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Daily Current Affairs

To The Point

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Table Of Content

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GS Paper 3 – Environment & Ecology

1 Rediscovery of a Living Fossil: Typhloperipatus williamsoni

Context: A team of scientists has **rediscovered** a rare and ancient species of **velvet worm**, *Typhloperipatus williamsoni*, after a gap of **111 years**. This remarkable finding took place in the **Siang Valley** of **Arunachal Pradesh**, India — the very region where it was first documented over a century ago.

About Typhloperipatus williamsoni:

- Belonging to the phylum **Onychophora**, this velvet worm is considered one of the **oldest living fossils** on Earth.
- Onychophorans have existed for over **350 million years**, surviving numerous mass extinction events — including the one that wiped out the dinosaurs.
- The group is extremely rare today, consisting of only **two families** and fewer than **200 species** globally.
- *T. williamsoni* was first collected in **December 1911** during the **Abor Expedition** led by **Stanley Kemp**, then superintendent of the **Indian Museum, Calcutta**.

A Unique Evolutionary Puzzle:

Recent **molecular analysis** reveals that *T. williamsoni* and its relatives in **South Asia** diverged from their **Neotropical (Central and South American)** and **African** cousins around **237 million years ago**. This suggests an ancient **Gondwanan lineage**.

What's truly fascinating is that unlike many invertebrates from **India and Southeast Asia**, which typically show close ties to **Australian species**, the **Asian onychophorans** — like *T. williamsoni* — have **no known relatives in Australia**. This makes them a **rare biogeographical anomaly** and a key subject for studying **continental drift** and **evolutionary isolation**.

What Makes Velvet Worms So Special?

- Velvet worms are **soft-bodied**, **segmented invertebrates** that hunt using a **slimy adhesive** they shoot to entangle prey.
- They bridge the evolutionary gap between **arthropods** (like insects and crustaceans) and **annelids** (like earthworms).
- They breathe through **spiracles** but cannot regulate water loss — making them highly sensitive to **humidity** and **microclimatic changes**.
- Their survival across ages speaks to their **adaptability** and the unique ecological **niches** they inhabit.

Conservation and Scientific Importance:

The rediscovery of *Typhloperipatus williamsoni* not only adds to the biodiversity records of **India's Northeast** but also highlights the **urgent need for conservation** in **biodiversity hotspots** like Arunachal Pradesh.

It stands as a reminder that **many ancient lifeforms** may still be hiding in Earth's unexplored corners — waiting to reshape our understanding of **evolution**, **ecology**, and **continental history**.

GS Paper 3 – Science and Technology

2 Saras Mk2: India's Indigenous Civil Aviation Leap

Context: The **Saras Mk2**, India's ambitious push into the civilian aviation sector, is gearing up for its **first test flight in December 2027**, as confirmed by the **Director of CSIR-National Aerospace Laboratories (CSIR-NAL)**. This marks a significant milestone for India's domestic aerospace capabilities.

Overview: India's First Light Civil Transport Aircraft

- **Saras Mk2** is a **19-seater**, **multi-purpose light transport aircraft** designed for **civilian use**.
- It is being developed by **National Aerospace Laboratories (NAL), Bengaluru**, under the **Council of Scientific and Industrial Research (CSIR)**.
- The aircraft is an **upgraded version of the earlier Saras Mk1**, which laid the foundation for this advanced model.
- Saras Mk2 is **India's first indigenously developed civilian aircraft** in its category.

Key Features & Capabilities:

- **Weight Class**: 7.5 tons
- **Passenger Capacity**: Up to **19 passengers**
- **Maximum Range**:
  - **775 km** with full capacity (19 passengers)
  - **2450 km** with reduced load (7 passengers)
- **Endurance**: **6 hours** of continuous flight
- **Service Ceiling**: **29,000 feet**
- **Cruise Speed**: **500 kmph**
- **Stall Speed**: **185 kmph**
- **Take-Off Distance**: **790 meters**
- **Landing Distance**: **740 meters**
- **Engines**: Powered by **2 Pratt & Whitney Canada PT6A-67A turboprop engines**, known for reliability and performance

Versatile Applications:

Saras Mk2 isn't just a passenger aircraft. Its **multi-role design** allows it to be configured for:

