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GS Paper 1: History,

TOPICS COVERED

24 March 2026

24Mar

Statue of Christopher Columbus installed on White House grounds  
व्हाइट हाउस परिसर में क्रिस्टोफर कोलंबस की प्रतिमा स्थापित

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**WASHINGTON**

**Statue of Christopher Columbus installed on White House grounds**



GS I: History

The White House installed on its grounds a statue of Christopher Columbus in a bid by Trump administration to reshape depictions of U.S. history. During the 2020 Black Lives Matter protests, many U.S. cities took down statues of the Italian navigator, whose voyages paved the way for Europe's conquests of the Americas. REUTERS

**24Mar. Statue of Christopher Columbus installed on White House grounds  
व्हाइट हाउस परिसर में क्रिस्टोफर कोलंबस की प्रतिमा स्थापित**

- The **White House** installed on its grounds a statue of **Christopher Columbus** in a bid by the **Trump administration** to reshape depictions of **U.S. history**.  
व्हाइट हाउस ने अपने परिसर में क्रिस्टोफर कोलंबस की प्रतिमा स्थापित की, जो ट्रंप प्रशासन द्वारा अमेरिकी इतिहास की व्याख्या को बदलने के प्रयास का हिस्सा है।
- During the **2020 Black Lives Matter protests**, many **U.S. cities** took down statues of the **Italian navigator**, whose voyages paved the way for **Europe's conquests of the Americas**.

2020 के ब्लैक लाइव्स मैटर आंदोलन के दौरान, कई अमेरिकी

शहरों ने इटालियन नाविक की प्रतिमाओं को हटा दिया था, जिनकी यात्राओं ने यूरोप द्वारा अमेरिका पर विजय का मार्ग प्रशस्त किया।

**GS Paper 1: Geography**

**TOPICS COVERED**

**24 March 2026**

<b>24Mar</b>	<b>Slovenia headed towards coalition talks after tight election outcome</b> करीबी चुनाव परिणाम के बाद स्लोवेनिया गठबंधन वार्ता की ओर बढ़ा
<b>24Mar</b>	<b>Sudan, South Sudan face devastating humanitarian crisis as conflicts rage</b> सूडान और दक्षिण सूडान भीषण मानवीय संकट का सामना कर रहे हैं क्योंकि संघर्ष जारी है

**LJUBLJANA**

**Slovenia headed towards coalition talks after tight election outcome**



GS I: Geography Mapping

Slovenia's President urged parties to start talks on forming a new government after a parliamentary poll ended with no winner. Prime Minister Robert Golob's Freedom Movement party (28.6%) and the Slovenian Democratic Party led by ex-Prime Minister Janez Jansa (28.2%) failed to secure enough seats needed for a majority. AP

**24Mar. Slovenia headed towards coalition talks after tight election outcome**  
करीबी चुनाव परिणाम के बाद स्लोवेनिया गठबंधन वार्ता की ओर बढ़ा

- Slovenia's President** urged parties to start talks on forming a new **government** after a **parliamentary poll** ended with no winner.  
स्लोवेनिया के राष्ट्रपति ने दलों से नई सरकार बनाने के लिए बातचीत शुरू करने का आग्रह किया, क्योंकि संसदीय चुनाव बिना किसी स्पष्ट विजेता के समाप्त हुआ।
- Prime Minister Robert Golob's Freedom Movement party (28.6%)** and the **Slovenian Democratic Party** led by ex-Prime Minister **Janez Jansa (28.2%)** failed to secure enough seats needed for a **majority**.

प्रधानमंत्री रॉबर्ट गोलोब की फ्रीडम मूवमेंट पार्टी (28.6%) और पूर्व प्रधानमंत्री जानेज जांसा (28.2%) के नेतृत्व वाली स्लोवेनियन डेमोक्रेटिक पार्टी बहुमत के लिए आवश्यक पर्याप्त सीटें हासिल करने में विफल रहीं।



# Sudan, South Sudan face devastating humanitarian crisis as conflicts rage

War between SAF and RSF in Darfur and Kordofan of Sudan have left thousands killed and millions displaced; South Sudan stares at a civil war as govt. and opposition forces are locked in a fight; these conflicts are marked by mass killings, fragmentation of territory, and international complicity

GS I: Geography  
NEWS ANALYSIS

Sharmada Venkatasubramanian

With over 12 million people displaced, famine spreading fast, the U.S. declaring the killings in western Sudan a genocide, the war in this country has become the biggest humanitarian crisis in the world. What began as a struggle for power between two generals in April 2023 has escalated into a war of mass killings, fragmentation of territory, and dissolution of state in Sudan.

To its south, South Sudan, the world's newest country, is again on the brink of civil war. The fragile peace agreement reached in 2018 is now broken as a renewed conflict in Jonglei State has displaced over 2,80,000 people.

In Sudan, the conflict between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF) has resulted in an estimated 150,000 to 400,000 deaths, and now it has caused famine and ethnic violence in Darfur.

Together, these conflicts have now become a regional emergency marked by mass killings, fragmentation of territory, and international complicity.

**War in Sudan**  
The conflict in Sudan arose



A file photo of a camp of displaced people who fled El Fasher after the city fell to RSF in October 2025. The UN described the RSF takeover of the city as a "horror movie" with over 6,000 lives lost. AFP

after a military coup that toppled a transitional civilian government in 2021, pitting two generals against each other in a power struggle. General Abdel Fattah al-Burhan heads the SAF and is backed by Egypt and Iran. General Mohamed Hamdan Dagalo, also known as Hemedti, heads the RSF and is backed by the United Arab Emirates and has roots in the Janjaweed militias in Darfur.

Sudan now appears to be a de facto divided country, with competing governments controlling different territories and each having their own networks, resources and external backers.

**Darfur 'horror'**  
The worst aspect of this

conflict is taking place in Darfur. Thousands of people have fled the state in the hopes of accessing humanitarian aid and finding safety.

The RSF is responsible for attacks on non-Arab tribes such as the Masalit, Fur, and Zaghawa. In January this year, the U.S. State Department declared that the RSF and their Arab allies commit genocide against non-Arab tribes. Their main aim is to cleanse the area for total Arab control.

The capture of El Fasher, the capital city of North Darfur, in October 2025 was a significant development in the Darfur conflict, where after an 18-month siege, the RSF entered the city. The United Nations described the

scene as a "horror movie" with over 6,000 lives lost.

As of March 2026, the conflict is concentrated mainly in the Kordofan region, an area connecting the west and the centre of Sudan.

The RSF is trying to secure the route by attacking towns surrounding the strategic city of El-Obeid. The city is the key to connecting the region of Darfur to the rest of the country.

On the other hand, the SAF is trying to hold strategic positions, raising the likelihood of intensifying conflict in the region.

**Humanitarian crisis**  
The humanitarian crisis in Sudan has reached a critical threshold. They are currently facing the largest

hunger crisis in the world, in addition to intense famine, with the condition rapidly deteriorating in Darfur and other conflict-ridden regions. In addition, the healthcare system in this region is barely functioning with hospitals destroyed or abandoned and aid blocked.

Moreover, Sudan has witnessed an extreme displacement crisis, both internally and across borders, as a result of this war. According to UN Refugee Agency (UNHCR), since the beginning of the conflict in April 2023, more than 12 million people have been displaced, and over 4 million, mostly women and children, have been displaced to neighbouring countries.

**Crisis in South Sudan**

In South Sudan, the most intense conflict seems to be surrounding the town of Akobo, which lies close to the Ethiopian border. Fighting between President Salva Kiir's government and the opposition forces threatens to push South Sudan to the brink of another round of civil war.

Earlier this month, the government forces issued a mass evacuation order for Akobo, in preparation for a military operation against the opposition forces in the region. The order led to a mass exodus of people from Akobo. Thousands were forced to flee. The town had been a haven for

tens of thousands of internally displaced people who had been forced to flee an earlier fighting in Jonglei State.

What is increasingly clear is that the crises in Sudan and South Sudan are no longer independent of each other. Conflict in Sudan is resulting in refugees crossing borders, and conflict in South Sudan is resulting in new patterns of refugee movements.

The situation is further deteriorating in the region, because borders are being closed off due to attacks from Chad, while Egypt is increasing the deportation of Sudanese asylum-seekers. This is limiting safe havens for civilians seeking refuge.

**What now?**

Despite several rounds of talks between all parties involved, there seems to be no immediate breakthrough. Talks including external actors aimed at ceasefire have proved inefficient. On the contrary, foreign interventions are aiding in sustaining the conflict by strengthening both parties militarily.

The war in Sudan seems to be escalating with new frontlines emerging.

The war in South Sudan seems to be escalating too, as political tensions spill over into armed conflict. Civilians face a dead-end with escalating conflicts, closed-off borders and waning humanitarian aid.

## 24Mar. Sudan, South Sudan face devastating humanitarian crisis as conflicts rage

सूडान और दक्षिण सूडान भीषण मानवीय संकट का सामना कर रहे हैं क्योंकि संघर्ष जारी है

- War between **SAF and RSF** in **Darfur and Kordofan of Sudan** have left thousands killed and millions displaced; **South Sudan** stares at a **civil war** as govt. and opposition forces are locked in a fight; these conflicts are marked by **mass killings, fragmentation of territory, and international complicity**.

