) and Satellite imagery to prevent illegal mining.

- **Launched in** - 2016.
- **Developed by:**
 - Indian Bureau of Mines (IBM).
 - Ministry of Electronics and Information Technology (MeitY).
 - Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG).
- **Aim** - To develop a system for detection of incidence of illegal mining by use of space technology.
- To survey an area up to 500m outside the lease boundary to check incidences of illegal mining.
- Since, the inception of MSS in 2016-17, the project was implemented in major mineral rich states including in Odisha.

DoT Action to Curb Spam/Fraud Call

Recently, the Department of Technology (DoT) has disconnected nearly 1.75 lakh unauthorized numbers.

- **Spam calls** - DoT identified that large number of spam calls are being originated from telecom identifiers like numbers starting from 0731, 079,080 etc.
- **DoT Actions** - It urges enterprises to comply with telecom regulations to avoid strict penalties.
- It encourages citizens to continue reporting spam calls through the Chakshu module of Sanchar Saathi app.
- It remains dedicated to strict monitoring and prompt action against Unsolicited Commercial Communication (UCC) (spam/fraud call) violators to protect consumer interests.

Smugglers and Foreign Exchange Manipulators (Forfeiture of Property) Act (SAFEMA), 1976

Recently, a special court in Mumbai finally handed over 14 properties belonging to Tiger Memon to the central government of India. Tiger Memon is the key accused in the 1993 Bombay Blasts.

- **Objectives of the Act** - To fight smuggling and illegal money activities.
- It allows the government to take away properties that were bought with illegal money.
- **Ambit of an act** - It applies not just to the accused person but also to their family members and associates.

Pension Adalats

The government aspires to organize additional Pension Adalats recently.

- **About** - It is a long standing redressal of pension grievances pertaining to Central Government Pensioners.
- **Objective** - To provide on-the-spot resolution of unresolved and chronic grievances in Centralized Pension Grievance Redress and Monitoring System (CPENGRAMS).
- **Unresolved cases** - These cases are revisited and their status is considered before holding the next Pension Adalat.

Multi Modal Logistics Parks (MMLPs)

Out of 32 approved MMLPs 5 MMLPs at Jogighopa, Chennai, Bengaluru, Nagpur and Indore are under development and expected to be operational in FY 2025-27.

- **About** - It is a transportation hub that offers multiple modes of transportation and logistics services in one location.
- **Developed by** - Both public and private entities.
- It is a facility that integrates various transportation modes such as rail, road, sea, and air, as well as warehousing, storage, distribution, and value-added services.

Security

Bollard Pull (BP) Tug Ojas

Recently, the 5th 25T Bollard Pull (BP) Tug Ojas was launched.

- **Tugs** - It is designed indigenously and built in accordance with relevant Naval Rules and Regulation of Indian Register of Shipping (IRS).
- **Objective** - To provide assistance to Naval ships and submarines during berthing, unberthing and manoeuvring in confined waters.
- To provide afloat firefighting support to ships and it have the capability to conduct limited search and rescue operations.

INS Tarkash

Recently, INS Tarkash has successfully intercepted and seized over 2500 kg of narcotics.

- **About** - It is a frontline frigate of the Indian Navy operating under the Western Naval Command.
- **Part of** - Combined Maritime Forces (CMF), for Maritime Security Operations.
- **Deployed in** - Western Indian Ocean.
- It is participating in the multi-national forces joint focus operation, Anzac Tiger.

Miscellaneous

Tarang

Recently, the Tarang facilities was discussed in the Parliament.

- **About** - It is a 64-bit High Performance Computing (HPC) system, capable of supporting multi-tasking, multi-programming, multi-user and time-sharing environment.
- It avoids single point of failure, to meet the operational requirements.
- **HPC technical support** - It is supported by transformers, diesel generators, UPS, batteries, multiple utility paths, lighting system, adequate number of earthing pits and cables.