- **Medical evacuation (air ambulance)**
- **Disaster relief and emergency response**
- **Short-haul regional connectivity**, especially between **Tier-1 and Tier-2/Tier-3 cities**
- **Cargo transport and logistics support** in remote or underserved areas

Why Saras Mk2 Matters for India:

- **Boosts Indigenous Manufacturing**: Aligns with the **Make in India** and **Atmanirbhar Bharat** initiatives.
- **Improves Regional Air Connectivity**: Supports **UDAN (Ude Desh ka Aam Nagrik)** scheme to make air travel affordable and widespread.
- **Strengthens Civil Aviation Sector**: Reduces dependency on imported aircraft for regional operations.
- **Economic Growth Catalyst**: Facilitates trade, healthcare access, and disaster management in remote regions.

Did You Know?

- The **PT6A engine** used in Saras Mk2 powers more than **130 different aircraft types worldwide** and has logged over **400 million flight hours**, showcasing exceptional dependability.
- The original Saras Mk1 program faced challenges but was **revived with renewed vigor** post-2016 under a redesigned configuration and stricter safety protocols.

Looking Ahead:

As India continues to assert its technological capabilities in aviation, the **Saras Mk2** stands as a **symbol of innovation, resilience, and engineering excellence**. If all goes according to plan, **by the end of the decade**, we could see this indigenous aircraft **serving remote corners of the country and beyond**.

GS Paper 3 – Disaster Management

3 Ramgarh Lake: Reviving Jaipur's Historic Water Legacy

Context: The **revival of the iconic Ramgarh Lake**, once the primary **water source for Jaipur**, has officially begun. Located near the **Jamwa Ramgarh subdivision** in Rajasthan's capital district, the lake is being rejuvenated to restore its ecological, cultural, and historical significance.

Location & Historical Background:

- **Ramgarh Lake** is situated **32 km northeast of Jaipur**, in the **Jamwa Ramgarh** region of Rajasthan.
- This **man-made reservoir** was constructed in **1876** by the then ruler **Sawai Ram Singh II** to address the region's growing water needs.
- Spanning an area of around **15.5 sq. km**, the lake stretches **4 km in length** and **2 km in width**, making it one of the largest water bodies near Jaipur during its prime.

A Lost Lifeline:

- In earlier times, **Ramgarh Lake was the main source of drinking water for Jaipur**.
- It was naturally replenished by four rivers — **Roda, Banganga, Tala**, and **Madhoveni** — which flowed from the surrounding Aravalli hills.
- Due to extensive **deforestation, encroachments**, and **illegal mining** in the catchment area, these rivers have **dried up**, leading to the lake's desiccation over the years.

A Sanctuary for Nature:

- The **forests surrounding Ramgarh Lake** are home to a variety of **wildlife species** including **Nilgai, Chital, and lions**.
- Recognizing its ecological value, the area was **declared a Wildlife Sanctuary in 1982** by the Government of India.
- The lush ecosystem makes it a vital habitat for biodiversity and a potential hotspot for **eco-tourism and conservation efforts**.

Sporting & Cultural Significance:

- **Ramgarh Lake once hosted the rowing event** during the prestigious **1982 Asian Games**, marking its place in India's sporting history.
- Nestled between the lake and the **Aravalli Hills**, the **Ramgarh Polo Ground** is considered **one of the finest polo grounds in India**, adding a royal touch to its legacy.
- Nearby lies the **Jamwa Mata Temple**, a revered shrine located just below the lake, drawing both spiritual seekers and tourists alike.

Looking to the Future:

With the ongoing **revival project**, authorities aim to:

- **Rejuvenate the catchment area** through afforestation and conservation
- **Restore natural inflow** by rehabilitating the feeder rivers
- **Promote sustainable tourism** around the lake and sanctuary
- **Preserve historical and cultural assets**, including temples and sports grounds

Did You Know?

- The lake's embankment, crafted in the **19th century**, is an engineering marvel made without modern machinery.
- If successfully restored, **Ramgarh Lake** could significantly **boost Jaipur's groundwater table** and act as a **climate resilience buffer** during dry spells.

Ramgarh Lake: A Symbol of Heritage and Hope

As work continues to breathe life back into this historic gem, **Ramgarh Lake stands as a reminder** of our intertwined relationship with nature, culture, and sustainable development. It is not just a water body—it is a **living chapter of Jaipur's history** and a beacon for **ecological renewal**.