सूडान के दारफुर और कोर्डोफान में **SAF और RSF** के बीच युद्ध में हजारों लोग मारे गए और लाखों विस्थापित हुए; **दक्षिण सूडान** गृहयुद्ध के कगार पर है क्योंकि सरकार और विपक्षी बलों के बीच लड़ाई जारी है; ये संघर्ष **सामूहिक हत्याओं, क्षेत्रीय विभाजन और अंतरराष्ट्रीय मिलीभगत** से चिह्नित हैं।

- With over **12 million people displaced**, famine spreading fast, the **U.S.** declaring the killings in western Sudan a **genocide**, the war in this country has become the biggest **humanitarian crisis** in the world.

**12 मिलियन से अधिक लोग विस्थापित**, तेजी से फैलते अकाल, और **अमेरिका** द्वारा पश्चिमी सूडान की हत्याओं को **नरसंहार** घोषित करने के साथ, यह युद्ध दुनिया का सबसे बड़ा **मानवीय संकट** बन गया है।

- What began as a struggle for power between two generals in **April 2023** has escalated into a war of **mass killings, fragmentation of territory, and dissolution of state** in Sudan.

**अप्रैल 2023** में दो जनरलों के बीच सत्ता संघर्ष के रूप में शुरू हुआ यह विवाद अब सूडान में **सामूहिक हत्याओं, क्षेत्रीय विभाजन और राज्य विघटन** के युद्ध में बदल गया है।

- To its south, **South Sudan**, the world's newest country, is again on the brink of **civil war**. इसके दक्षिण में, दुनिया का सबसे नया देश **दक्षिण सूडान** फिर से **गृहयुद्ध** के कगार पर है।



- The fragile peace agreement reached in **2018** is now broken as a renewed conflict in **Jonglei State** has displaced over **2,80,000 people**.  
2018 में हुआ नाजुक शांति समझौता अब टूट गया है, क्योंकि **जोंगलेई राज्य** में नए संघर्ष ने **2,80,000 से अधिक लोगों** को विस्थापित कर दिया है।
- In Sudan, the conflict between the **Sudanese Armed Forces (SAF)** and the **Rapid Support Forces (RSF)** has resulted in an estimated **150,000 to 400,000 deaths**, and now it has caused **famine and ethnic violence in Darfur**.  
सूडान में **सूडानी सशस्त्र बल (SAF)** और **रैपिड सपोर्ट फोर्स (RSF)** के बीच संघर्ष में अनुमानित **1.5 लाख से 4 लाख मौतें** हुई हैं और अब इसने **दारफुर में अकाल और जातीय हिंसा** को जन्म दिया है।
- Together, these conflicts have now become a **regional emergency** marked by **mass killings, fragmentation of territory, and international complicity**.  
ये सभी संघर्ष मिलकर अब एक **क्षेत्रीय आपात स्थिति** बन गए हैं, जो **सामूहिक हत्याओं, क्षेत्रीय विभाजन और अंतरराष्ट्रीय मिलीभगत** से चिह्नित है।

## War in Sudan सूडान में युद्ध

- The conflict in Sudan arose after a **military coup** that toppled a **transitional civilian government** in **2021**, pitting two generals against each other in a power struggle.  
सूडान में यह संघर्ष **2021** में एक **सैन्य तख्तापलट** के बाद शुरू हुआ, जिसने **अंतरिम नागरिक सरकार** को गिरा दिया और दो जनरलों को सत्ता संघर्ष में आमने-सामने ला दिया।
- **General Abdel Fattah al-Burhan** heads the **SAF** and is backed by **Egypt and Iran**.  
जनरल **अब्देल फत्ताह अल-बुरहान** **SAF** के प्रमुख हैं और उन्हें **मिस्र और ईरान** का समर्थन प्राप्त है।
- **General Mohamed Hamdan Dagalo (Hemedti)** heads the **RSF** and is backed by the **United Arab Emirates** and has roots in the **Janjaweed militias** in Darfur.  
जनरल **मोहम्मद हमदान दगालो (हेमेदती)** **RSF** के प्रमुख हैं और उन्हें **संयुक्त अरब अमीरात** का समर्थन प्राप्त है तथा उनकी जड़ें **दारफुर की जांजावीद मिलिशिया** में हैं।
- Sudan now appears to be a **de facto divided country**, with competing governments controlling different territories and each having their own networks, resources and external backers.  
सूडान अब एक **वास्तविक रूप से विभाजित देश** प्रतीत होता है, जहां अलग-अलग क्षेत्रों पर अलग-अलग सरकारें नियंत्रण कर रही हैं और उनके अपने नेटवर्क, संसाधन और बाहरी समर्थक हैं।

## Darfur 'horror' दारफुर 'भयावहता'

- The worst aspect of this conflict is taking place in **Darfur**.  
इस संघर्ष का सबसे बुरा पहलू **दारफुर** में देखा जा रहा है।
- Thousands of people have fled the state in the hopes of accessing **humanitarian aid** and finding **safety**.  
हजारों लोग **मानवीय सहायता** पाने और **सुरक्षा** की तलाश में राज्य से भाग गए हैं।
- The **RSF** is responsible for attacks on **non-Arab tribes** such as the **Masalit, Fur, and Zaghawa**.  
**RSF** **मसलित, फुर और ज़घावा** जैसी **गैर-अरब जनजातियों** पर हमलों के लिए जिम्मेदार है।
- In **January this year**, the **U.S. State Department** declared that the **RSF and their Arab allies** commit **genocide** against non-Arab tribes.  
**इस वर्ष जनवरी** में, **अमेरिकी विदेश विभाग** ने घोषणा की कि **RSF और उसके अरब सहयोगी** गैर-अरब जनजातियों के खिलाफ **नरसंहार** कर रहे हैं।
- Their main aim is to **cleanse the area** for total **Arab control**.  
उनका मुख्य उद्देश्य क्षेत्र को पूरी तरह से **अरब नियंत्रण** के लिए **साफ करना** है।
- The capture of **El Fasher**, the capital city of **North Darfur**, in **October 2025** was a significant development in the Darfur conflict, where after an **18-month siege**, the **RSF** entered the city.  
**अक्टूबर 2025** में **उत्तर दारफुर** की राजधानी **एल फाशर** पर कब्जा एक महत्वपूर्ण घटना थी, जहां **18 महीने की घेराबंदी** के बाद **RSF** शहर में प्रवेश कर गया।



- The **United Nations** described the scene as a “**horror movie**” with over **6,000 lives lost**.  
संयुक्त राष्ट्र ने इस दृश्य को “हॉरर मूवी” जैसा बताया, जिसमें 6,000 से अधिक लोगों की जान गई।
- As of **March 2026**, the conflict is concentrated mainly in the **Kordofan region**, an area connecting the west and the centre of Sudan.  
मार्च 2026 तक, संघर्ष मुख्य रूप से कोर्डोफान क्षेत्र में केंद्रित है, जो सूडान के पश्चिम और केंद्र को जोड़ता है।
- The **RSF** is trying to secure the route by attacking towns surrounding the strategic city of **El-Obeid**.  
RSF रणनीतिक शहर एल-ओबैद के आसपास के कस्बों पर हमला करके मार्ग सुरक्षित करने की कोशिश कर रहा है।
- The city is the key to connecting the region of **Darfur** to the rest of the country.  
यह शहर दारफुर को देश के बाकी हिस्सों से जोड़ने की कुंजी है।
- On the other hand, the **SAF** is trying to hold strategic positions, raising the likelihood of intensifying conflict in the region.  
दूसरी ओर, SAF रणनीतिक स्थानों को बनाए रखने की कोशिश कर रहा है, जिससे क्षेत्र में संघर्ष के और तेज होने की संभावना बढ़ रही है।

## Humanitarian crisis मानवीय संकट

- The humanitarian crisis in Sudan has reached a **critical threshold**.  
सूडान में मानवीय संकट गंभीर स्तर तक पहुंच गया है।
- They are currently facing the **largest hunger crisis in the world**, in addition to intense **famine**, with the condition rapidly deteriorating in **Darfur** and other conflict-ridden regions.  
वे वर्तमान में दुनिया के सबसे बड़े भूख संकट का सामना कर रहे हैं, साथ ही गंभीर अकाल, और दारफुर व अन्य संघर्षग्रस्त क्षेत्रों में स्थिति तेजी से बिगड़ रही है।
- In addition, the **healthcare system** in this region is barely functioning with hospitals destroyed or abandoned and **aid blocked**.  
इसके अलावा, इस क्षेत्र का स्वास्थ्य तंत्र मुश्किल से काम कर रहा है क्योंकि अस्पताल नष्ट या छोड़ दिए गए हैं और सहायता अवरुद्ध है।
- Moreover, Sudan has witnessed an extreme **displacement crisis**, both internally and across borders, as a result of this war.  
इसके अलावा, इस युद्ध के कारण सूडान में आंतरिक और सीमा पार दोनों स्तरों पर गंभीर विस्थापन संकट देखा गया है।
- According to **UNHCR**, since the beginning of the conflict in **April 2023**, more than **12 million people** have been displaced, and over **4 million**, mostly women and children, have been displaced to neighbouring countries.  
UNHCR के अनुसार, अप्रैल 2023 से अब तक 12 मिलियन से अधिक लोग विस्थापित हुए हैं, जिनमें से 4 मिलियन से अधिक, ज्यादातर महिलाएं और बच्चे, पड़ोसी देशों में चले गए हैं।

## Crisis in South Sudan दक्षिण सूडान में संकट

- In **South Sudan**, the most intense conflict seems to be surrounding the town of **Akobo**, which lies close to the **Ethiopian border**.  
दक्षिण सूडान में सबसे तीव्र संघर्ष अकोबो शहर के आसपास हो रहा है, जो इथियोपिया सीमा के पास स्थित है।
- Fighting between **President Salva Kiir's government** and the **opposition forces** threatens to push South Sudan to the brink of another round of **civil war**.  
राष्ट्रपति सलवा कीर की सरकार और विपक्षी बलों के बीच लड़ाई दक्षिण सूडान को फिर से गृहयुद्ध के कगार पर ले जा रही है।
- Earlier this month, the government forces issued a **mass evacuation order** for **Akobo**, in preparation for a military operation against the opposition forces in the region.  
इस महीने की शुरुआत में, सरकारी बलों ने अकोबो के लिए सामूहिक निकासी आदेश जारी किया, ताकि क्षेत्र में विपक्षी बलों के खिलाफ सैन्य अभियान चलाया जा सके।



- The order led to a **mass exodus** of people from Akobo.  
इस आदेश के कारण अकोबो से लोगों का **बड़ा पलायन** हुआ।
- Thousands were forced to flee.  
हजारों लोगों को भागने के लिए मजबूर होना पड़ा।
- The town had been a **haven** for tens of thousands of **internally displaced people** who had been forced to flee an earlier fighting in **Jonglei State**.  
यह शहर पहले **जोंगलेई राज्य** में संघर्ष से भागे हुए हजारों **आंतरिक विस्थापित लोगों** के लिए एक **सुरक्षित स्थान** था।
- What is increasingly clear is that the crises in **Sudan and South Sudan** are no longer independent of each other.  
अब यह स्पष्ट हो रहा है कि **सूडान और दक्षिण सूडान** के संकट एक-दूसरे से अलग नहीं हैं।
- Conflict in Sudan is resulting in **refugees crossing borders**, and conflict in South Sudan is resulting in new patterns of **refugee movements**.  
सूडान का संघर्ष **शरणार्थियों के सीमा पार जाने** का कारण बन रहा है, जबकि दक्षिण सूडान का संघर्ष **शरणार्थी आंदोलनों के नए पैटर्न** उत्पन्न कर रहा है।
- The situation is further deteriorating in the region, because **borders are being closed off** due to attacks from **Chad**, while **Egypt** is increasing the deportation of **Sudanese asylum-seekers**.  
क्षेत्र में स्थिति और बिगड़ रही है क्योंकि **चाड** के हमलों के कारण **सीमाएं बंद** की जा रही हैं, जबकि **मिस्र** **सूडानी शरणार्थियों** की वापसी बढ़ा रहा है।
- This is limiting **safe havens** for civilians seeking refuge.  
इससे शरण लेने वाले नागरिकों के लिए **सुरक्षित स्थान** सीमित हो रहे हैं।

#### What now?

#### अब क्या?

- Despite several rounds of talks between all parties involved, there seems to be no immediate **breakthrough**.  
सभी पक्षों के बीच कई दौर की बातचीत के बावजूद कोई त्वरित **समाधान** नजर नहीं आ रहा है।
- Talks including external actors aimed at **ceasefire** have proved inefficient.  
बाहरी पक्षों के साथ **युद्धविराम** के लिए हुई बातचीत भी प्रभावी नहीं रही है।
- On the contrary, **foreign interventions** are aiding in sustaining the conflict by strengthening both parties militarily.  
इसके विपरीत, **विदेशी हस्तक्षेप** दोनों पक्षों को सैन्य रूप से मजबूत करके संघर्ष को बनाए रखने में मदद कर रहे हैं।
- The war in Sudan seems to be escalating with new **frontlines** emerging.  
सूडान में युद्ध नए **मोर्चों** के साथ और बढ़ता हुआ दिखाई दे रहा है।
- The war in South Sudan seems to be escalating too, as **political tensions** spill over into **armed conflict**.  
दक्षिण सूडान में भी युद्ध बढ़ता दिख रहा है, क्योंकि **राजनीतिक तनाव सशस्त्र संघर्ष** में बदल रहा है।
- Civilians face a **dead-end** with escalating conflicts, **closed-off borders** and waning **humanitarian aid**.  
नागरिक बढ़ते संघर्ष, **बंद सीमाओं** और घटती **मानवीय सहायता** के बीच **गतिरोध** का सामना कर रहे हैं।

<b>GS Paper II: Polity,</b>	
<b>TOPICS COVERED</b>	<b>24 March 2026</b>
<b>24Mar</b>	<b>Centre mulls delimitation based on 2011 Census to implement women's quota</b> केंद्र 2011 की जनगणना के आधार पर परिसीमन कर महिला आरक्षण लागू करने पर विचार कर रहा है
<b>24Mar</b>	<b>Garo district council bars non-tribals from contesting polls after over seven decades</b>



	गारो जिला परिषद ने सात दशकों बाद गैर-जनजातियों को चुनाव लड़ने से रोका
24Mar	BJP seal on EC letter sparks row in Kerala केरल में EC पत्र पर BJP की मुहर से विवाद
24Mar	BJP, Congress spar over fuel prices as LS debates Finance Bill लोकसभा में वित्त विधेयक पर बहस के दौरान ईंधन कीमतों को लेकर BJP और कांग्रेस में टकराव
24Mar	SEBI board okays conflict of interest panel's key recommendations सेबी बोर्ड ने हितों के टकराव पैनल की प्रमुख सिफारिशों को मंजूरी दी

## Centre mulls delimitation based on 2011 Census to implement women's quota

GS II: Polity

Nistula Hebbar  
NEW DELHI

The Union government on Monday indicated that it would bring an amendment Bill proposing a delimitation exercise based on the 2011 Census, to ensure the implementation of the Women's Reservation Act, 2023 ahead of the 2029 Lok Sabha election. Under the proposed amendments, the number of Lok Sabha seats will increase from 543 to 816, with 273 seats reserved for women. The amendments could be brought in the ongoing Budget Session or in a Special Session called for the purpose.

Though the draft of the amendments are yet to be circulated, it is understood by sources that care would be taken so that the existing proportion of seats will be maintained for all States, amid concerns that States that had showed success in population programmes would lose out on representation vis a vis more populous States. Southern States had in particular expressed this concern. Overall, each State is likely to see a 50% rise in seats, but the pro rata basis would be maintained.

As per Article 82 of the Constitution, the next delimitation exercise was to be done based on the first Census after 2026, but these amendments could mean that the 2011 Census



If the Bill is passed, seats in Lok Sabha will increase to 816, out of which 273 will be reserved for women. PTI

data will be applied and the remaking of constituencies can proceed without the current Census being concluded. The proposals may include the expansion of State Assemblies as well.

**Extensive consultations**  
The Act originally passed in September 2023 envisaged the conduct of the Decadal Census, followed by delimitation of constituencies. The 2021 Decadal Census, which got delayed because of COVID, is beginning next month. As per the current timelines, implementation of the Act could be pushed beyond 2030. However, by bringing in fresh amendments, the government is now seeking to bring forward the implementation of the Act.

Government managers, including Union Home Minister Amit Shah, met with leaders of several Opposi-

tion parties on Monday, including the Nationalist Congress Party (SP)'s Supriya Sule, YSR Congress Party's P.V. Midhun Reddy, the All India Majlis-e-Ittehadul Muslimeen's Asaduddin Owaisi and the Shiv Sena (UBT)'s Arvind Sawant, among others. The Trinamool Congress and the Left skipped the meeting. A separate meeting of NDA partners was held later on Monday evening. The government managers had consulted the Congress and the Samajwadi Party earlier. The Congress will hold a meeting of Opposition floor leaders on Tuesday morning to go through the proposals put forward by the government.

"The amendments will require a two-thirds majority of both Houses, which is why extensive consultations are being held with the Opposition," said a government source.

### 24Mar. Centre mulls delimitation based on 2011 Census to implement women's quota

केंद्र 2011 की जनगणना के आधार पर परिसीमन कर महिला आरक्षण लागू करने पर विचार कर रहा है

- The Union government on Monday indicated that it would bring an amendment Bill proposing a delimitation exercise based on the 2011 Census, to ensure the implementation of the Women's Reservation Act, 2023 ahead of the 2029 Lok Sabha election.

केंद्र सरकार ने सोमवार को संकेत दिया कि वह संशोधन विधेयक लाएगी, जिसमें 2011 की जनगणना के आधार पर परिसीमन प्रक्रिया का प्रस्ताव होगा, ताकि महिला आरक्षण अधिनियम, 2023 को 2029 लोकसभा चुनाव से पहले लागू किया जा सके।

- Under the proposed amendments, the number of Lok Sabha seats will increase from 543 to 816, with 273 seats reserved for women.