GS Paper 2 – International Relation

4 US-Iran Nuclear Talks 2025: Strategic Shifts, Challenges, and the Trump Factor

Context: The **resumption of nuclear negotiations** between the **United States and Iran**—this time in **Muscat, Oman**—has caught many observers by surprise. Despite deep-seated **mutual distrust** and heightened tensions, including recent **US strikes against Iran-aligned Houthis**, both parties chose diplomacy over escalation.

While the talks are **officially "indirect"**, the very act of returning to the table marks a **strategic recalibration**, especially on Iran's side. This new chapter may indicate the beginning of a **more pragmatic phase** in a historically volatile relationship.

Iran's Strategic Realignment: A Nation Under Pressure

Generational Shift in Iranian Society:

With the **average age in Iran now around 32**, most citizens were **not alive during** the 1979 Islamic Revolution, the **Iran-Iraq War**, or the 1989 **succession of Ayatollah Khamenei**. This generational gap has created a **disconnect between rulers and the ruled**.

Younger Iranians are:

- **Less ideologically driven**
- Focused on **economic opportunity**, civil liberties, and global integration
- Driving **protests and reform movements**, often met with state suppression

This youth-led demand for **change** is exerting pressure on Iran's leadership to **rethink its long-held policies**.

Economic Distress and Sanctions Fatigue:

The Iranian economy remains crippled by:

- **High inflation and unemployment**
- Currency devaluation
- A need for **$100+ billion in foreign investment** for sustainable growth

Even leaders previously skeptical of the West, like **Supreme Leader Khamenei**, are now reportedly **open to US investment**—a major policy shift. Reform-minded President **Masoud Pezeshkian** and seasoned diplomat **Abbas Araghchi** support re-engagement with the global economy.

Internal Political Alignment:

Remarkably, even **hardline conservatives** are not blocking talks, reflecting a rare **political consensus** around the need for diplomacy. Reformists are leveraging the economic crisis to promote a **revival of the nuclear deal**.

Regional and Global Dynamics:

- The once-feared **Axis of Resistance** (Iran's proxy network) has lost its cohesion.
- **Saudi Arabia and Gulf states**, once opposed to the 2015 JCPOA, now favor **regional cooperation** and **economic integration**.
- **Russia**, preoccupied with Ukraine and wary of instability, is quietly pushing Iran toward **diplomatic solutions**.

- **China**, a key trade partner, has also urged Iran to **stabilize regional relations** for economic reasons.

Trump's Role: From Maximum Pressure to Strategic Leverage

A Tumultuous History of US-Iran Negotiations:

Iran's nuclear diplomacy began with the **E3 (UK, France, Germany)** in 2003, eventually including the **US in 2013**. Talks have often been influenced by **military threats** and shifting American administrations.

Fallout from Trump's 2018 Withdrawal

In 2018, **President Trump unilaterally exited** the Joint Comprehensive Plan of Action (JCPOA) and re-imposed crippling sanctions. This hardened Iran's position, leading to:

- **Uranium enrichment reaching 60%**, edging closer to weapons-grade
- Khamenei's "**no war, no talks**" doctrine
- Deep skepticism about future US commitments

The Soleimani Assassination: A Turning Point

The **US drone strike on Qassem Soleimani** in January 2020 shocked Iran's leadership, reinforcing the perception that the **Trump administration favored force over diplomacy**. Trust eroded significantly.

Biden's Cautious Engagement

Under **President Biden**, indirect negotiations resumed (Vienna, 2021–22). However, Iran remained non-committal, wary of another **policy reversal** if Trump returned to power—a concern that now feels prescient in 2025.

Prospects for a New Deal: Opportunities and Obstacles:

Where Interests Align:

Despite tensions, both parties have **overlapping objectives**:

- **Washington** wants to **prevent nuclear weaponization**.
- **Tehran** seeks **sanctions relief** and **economic recovery**.

Iran continues to emphasize that its nuclear program is **peaceful**, citing **Khamenei's religious fatwa against nuclear arms**.

Key Challenges and Red Lines:

The potential **stumbling blocks** include:

- US demands for limits on **ballistic missile programs**
- Iran's support for **regional proxy groups** (e.g., Hezbollah, Houthis)
- **Israeli opposition** to any form of compromise—Tel Aviv has even hinted at **military options**

Trump's Maximalist Strategy Returns:

Trump is known for starting negotiations with **extreme demands**, only to walk them back for strategic gains. This "**art of the deal**" approach could inject volatility, yet also open **paths to compromise**.