प्रस्तावित संशोधनों के तहत लोकसभा सीटों की संख्या 543 से बढ़कर 816 हो जाएगी, जिसमें 273 सीटें महिलाओं के लिए आरक्षित होंगी।

- The amendments could be brought in the ongoing Budget Session or in a Special Session called for the purpose.

ये संशोधन वर्तमान बजट सत्र में या इस उद्देश्य के लिए बुलाए गए विशेष सत्र में लाए जा सकते हैं।

- Though the draft of the amendments are yet to be circulated, it is understood by sources that care would be taken so that the existing proportion of seats will be maintained for all States, amid concerns that States that had

shown success in population programmes would lose out on representation vis a vis more populous States.

हालांकि संशोधनों का मसौदा अभी तक प्रसारित नहीं किया गया है, लेकिन सूत्रों के अनुसार यह सुनिश्चित करने के लिए सावधानी बरती जाएगी कि सभी राज्यों के लिए सीटों का वर्तमान अनुपात बना रहे, क्योंकि यह चिंता है कि जनसंख्या नियंत्रण कार्यक्रमों में सफल राज्यों को अधिक जनसंख्या वाले राज्यों की तुलना में प्रतिनिधित्व में नुकसान हो सकता है।

- Southern States had in particular expressed this concern. दक्षिणी राज्यों ने विशेष रूप से यह चिंता व्यक्त की थी।



- Overall, each State is likely to see a **50% rise in seats**, but the **pro rata basis** would be maintained.  
कुल मिलाकर, प्रत्येक राज्य में सीटों में **50% की वृद्धि** होने की संभावना है, लेकिन **अनुपातिक आधार (प्रो-राटा)** बनाए रखा जाएगा।
- As per **Article 82 of the Constitution**, the next delimitation exercise was to be done based on the first Census after **2026**, but these amendments could mean that the **2011 Census data** will be applied and the remaking of constituencies can proceed without the current Census being concluded.  
**संविधान के अनुच्छेद 82** के अनुसार अगला परिसीमन **2026 के बाद पहली जनगणना** के आधार पर होना था, लेकिन इन संशोधनों का मतलब यह हो सकता है कि **2011 की जनगणना के आंकड़ों** को लागू किया जाएगा और वर्तमान जनगणना पूरी हुए बिना ही निर्वाचन क्षेत्रों का पुनर्निर्धारण किया जा सकेगा।
- The proposals may include the expansion of **State Assemblies** as well.  
इन प्रस्तावों में **राज्य विधानसभाओं** के विस्तार को भी शामिल किया जा सकता है।

## Extensive consultations

### व्यापक परामर्श

- The Act originally passed in **September 2023** envisaged the conduct of the **Decadal Census**, followed by delimitation of constituencies.  
यह अधिनियम मूल रूप से **सितंबर 2023** में पारित हुआ था, जिसमें **दशकीय जनगणना** के बाद निर्वाचन क्षेत्रों के परिसीमन की परिकल्पना की गई थी।
- The **2021 Decadal Census**, which got delayed because of **COVID**, is beginning next month.  
**2021 की दशकीय जनगणना**, जो **COVID** के कारण विलंबित हुई थी, अगले महीने शुरू हो रही है।
- As per the current timelines, implementation of the Act could be pushed beyond **2030**.  
वर्तमान समयसीमा के अनुसार, इस अधिनियम का कार्यान्वयन **2030 के बाद** तक टल सकता है।
- However, by bringing in fresh amendments, the government is now seeking to bring forward the implementation of the Act.  
हालांकि, नए संशोधन लाकर सरकार अब इस अधिनियम के कार्यान्वयन को जल्द करने का प्रयास कर रही है।
- Government managers, including **Union Home Minister Amit Shah**, met with leaders of several **Opposition parties** on Monday, including the **Nationalist Congress Party (SP)'s Supriya Sule**, **YSR Congress Party's P.V. Midhun Reddy**, the **All India Majlis-e-Ittehadul Muslimeen's Asaduddin Owaisi** and the **Shiv Sena (UBT)'s Arvind Sawant**, among others.  
सरकारी प्रबंधकों, जिनमें **केंद्रीय गृह मंत्री अमित शाह** शामिल थे, ने सोमवार को कई **विपक्षी दलों** के नेताओं से मुलाकात की, जिनमें **एनसीपी (एसपी) की सुप्रिया सुले**, **वाईएसआर कांग्रेस के पी.वी. मिधुन रेड्डी**, **एआईएमआईएम के असदुद्दीन ओवैसी** और **शिवसेना (यूबीटी) के अरविंद सावंत** शामिल थे।
- The **Trinamool Congress** and the **Left** skipped the meeting.  
**तृणमूल कांग्रेस** और **वाम दलों** ने बैठक में भाग नहीं लिया।
- A separate meeting of **NDA partners** was held later on Monday evening.  
सोमवार शाम को **एनडीए सहयोगियों** की एक अलग बैठक आयोजित की गई।
- The government managers had consulted the **Congress** and the **Samajwadi Party** earlier.  
सरकारी प्रबंधकों ने पहले ही **कांग्रेस** और **समाजवादी पार्टी** से परामर्श किया था।
- The Congress will hold a meeting of **Opposition floor leaders** on Tuesday morning to go through the proposals put forward by the government.  
कांग्रेस मंगलवार सुबह **विपक्षी फ्लोर नेताओं** की बैठक करेगी ताकि सरकार द्वारा प्रस्तुत प्रस्तावों की समीक्षा की जा सके।
- "The amendments will require a **two-thirds majority** of both Houses, which is why extensive consultations are being held with the Opposition," said a government source.  
"इन संशोधनों के लिए दोनों सदनों में **दो-तिहाई बहुमत** की आवश्यकता होगी, यही कारण है कि विपक्ष के साथ व्यापक परामर्श किया जा रहा है," एक सरकारी स्रोत ने कहा।



# Garo district council bars non-tribals from contesting polls after over seven decades

GS II: Polity  
Press Trust of India  
SHILLONG

Amidst protests over non-tribal participation in a tribal council election in Meghalaya, the Garo Hills Autonomous District Council (GHADC) on Monday approved a key amendment mandating that only Scheduled Tribe members can contest the polls, effectively ending the participation of non-tribals after over seven decades, officials said.

The move follows weeks of unrest and ethnic tensions in parts of Garo Hills.

Two persons died in protests against the participation of non-tribals in the council elections.

## Political instability

The situation was further compounded by political instability within the GHADC, even as pressure mounted on the government to address the longstanding demand for restricting electoral participation to tribal communities.

Following the unrest, the State government had deferred the elections scheduled for April 10 and later decided to extend the tenure of the council by six months to allow the new ex-



Chief Minister Conrad Sangma termed the council resolution a 'historic milestone'.

ecutive committee to introduce amendments to the rules in line with public demand.

Chief Minister Conrad K. Sangma termed the council resolution a "historic milestone". "Today is a special session of the district council. The House has passed a resolution that will be remembered in history, making it mandatory for any candidate contesting the council elections to possess a Scheduled Tribe certificate," he said while addressing a gathering in front of the National People's Party office in Tura.

The GHADC was constituted under the Sixth Schedule of the Constitution to safeguard the rights and self-governance of tribal communities.

जनजातीय समुदायों तक ही चुनावी भागीदारी सीमित करने की लंबे समय से चली आ रही मांग को पूरा करने का दबाव बढ़ता गया।

- Following the unrest, the **State government** had deferred the elections scheduled for **April 10** and later decided to extend the tenure of the council by **six months** to allow the new executive committee to introduce amendments to the rules in line with public demand. अशांति के बाद, **राज्य सरकार** ने **10 अप्रैल** को निर्धारित चुनावों को स्थगित कर दिया और बाद में परिषद का कार्यकाल **छह महीने** बढ़ाने का निर्णय लिया, ताकि नई कार्यकारी समिति जन मांग के अनुरूप नियमों में संशोधन कर सके।
- **Chief Minister Conrad K. Sangma** termed the council resolution a "**historic milestone**". **मुख्यमंत्री कॉनराड के. संगमा** ने परिषद के इस प्रस्ताव को "**ऐतिहासिक मील का पत्थर**" बताया।
- "Today is a special session of the district council. "आज जिला परिषद का एक विशेष सत्र है।
- The House has passed a resolution that will be remembered in history, making it mandatory for any candidate contesting the council elections to possess a **Scheduled Tribe certificate**," he said while addressing a gathering in front of the **National People's Party** office in Tura.

## 24Mar. Garo district council bars non-tribals from contesting polls after over seven decades

गारो जिला परिषद ने सात दशकों बाद गैर-जनजातियों को चुनाव लड़ने से रोका

• Amidst protests over **non-tribal participation** in a tribal council election in **Meghalaya**, the **Garo Hills Autonomous District Council (GHADC)** on Monday approved a key **amendment** mandating that only **Scheduled Tribe members** can contest the polls, effectively ending the participation of non-tribals after over seven decades, officials said.

मेघालय में जनजातीय परिषद चुनाव में गैर-जनजातीय भागीदारी को लेकर विरोध के बीच, गारो हिल्स स्वायत्त जिला परिषद (GHADC) ने सोमवार को एक महत्वपूर्ण संशोधन को मंजूरी दी, जिसमें केवल अनुसूचित जनजाति के सदस्य ही चुनाव लड़ सकेंगे, जिससे सात दशकों से अधिक समय बाद गैर-जनजातियों की भागीदारी समाप्त हो गई, अधिकारियों ने कहा।

• The move follows weeks of unrest and **ethnic tensions** in parts of **Garo Hills**.

यह कदम गारो हिल्स के कुछ हिस्सों में कई हफ्तों से चल रहे अशांति और **जातीय तनाव** के बाद उठाया गया है।

• Two persons died in protests against the participation of non-tribals in the council elections. परिषद चुनावों में गैर-जनजातियों की भागीदारी के विरोध में हुए प्रदर्शनों में दो लोगों की मौत हो गई।

## Political instability राजनीतिक अस्थिरता

• The situation was further compounded by **political instability** within the **GHADC**, even as pressure mounted on the government to address the longstanding demand for restricting electoral participation to tribal communities.

स्थिति और जटिल हो गई जब **GHADC** के भीतर **राजनीतिक अस्थिरता** बढ़ गई, जबकि सरकार पर



सदन ने एक ऐसा प्रस्ताव पारित किया है जिसे इतिहास में याद रखा जाएगा, जिसमें परिषद चुनाव लड़ने वाले किसी भी उम्मीदवार के लिए **अनुसूचित जनजाति प्रमाणपत्र** होना अनिवार्य कर दिया गया है," उन्होंने **तुरा** में **नेशनल पीपल्स पार्टी** कार्यालय के सामने एक सभा को संबोधित करते हुए कहा।

- The **GHADC** was constituted under the **Sixth Schedule of the Constitution** to safeguard the rights and **self-governance** of tribal communities.

**GHADC** का गठन **संविधान की छठी अनुसूची** के तहत जनजातीय समुदायों के अधिकारों और **स्वशासन** की रक्षा के लिए किया गया था।

## BJP seal on EC letter sparks row in Kerala

**GS II: Polity**

**The Hindu Bureau**  
THIRUVANANTHAPURAM

The presence of a seal of the BJP Kerala unit on a 2019 Election Commission of India (EC) letter on poll-related guidelines, which was distributed to political parties recently, sparked a row in the State on Monday, the final day for submitting nominations for the April 9 Assembly polls.

While the ruling CPI(M) alleged that "seals are being casually swapped" and questioned whether "all pretences" have been dropped by the BJP, Chief Electoral Officer (Kerala) (CEO) Rathan U. Kelkar at-



An Election Commission letter bearing the BJP seal that was shared by the CPI(M) on X.

tributed the issue to a "clerical error" and added that corrective measures had been taken.

The CPI(M) had shared on its X handle a copy of a March 19, 2019, Election

Commission letter bearing the BJP seal. The letter, to CEOs of all States and Union Territories ahead of the 2019 Lok Sabha polls, dealt with the EC guidelines on the publicity of criminal antecedents by political parties and candidates. Copies of the letter had been issued afresh to political parties by mistake, according to the CEO's office.

**Clerical error, says CEO**

The CEO issued a clarification attributing the episode to a clerical error and asking everyone to avoid spreading the "wrong message."

According to him, the

BJP Kerala unit had visited the CEO's office seeking clarification on the EC guidelines.

The party seal was on a copy of the EC letter submitted along with the application seeking the clarification.

"The old letter was distributed to political parties due to an oversight," Mr. Kelkar said.

Once the error was noticed by the CEO's office, all political parties, district election officers, and returning officers were told in writing that the letter was being withdrawn and it should be disregarded, he said.

### 24Mar.BJP seal on EC letter sparks row in Kerala केरल में EC पत्र पर BJP की मुहर से विवाद

- The presence of a **seal of the BJP Kerala unit** on a **2019 Election Commission of India (EC) letter** on poll-related guidelines, which was distributed to political parties recently, sparked a row in the State on Monday, the final day for submitting nominations for the **April 9 Assembly polls**.

हाल ही में राजनीतिक दलों को वितरित किए गए चुनाव संबंधी दिशा-निर्देशों वाले **2019 के भारत निर्वाचन आयोग (EC) के पत्र पर BJP केरल इकाई की मुहर** की उपस्थिति ने सोमवार को राज्य में विवाद खड़ा कर दिया, जो **9 अप्रैल विधानसभा चुनाव** के लिए नामांकन दाखिल करने का अंतिम दिन था।

- While the ruling **CPI(M)** alleged that "seals are being casually swapped" and questioned whether "all pretences" have been dropped by the **BJP**, Chief Electoral Officer (Kerala) (CEO) **Rathan U. Kelkar** attributed the issue to a "**clerical error**" and added that corrective measures had been taken.

जहां सत्तारूढ़ **CPI(M)** ने आरोप लगाया कि "मुहरों को आसानी से बदला जा रहा है" और पूछा कि क्या **BJP** ने "सभी दिखावे" छोड़ दिए हैं, वहीं मुख्य निर्वाचन अधिकारी (केरल) **रथन यू. केलकर** ने इस मुद्दे को "**लिपिकीय त्रुटि**" बताया और कहा कि सुधारात्मक कदम उठाए गए हैं।

- The **CPI(M)** had shared on its X handle a copy of a **March 19, 2019**, Election Commission letter bearing the **BJP seal**.  
**CPI(M)** ने अपने X हैंडल पर **19 मार्च 2019** के एक निर्वाचन आयोग के पत्र की प्रति साझा की, जिस पर **BJP की मुहर** लगी हुई थी।

- The letter, to CEOs of all States and Union Territories ahead of the **2019 Lok Sabha polls**, dealt with the EC guidelines on the publicity of **criminal antecedents** by political parties and candidates.

यह पत्र **2019 लोकसभा चुनाव** से पहले सभी राज्यों और केंद्र शासित प्रदेशों के मुख्य निर्वाचन अधिकारियों



को भेजा गया था, जिसमें राजनीतिक दलों और उम्मीदवारों द्वारा **आपराधिक पृष्ठभूमि** के प्रचार संबंधी EC दिशानिर्देशों पर चर्चा की गई थी।

- Copies of the letter had been issued afresh to political parties by mistake, according to the CEO's office.  
CEO के कार्यालय के अनुसार, इस पत्र की प्रतियां गलती से राजनीतिक दलों को फिर से जारी कर दी गई थीं।

### Clerical error, says CEO लिपिकीय त्रुटि, CEO ने कहा

- The CEO issued a clarification attributing the episode to a **clerical error** and asking everyone to avoid spreading the "wrong message."  
CEO ने स्पष्टीकरण जारी करते हुए इस घटना को **लिपिकीय त्रुटि** बताया और सभी से "गलत संदेश" फैलाने से बचने को कहा।
- According to him, the **BJP Kerala unit** had visited the CEO's office seeking clarification on the **EC guidelines**.  
उनके अनुसार, **BJP केरल इकाई** ने EC दिशानिर्देशों पर स्पष्टीकरण मांगने के लिए CEO कार्यालय का दौरा किया था।
- The party seal was on a copy of the EC letter submitted along with the application seeking the clarification.  
पार्टी का मुहर उस EC पत्र की प्रति पर थी, जिसे स्पष्टीकरण मांगने वाले आवेदन के साथ प्रस्तुत किया गया था।
- "The old letter was distributed to political parties due to an oversight," Mr. Kelkar said.  
"पुराना पत्र एक चूक के कारण राजनीतिक दलों को वितरित कर दिया गया," श्री केलकर ने कहा।
- Once the error was noticed by the CEO's office, all political parties, district election officers, and returning officers were told in writing that the letter was being withdrawn and it should be disregarded, he said.  
उन्होंने कहा कि जैसे ही CEO कार्यालय को त्रुटि का पता चला, सभी राजनीतिक दलों, जिला निर्वाचन अधिकारियों और रिटर्निंग अधिकारियों को लिखित रूप में सूचित किया गया कि पत्र वापस लिया जा रहा है और इसे नजरअंदाज किया जाना चाहिए।



# BJP, Congress spar over fuel prices as LS debates Finance Bill

GS II: Polity  
The Hindu Bureau  
NEW DELHI

The Congress on Monday accused the Centre of holding back a hike in petrol and diesel prices in view of the upcoming Assembly elections, a charge the BJP categorically rejected.

The ruling party said that the government's efforts to secure diversified energy sources should be appreciated.

Initiating a discussion on the Finance Bill in the Lok Sabha, Congress member Amar Singh criticised the government's tax policies, pointing to a disparity between corporate and income tax collections.

He argued that despite lower corporate tax rates, high net-worth individuals were increasingly investing abroad rather than within the country.

## Owing to elections

Mr. Singh also linked the government's reluctance to raise fuel prices to electoral considerations, noting that global crude oil prices had risen amid the West Asia conflict, leading to higher fuel costs in several countries.

Responding to the criticism, BJP member Nishikant Dubey said the government should be commended for shielding consumers from price hikes.

Citing Prime Minister Narendra Modi's earlier remarks in the House, he said India had expanded its sources of crude imports from 27 countries to 41, reflecting sustained efforts to enhance energy security.