There's speculation that the US may not **enforce a rigid stance**, allowing room for **flexible agreements**—possibly involving **tiered sanctions relief** in exchange for **verifiable enrichment limits**.

Iran's Strategic Flexibility:

Iran could:

- Reduce support to less controllable proxies like the **Houthis**, who act independently

- Seek **economic cooperation** with Gulf states, diluting Israeli resistance
- Use regional goodwill to counterbalance any Western skepticism

Role of the Region and the Need for Isolation:

To succeed, negotiations must be **insulated from regional crises** in:

- **Gaza**
- **Syria**
- **Lebanon**

Any escalation in these arenas could **derail talks** and return the US-Iran dynamic to a **conflict trajectory**.

Conclusion: Cautious Optimism Amid Uncertainty

A **renewed US-Iran nuclear deal is within reach**, but it remains **fragile and conditional**. The evolving **generational, economic, and geopolitical landscape** has pushed Iran to the table. Trump's return—and his unpredictability—adds both **opportunity and risk**.

To navigate this complex moment, both sides must:

- Exercise **diplomatic creativity**
- Resist **external provocations**
- Focus on **shared strategic interests**

The stakes are high—not just for Washington and Tehran, but for the **entire Middle East and global non-proliferation regime**.

5 BatEchoMon: India's First Smart Bat Detection System

Context: In a groundbreaking development, the **Indian Institute for Human Settlements (IIHS)**, Bengaluru, has introduced **India's first automated bat detection and monitoring system — BatEchoMon**. This innovative system is poised to transform the way scientists study **urban bat populations**, allowing for real-time monitoring that once required months of manual effort.

What is BatEchoMon?

BatEchoMon stands for **"Bat Echolocation Monitoring"**, a pioneering initiative that combines **ecology, engineering, and artificial intelligence** to track and identify bat species through their echolocation calls.

This fully **automated, real-time system** was designed by **bat biologist Kadambari Deshpande** and **engineer Vedant Barje**, under the mentorship of **Jagdish Krishnaswamy**. It was developed as a part of the **Long-Term Urban Ecological Observatory** at the **School of Environment and Sustainability**, IIHS, Bengaluru.

How Does BatEchoMon Work?

BatEchoMon uses an intelligent mix of **hardware, software, and machine learning** to autonomously detect and analyze bat activity. Here's what powers it:

Key Components:

- **Ultrasonic Microphone** (modified **AudioMoth**): Captures high-frequency bat calls.
- **Raspberry Pi Microprocessor**: Processes and classifies sound data on-site.
- **Solar-Powered Battery**: Ensures sustainable, off-grid energy supply.
- **Wi-Fi Module**: For remote data transmission and cloud syncing.

Operational Details:

- Activates **automatically at sunset**
- Records **continuously throughout the night**
- Uses a **Convolutional Neural Network (CNN)** to:
    - **Detect bat calls** amid background noise
    - **Classify calls** based on frequency and structure

Outputs and Insights:

- **Spectrograms** (time vs. frequency plots)
- **Audio files** of bat calls
- **Species-specific data** on call timing, density, and behavior patterns

Why is BatEchoMon Important?

Revolutionizing Bat Research:

- Traditionally, bat call analysis was **labor-intensive** and delayed — now, **real-time detection** means faster insights and more efficient conservation.

Urban Biodiversity Monitoring:

With cities expanding rapidly, understanding **how bats adapt to urban environments** is crucial. Bats help control insect populations and pollinate plants, making them vital for **urban ecosystem health**.

A Tech-Driven Conservation Model:

- BatEchoMon is among the few globally that **integrate AI in wildlife monitoring**. It offers a **scalable solution** for developing nations looking to modernize biodiversity tracking without heavy infrastructure.

Looking Ahead: The Future of Bioacoustic Monitoring

The success of BatEchoMon could inspire **similar systems for monitoring birds, frogs, or even marine life**, using acoustic signatures and machine learning.