Mr. Dubey further alleged that key legislations such as the Benami Transactions Act and provisions relating to minimum alternate tax were not effectively implemented during Congress regimes in the past.

## FRBM framework

Participating in the debate, DMK member Arun Nehru accused the Centre of not adhering to the Fiscal Responsibility and Budget Management (FRBM) framework while urging States to maintain fiscal discipline. He also flagged rising trade deficits under various free trade agreements, including those with ASEAN, the UAE, Japan and South Korea.

## 24Mar.BJP, Congress spar over fuel prices as LS debates Finance Bill लोकसभा में वित्त विधेयक पर बहस के दौरान ईंधन कीमतों को लेकर BJP और कांग्रेस में टकराव

The Congress on Monday accused the Centre of holding back a hike in petrol and diesel prices in view of the upcoming Assembly elections, a charge the BJP categorically rejected.

कांग्रेस ने सोमवार को केंद्र पर आरोप लगाया कि आगामी विधानसभा चुनावों को देखते हुए पेट्रोल और डीजल की कीमतों में बढ़ोतरी रोक दी जा रही है, जिसे BJP ने सिरे से खारिज कर दिया।

The ruling party said that the government's efforts to secure diversified energy sources should be appreciated.

सत्तारूढ़ दल ने कहा कि सरकार के विविध ऊर्जा स्रोतों को सुरक्षित करने के प्रयासों की सराहना की जानी चाहिए।

Initiating a discussion on the Finance Bill in the Lok Sabha, Congress member Amar Singh criticised the government's tax policies, pointing to a disparity between corporate and income tax collections.

लोकसभा में वित्त विधेयक पर चर्चा की शुरुआत करते हुए कांग्रेस सदस्य अमर सिंह ने सरकार की कर नीतियों की आलोचना की और कॉर्पोरेट टैक्स और आयकर संग्रह के बीच असमानता की ओर इशारा किया।

He argued that despite lower corporate tax rates, high net-worth individuals were increasingly investing abroad rather than within the country.

उन्होंने तर्क दिया कि कम कॉर्पोरेट कर दरों के बावजूद उच्च संपत्ति वाले व्यक्ति देश के बजाय विदेशों में अधिक निवेश कर रहे हैं।

## Owing to elections चुनावों के कारण

- Mr. Singh also linked the government's reluctance to raise fuel prices to electoral considerations, noting that global crude oil prices had risen amid the West Asia conflict, leading to higher fuel costs in several countries.

श्री सिंह ने ईंधन कीमतों न बढ़ाने की सरकार की अनिच्छा को चुनावी कारणों से जोड़ा और कहा कि पश्चिम एशिया संघर्ष के बीच वैश्विक कच्चे तेल की कीमतें बढ़ी हैं, जिससे कई देशों में ईंधन महंगा हुआ है।

- Responding to the criticism, BJP member Nishikant Dubey said the government should be commended for shielding consumers from price hikes.

आलोचना का जवाब देते हुए BJP सदस्य निशिकान्त दुबे ने कहा कि कीमतों में वृद्धि से उपभोक्ताओं को बचाने के लिए सरकार की सराहना की जानी चाहिए।

- Citing Prime Minister Narendra Modi's earlier remarks in the House, he said India had expanded its sources of crude imports from 27 countries to 41, reflecting sustained efforts to enhance energy security.

प्रधानमंत्री नरेंद्र मोदी की पूर्व टिप्पणियों का हवाला देते हुए उन्होंने कहा कि भारत ने कच्चे तेल के आयात के स्रोतों को 27 देशों से बढ़ाकर 41 कर दिया है, जो ऊर्जा सुरक्षा बढ़ाने के निरंतर प्रयासों को दर्शाता है।

- Mr. Dubey further alleged that key legislations such as the Benami Transactions Act and provisions relating to minimum alternate tax were not effectively implemented during Congress regimes in the past.



श्री दुबे ने आगे आरोप लगाया कि बेनामी लेनदेन अधिनियम और न्यूनतम वैकल्पिक कर से संबंधित प्रावधानों को पूर्व में कांग्रेस सरकारों के दौरान प्रभावी ढंग से लागू नहीं किया गया था।

## FRBM framework

### FRBM ढांचा

- Participating in the debate, DMK member **Arun Nehru** accused the Centre of not adhering to the **Fiscal Responsibility and Budget Management (FRBM) framework** while urging States to maintain **fiscal discipline**.

बहस में भाग लेते हुए DMK सदस्य अरुण नेहरू ने केंद्र पर राजकोषीय उत्तरदायित्व और बजट प्रबंधन (FRBM) ढांचे का पालन न करने का आरोप लगाया, जबकि राज्यों से राजकोषीय अनुशासन बनाए रखने को कहा जा रहा है।

- He also flagged rising **trade deficits** under various **free trade agreements**, including those with **ASEAN**, the **UAE**, **Japan** and **South Korea**.

उन्होंने विभिन्न मुक्त व्यापार समझौतों के तहत बढ़ते व्यापार घाटे को भी उजागर किया, जिनमें आसियान, यूएई, जापान और दक्षिण कोरिया शामिल हैं।

# SEBI board okays conflict of interest panel's key recommendations

GS II: Polity

**Ashokamithran T.**  
MUMBAI

The Securities and Exchange Board of India (SEBI) has decided to approve key recommendations of the High Level Committee on Conflict of Interest..

According to the board, the recommendations include bringing the chairperson and whole time board members within the definition of an 'insider', establishing digital systems for conflict-of-interest management and a new office of ethics and compliance to oversee public issues. SEBI also recommended notifying separate regulations for board members and an oversight committee on ethics to oversee board members.



**Ease of doing business:** FPIs will now be allowed to settle funds on a net basis for stock market transactions. REUTERS

Another major regulatory change approved was to simplify 'fit and proper person' norms for intermediaries, which include depositories, clearing houses and exchanges. Accordingly, members of intermediaries would be disqualified only on conviction for economic offences or securities law violation. However, grounds for disqualification would also include offences involving moral turpitude.

The board also decided Foreign Portfolio Investors (FPIs) will now be allowed to settle funds on a net basis for stock market transactions viz. payment for a stock FPIs buy would be adjusted against the proceeds of the stock it sells.

Earlier, FPIs had to pay for the stock they bought in full and receive payment for the stocks they sold.

**Cutting cost**  
When FPI outflows had crossed ₹88,000 crore in March alone, SEBI Chairman Tuhin Kanta Pandey assured new FPI registrations continued in response to steps easing their operations and cutting cost. The board also reduced minimum investment value for social impact funds in Alternative Investment Funds to ₹1,000 from ₹2 lakh to boost retail participation.

When FPI outflows had crossed ₹88,000 crore in March alone, SEBI Chairman Tuhin Kanta Pandey assured new FPI registrations continued in response to steps easing their operations and cutting cost. The board also reduced minimum investment value for social impact funds in Alternative Investment Funds to ₹1,000 from ₹2 lakh to boost retail participation.

## 24Mar. SEBI board okays conflict of interest panel's key recommendations सेबी बोर्ड ने हितों के टकराव पैनल की प्रमुख सिफारिशों को मंजूरी दी

- The **Securities and Exchange Board of India (SEBI)** has decided to approve key recommendations of the **High Level Committee on Conflict of Interest**.  
भारतीय प्रतिभूति और विनिमय बोर्ड (SEBI) ने हितों के टकराव पर उच्च स्तरीय समिति की प्रमुख सिफारिशों को मंजूरी देने का निर्णय लिया है।
- According to the board, the recommendations include bringing the **chairperson and whole time board members** within the definition of an 'insider', establishing **digital systems** for conflict-of-interest management and a new office of **ethics and compliance** to oversee public issues.  
बोर्ड के अनुसार, सिफारिशों में अध्यक्ष और पूर्णकालिक बोर्ड सदस्यों को 'इनसाइडर' की परिभाषा में



शामिल करना, हितों के टकराव के प्रबंधन के लिए **डिजिटल सिस्टम** स्थापित करना और सार्वजनिक मुद्दों की निगरानी के लिए **एथिक्स और कंप्लायंस** का नया कार्यालय बनाना शामिल है।

- **SEBI** also recommended notifying separate regulations for **board members** and an **oversight committee on ethics** to oversee board members.  
**SEBI** ने **बोर्ड सदस्यों** के लिए अलग नियम अधिसूचित करने और उनकी निगरानी के लिए **एथिक्स ओवरसाइट कमेटी** बनाने की भी सिफारिश की।
- Another major regulatory change approved was to simplify **'fit and proper person'** norms for **intermediaries**, which include depositories, clearing houses and exchanges.  
एक अन्य महत्वपूर्ण नियामक बदलाव में **इंटरमीडियरीज़** (जैसे डिपॉजिटरी, क्लियरिंग हाउस और एक्सचेंज) के लिए **'फिट एंड प्रॉपर पर्सन'** मानदंडों को सरल बनाना शामिल है।
- Accordingly, members of intermediaries would be disqualified only on conviction for **economic offences** or **securities law violation**.  
इसके अनुसार, इंटरमीडियरी के सदस्य केवल **आर्थिक अपराधों** या **प्रतिभूति कानून उल्लंघन** में दोषी ठहराए जाने पर ही अयोग्य घोषित किए जाएंगे।
- However, grounds for disqualification would also include offences involving **moral turpitude**.  
हालांकि, अयोग्यता के आधार में **नैतिक अधःपतन** से जुड़े अपराध भी शामिल होंगे।
- The board also decided **Foreign Portfolio Investors (FPIs)** will now be allowed to settle funds on a **net basis** for stock market transactions viz. payment for a stock FPIs buy would be adjusted against the proceeds of the stock it sells.  
बोर्ड ने यह भी निर्णय लिया कि **विदेशी पोर्टफोलियो निवेशक (FPIs)** अब शेयर बाजार लेनदेन में **नेट आधार** पर फंड का निपटान कर सकेंगे, यानी खरीदे गए शेयर का भुगतान बेचे गए शेयर की प्राप्ति से समायोजित किया जाएगा।
- Earlier, FPIs had to pay for the stock they bought in full and receive payment for the stocks they sold.  
पहले FPIs को खरीदे गए शेयर का पूरा भुगतान करना पड़ता था और बेचे गए शेयरों का भुगतान अलग से प्राप्त होता था।

### Cutting cost लागत में कमी

- When **FPI outflows** had crossed **₹88,000 crore** in March alone, **SEBI Chairman Tuhin Kanta Pandey** assured new FPI registrations continued in response to steps easing their operations and cutting cost.  
जब मार्च में ही **FPI आउटफ्लो ₹88,000 करोड़** पार कर गया, तब **SEBI अध्यक्ष तुहिन कांत पांडेय** ने आश्वासन दिया कि संचालन को आसान बनाने और लागत कम करने के कदमों के कारण नए FPI पंजीकरण जारी रहे।
- The board also reduced minimum investment value for **social impact funds** in **Alternative Investment Funds** to **₹1,000** from **₹2 lakh** to boost **retail participation**.  
बोर्ड ने **अल्टरनेटिव इन्वेस्टमेंट फंड्स** में **सोशल इम्पैक्ट फंड्स** के लिए न्यूनतम निवेश राशि **₹2 लाख से घटाकर ₹1,000** कर दी, ताकि **खुदरा भागीदारी** बढ़ाई जा सके।
- The **Securities and Exchange Board of India (SEBI)** has decided to approve key recommendations of the **High Level Committee on Conflict of Interest**.  
**भारतीय प्रतिभूति और विनिमय बोर्ड (SEBI)** ने **हितों के टकराव पर उच्च स्तरीय समिति** की प्रमुख सिफारिशों को मंजूरी देने का निर्णय लिया है।
- According to the board, the recommendations include bringing the **chairperson and whole time board members** within the definition of an **'insider'**, establishing **digital systems** for conflict-of-interest management and a new office of **ethics and compliance** to oversee public issues.  
बोर्ड के अनुसार, सिफारिशों में **अध्यक्ष और पूर्णकालिक बोर्ड सदस्यों** को **'इनसाइडर'** की परिभाषा में शामिल करना, हितों के टकराव के प्रबंधन के लिए **डिजिटल सिस्टम** स्थापित करना और सार्वजनिक मुद्दों की निगरानी के लिए **एथिक्स और कंप्लायंस** का नया कार्यालय बनाना शामिल है।
- **SEBI** also recommended notifying separate regulations for **board members** and an **oversight committee on ethics** to oversee board members.  
**SEBI** ने **बोर्ड सदस्यों** के लिए अलग नियम अधिसूचित करने और उनकी निगरानी के लिए **एथिक्स ओवरसाइट कमेटी** बनाने की भी सिफारिश की।



- Another major regulatory change approved was to simplify 'fit and proper person' norms for **intermediaries**, which include depositories, clearing houses and exchanges.  
एक अन्य महत्वपूर्ण नियामक बदलाव में **इंटरमीडियरीज़** (जैसे डिपॉजिटरी, क्लियरिंग हाउस और एक्सचेंज) के लिए 'फिट एंड प्रॉपर पर्सन' मानदंडों को सरल बनाना शामिल है।
- Accordingly, members of intermediaries would be disqualified only on conviction for **economic offences** or **securities law violation**.  
इसके अनुसार, इंटरमीडियरी के सदस्य केवल **आर्थिक अपराधों** या **प्रतिभूति कानून उल्लंघन** में दोषी ठहराए जाने पर ही अयोग्य घोषित किए जाएंगे।
- However, grounds for disqualification would also include offences involving **moral turpitude**.  
हालांकि, अयोग्यता के आधार में **नैतिक अधःपतन** से जुड़े अपराध भी शामिल होंगे।
- The board also decided **Foreign Portfolio Investors (FPIs)** will now be allowed to settle funds on a **net basis** for stock market transactions viz. payment for a stock FPIs buy would be adjusted against the proceeds of the stock it sells.  
बोर्ड ने यह भी निर्णय लिया कि **विदेशी पोर्टफोलियो निवेशक (FPIs)** अब शेयर बाजार लेनदेन में **नेट आधार** पर फंड का निपटान कर सकेंगे, यानी खरीदे गए शेयर का भुगतान बेचे गए शेयर की प्राप्ति से समायोजित किया जाएगा।
- Earlier, FPIs had to pay for the stock they bought in full and receive payment for the stocks they sold.  
पहले FPIs को खरीदे गए शेयर का पूरा भुगतान करना पड़ता था और बेचे गए शेयरों का भुगतान अलग से प्राप्त होता था।

### Cutting cost लागत में कमी

- When **FPI outflows** had crossed **₹88,000 crore** in March alone, **SEBI Chairman Tuhin Kanta Pandey** assured new FPI registrations continued in response to steps easing their operations and cutting cost.  
जब मार्च में ही **FPI आउटफ्लो ₹88,000 करोड़** पार कर गया, तब **SEBI अध्यक्ष तुहिन कांत पांडेय** ने आश्वासन दिया कि संचालन को आसान बनाने और लागत कम करने के कदमों के कारण नए FPI पंजीकरण जारी रहे।
- The board also reduced minimum investment value for **social impact funds** in **Alternative Investment Funds** to **₹1,000** from **₹2 lakh** to boost **retail participation**.  
बोर्ड ने **अल्टरनेटिव इन्वेस्टमेंट फंड्स** में **सोशल इम्पैक्ट फंड्स** के लिए न्यूनतम निवेश राशि **₹2 लाख** से घटाकर **₹1,000** कर दी, ताकि **खुदरा भागीदारी** बढ़ाई जा सके।

### GS Paper II: Governance,

#### TOPICS COVERED

24 March 2026

24Mar

**Centre to amend the Foreign Contribution (Regulation) Act**  
**केंद्र विदेशी अंशदान (विनियमन) अधिनियम में संशोधन करेगा**



# Centre to amend the Foreign Contribution (Regulation) Act

GS II: Governance

NEW DELHI

The Union government is likely to amend the Foreign Contribution (Regulation) Act in the ongoing session of Parliament session. One of the key changes proposed is the appointment of a “designated authority” to take over, manage or dispose of assets created out of foreign funds by an NGO or association, which has had its FCRA registration suspended, cancelled, or not renewed.

Another proposed amendment is expanding the definition of “key functionary” of an NGO beyond an “office bearer/director” to include directors; partners; trustees; the *karta* (head) of a Hindu Undivided Family; office-bearers or members of the governing body or managing committee of a society, trust, trade union or association; and any other person who has control over or responsibility for the management or affairs of such an organisation.

The amendment also proposes to make key functionaries liable for offences under the FCRA.

Registration under the FCRA is mandatory for an NGO to receive foreign funds. Till now, the 2010 parent Act only had the

**The Bill proposes to reduce the maximum imprisonment for FCRA offences from five years to one year**

provision to regulate the flow of foreign funds, and not the statutory framework to manage the assets created out of such funds.

The Foreign Contribution (Regulation) Amendment Bill, 2026 also proposes to amend Section 43 of the parent Act, which will require any law enforcement agency or State government to seek prior approval of the Central government for initiation of investigation into FCRA-related complaints.

The Statement of Objects and Reasons of the Bill circulated by Home Minister Amit Shah said that, at present, around 16,000 associations are registered under the FCRA and they receive around ₹22,000 crore annually.

The Bill proposes to reduce the maximum imprisonment for FCRA offences from five years to one year. It also proposes fixed time-lines for the utilisation of foreign funds received under the “prior permission” category, unlike the open-ended provision under the 2010 Act.

संशोधन में यह भी प्रस्ताव है कि मुख्य पदाधिकारियों को FCRA के तहत अपराधों के लिए उत्तरदायी बनाया जाए।

- Registration under the FCRA is mandatory for an NGO to receive foreign funds. किसी NGO के लिए विदेशी फंड प्राप्त करने हेतु FCRA के तहत पंजीकरण अनिवार्य है।
- Till now, the 2010 parent Act only had the provision to regulate the flow of foreign funds, and not the statutory framework to manage the assets created out of such funds. अब तक 2010 के मूल अधिनियम में केवल विदेशी फंड के प्रवाह को नियंत्रित करने का प्रावधान था, लेकिन उन फंड से बनी संपत्तियों के प्रबंधन के लिए कोई वैधानिक ढांचा नहीं था।
- The Foreign Contribution (Regulation) Amendment Bill, 2026 also proposes to amend Section 43 of the parent Act, which will require any law enforcement agency or State government to seek prior approval of the Central government for initiation of investigation into FCRA-related complaints.