In addition, data from BatEchoMon can:

- **Support policy-making** in urban planning
- Enhance **biodiversity indexes**
- Enable **citizen science** through open-access bat call libraries

Quick Facts: BatEchoMon at a Glance

Feature	**Details**
Developed by	IIHS, Bengaluru
Core Tech	AudioMoth, Raspberry Pi, CNN algorithm
Power Source	Solar-powered battery
Function	Autonomous bat call detection and classification
Outputs	Spectrograms, audio files, statistical reports
Significance	India's first real-time bat monitoring system

Conclusion: A New Era for Indian Bat Science

BatEchoMon is not just a scientific tool — it's a leap toward **modern, AI-integrated wildlife conservation**. With rising interest in **bioacoustics** and **urban ecology**, this system places India at the forefront of **smart environmental monitoring**.

It also sets the stage for **collaborative, tech-enabled conservation strategies** in an increasingly urbanized world.

GS Paper 2 – Governance, Constitution, Polity, Social Justice

6 Mehul Choksi Arrested in Belgium: India Moves for Extradition in 13,500 Crore PNB Scam

Context: Mehul Choksi, a key figure in the massive **13,500 crore Punjab National Bank (PNB) fraud**, has been **arrested in Belgium**. India has officially **requested his extradition** to face charges. Choksi, who had been a **citizen of Antigua and Barbuda since 2018**, relocated to Belgium last year citing **cancer treatment**.

What's Next for Choksi?

India-Belgium Extradition Treaty:

India and Belgium share a long-standing **extradition treaty (since 1901)** based on the principle of **dual criminality**—the offence must be punishable in both nations. However, **political offences or claims of persecution** are exempt.

Legal Timeline:

India must **submit substantial evidence** within **two months**, or Belgium may be forced to **release Choksi**.

Agencies on the Case:

- Choksi's arrest was driven by coordinated efforts from the **CBI (Central Bureau of Investigation)** and the **ED (Enforcement Directorate)**. Both agencies are preparing a detailed case that aligns with **Belgian legal requirements**.

Mutual Legal Assistance Treaty:

- A **2020 Mutual Legal Assistance Treaty** between India and Belgium is expected to **ease cooperation** in legal procedures, including extradition.

Potential Legal Hurdles for India:

2021 Dominica Abduction Controversy:

- Choksi's legal team is likely to bring up the **alleged 2021 abduction** from Antigua to Dominica. Photos revealed him **bruised and injured**, raising **serious human rights concerns**.

Claims of Coerced Consent:

- His lawyers allege that he was **forced to sign** a return consent form under duress—an effort to **bypass Antigua's legal safeguards**. His **UK-based lawyer** maintains that this violated his **fundamental rights**.

Interpol's Red Corner Notice Withdrawal:

- In 2023, **Interpol revoked its Red Corner Notice** against Choksi, citing the **Dominica incident** and a **potentially unfair trial** in India.

Health and Prison Conditions:

- Choksi is expected to argue that **poor health**, **inadequate prison conditions**, and **possible human rights violations** in India render extradition **unsafe and unjust**.

Citizenship Concerns:

- Although arrested in Belgium, Choksi's **Antiguan citizenship** could pose complications. His legal team may argue that **Belgium must consult Antigua** before approving extradition to a **third country**.

Criminal Allegations Against Mehul Choksi:

Gitanjali Group Expansion:

- Coming from a family of **diamantaires**, Choksi expanded the **Gitanjali Group**, launching luxury jewellery outlets in India and overseas. He and his nephew, **Nirav Modi**, also invested heavily in **celebrity endorsements**, featuring stars like **Kate Winslet** and **Rosie Huntington-Whiteley**.

PNB Scam Modus Operandi:

- Between **2014 and 2017**, Choksi and Modi allegedly worked with **corrupt PNB officials** to issue fraudulent **Letters of Undertaking (LoUs)**. These LoUs were used to **obtain overseas credit** to fund their operations and luxury lifestyles.

Loan Defaults & Scam Discovery:

- The LoUs were repeatedly **rolled over** beyond the legal 90-day repayment window. Eventually, the **ballooning debt** led PNB to uncover the fraud and approach the **CBI**—by which time both men had fled India.

Fraud Scale & Fake Assets:

- Choksi is accused of defrauding PNB of **6,000+ crore**. The **ED seized assets** worth over **5,000 crore**, though lab tests revealed that many **diamonds were fake**. The total **current value** of his seized assets is estimated at **2,500 crore**.