विदेशी अंशदान (विनियमन) संशोधन विधेयक, 2026 में मूल अधिनियम की धारा 43 में संशोधन का भी

**24Mar. Centre to amend the Foreign Contribution (Regulation) Act**  
**केंद्र विदेशी अंशदान (विनियमन) अधिनियम में संशोधन करेगा**

• The Union government is likely to amend the Foreign Contribution (Regulation) Act in the ongoing Parliament session.

केंद्र सरकार वर्तमान संसद सत्र में विदेशी अंशदान (विनियमन) अधिनियम में संशोधन करने की संभावना है।

• One of the key changes proposed is the appointment of a “designated authority” to take over, manage or dispose of assets created out of foreign funds by an NGO or association, which has had its FCRA registration suspended, cancelled, or not renewed.

प्रस्तावित प्रमुख बदलावों में से एक “निर्धारित प्राधिकरण” की नियुक्ति है, जो उन NGO या संगठनों द्वारा बनाए गए विदेशी फंड से निर्मित संपत्तियों को संभालेगा, प्रबंधित करेगा या निपटाएगा, जिनका FCRA पंजीकरण निलंबित, रद्द या नवीनीकृत नहीं हुआ है।

• Another proposed amendment is expanding the definition of “key functionary” of an NGO beyond an “office bearer/director” to include directors; partners; trustees; the *karta* (head) of a Hindu Undivided Family; office-bearers or members of the governing body or managing committee of a society, trust, trade union or association; and any other person who has control over or responsibility for the management or affairs of such an organisation.

एक अन्य प्रस्तावित संशोधन में NGO के “मुख्य पदाधिकारी (key functionary)” की परिभाषा को “पदाधिकारी/निदेशक” से आगे बढ़ाकर निदेशकों, साझेदारों, न्यासियों, हिंदू अविभाजित परिवार के कर्ता, तथा किसी सोसायटी, ट्रस्ट, ट्रेड यूनियन या संगठन की शासी निकाय या प्रबंधन समिति के पदाधिकारियों या सदस्यों और ऐसे किसी भी व्यक्ति को शामिल करना है जो संगठन के प्रबंधन या कार्यों पर नियंत्रण या जिम्मेदारी रखता हो।

• The amendment also proposes to make key functionaries liable for offences under the FCRA.



प्रस्ताव है, जिसके तहत किसी भी कानून प्रवर्तन एजेंसी या राज्य सरकार को FCRA से संबंधित शिकायतों की जांच शुरू करने के लिए केंद्र सरकार की पूर्व अनुमति लेनी होगी।

- The **Statement of Objects and Reasons** of the Bill circulated by **Home Minister Amit Shah** said that, at present, around **16,000 associations** are registered under the **FCRA** and they receive around **₹22,000 crore annually**.  
गृह मंत्री अमित शाह द्वारा जारी विधेयक के उद्देश्य और कारणों के वक्तव्य में कहा गया है कि वर्तमान में लगभग **16,000 संगठन FCRA** के तहत पंजीकृत हैं और उन्हें सालाना लगभग **₹22,000 करोड़** प्राप्त होते हैं।
- The Bill proposes to reduce the maximum **imprisonment** for FCRA offences from **five years to one year**.  
विधेयक में FCRA अपराधों के लिए अधिकतम कारावास को पांच वर्ष से घटाकर एक वर्ष करने का प्रस्ताव है।
- It also proposes fixed timelines for the utilisation of **foreign funds** received under the "**prior permission**" category, unlike the open-ended provision under the **2010 Act**.  
इसमें "पूर्व अनुमति" श्रेणी के तहत प्राप्त विदेशी फंड के उपयोग के लिए निश्चित समयसीमा का प्रस्ताव भी है, जो **2010 अधिनियम** के खुले प्रावधान से अलग है।

## GS Paper II: International Relations

### TOPICS COVERED

24 March 2026

24Mar	'U.S.-led Pax Silica is a step towards digital colonialism' 'अमेरिका-नेतृत्व वाला Pax Silica डिजिटल उपनिवेशवाद की ओर एक कदम है'
24Mar	Nepal's political shift opens a strategic window for India नेपाल में राजनीतिक बदलाव भारत के लिए एक रणनीतिक अवसर खोलता है

### 'U.S.-led Pax Silica is a step towards digital colonialism'

GS II: IR

The Hindu Bureau  
NEW DELHI

Senior Congress MP Digvijaya Singh on Monday warned the Union government against joining Pax Silica, terming the U.S.-led project a step towards digital colonialism.

The U.S.-led initiative is aimed at building resilient supply chains for critical minerals and Artificial Intelligence (AI) technologies. India joined the coalition in February 2026, during the AI Impact summit held in New Delhi.

Raising the matter during Zero Hour in the Rajya Sabha on Monday, Mr. Singh asked the government to make the terms and conditions of the agreement public.

### 24Mar. 'U.S.-led Pax Silica is a step towards digital colonialism'

### 'अमेरिका-नेतृत्व वाला Pax Silica डिजिटल उपनिवेशवाद की ओर एक कदम है'

- Senior Congress MP Digvijaya Singh on Monday warned the Union government against joining Pax Silica, terming the U.S.-led project a step towards digital colonialism.

वरिष्ठ कांग्रेस सांसद दिग्विजय सिंह ने सोमवार को केंद्र सरकार को Pax Silica में शामिल होने के खिलाफ चेतावनी दी और इसे अमेरिका-नेतृत्व वाली परियोजना बताते हुए डिजिटल उपनिवेशवाद की दिशा में एक कदम कहा।

- The U.S.-led initiative is aimed at building resilient supply chains for critical minerals and Artificial Intelligence (AI) technologies.

यह अमेरिका-नेतृत्व वाली पहल महत्वपूर्ण खनिजों और कृत्रिम बुद्धिमत्ता (AI) तकनीकों के लिए मजबूत आपूर्ति श्रृंखलाएं बनाने का लक्ष्य रखती है।

- India joined the coalition in February 2026, during the AI Impact summit held in New Delhi.

भारत फरवरी 2026 में नई दिल्ली में आयोजित AI इम्पैक्ट शिखर सम्मेलन के दौरान इस गठबंधन में शामिल हुआ।

- Raising the matter during Zero Hour in the Rajya Sabha on Monday, Mr. Singh asked the government to make the terms and conditions of the agreement public.

सोमवार को राज्यसभा में शून्यकाल के दौरान इस मुद्दे को उठाते हुए, श्री सिंह ने सरकार से समझौते के नियम और शर्तों को सार्वजनिक करने की मांग की।



# Nepal's political shift opens a strategic window for India

The new government in Nepal extends an opportunity to fashion a forward-looking bilateral relationship

ISSUE

MOB

K.V. Rajan  
Atul K. Thakur

The election results in Nepal have been described as a political earthquake. There has been an emphatic and comprehensive rejection of old leaders and established parties. A younger generation of professionals and tech savvy figures, enjoying the support of Gen Z activists is set to take over.

## Challenges ahead

By giving the Rastriya Swatantra Party (RSP) a two thirds majority, Nepali voters have granted Balendra Shah and his government, a powerful mandate for Nepal's complete transformation. It now has a huge responsibility to answer wide-ranging expectations—enough jobs for the youth, reversing the migration for

work abroad, stimulate economic growth, and ensure good governance. It needs to be noted, however, that while voters have demonstrated their impatience with the old order and its decades- old insensitivity to their aspirations, this is not a positive vote for a clear-cut new agenda for reform, political or economic, since it was never spelt out and placed before them.

There is a real possibility of frustration and disillusionment that the new government will have to deal with as it settles down. The first warning shots were fired by the caretaker Prime Minister Sushil Karki even before the election, when she reminded the political class that the agitations of September 2025 had erupted because of the frustrations of people insisting on good governance, and a recurrence was inevitable if the situation lapsed into the same old pattern. Hopefully the people of Nepal will give

the new leaders enough time to address the country's problems.

## Restructuring India-Nepal ties

For now, Nepal deserves every encouragement possible. India has been quick to extend it, without being loud or patronising. India has not been an issue during the election campaign. Its relationship with Nepal in recent years has focused on the right priorities – development, infrastructure, digital connectivity, energy. It has played its cards well and can continue to capitalise on the existing goodwill as the new leaders in Nepal seek to respond to development needs of the people.

Restructuring of the India-Nepal relationship has been long overdue. For far too long it has been trapped in the shadows of the legacy of British India days. Hopefully India and Nepal will seize

every opportunity to fashion a forward-looking relationship based on today's realities and the immense potential for expanding cooperation. For this it will be necessary for policy makers on both sides to discard old mindsets, address long standing irritants with fresh approaches, and prioritise people-centric policies which can be delivered to keep pace with people's expectations and needs.

India also needs to look at the recent developments in Nepal as part of a wider regional phenomenon since happenings in Bangladesh, Sri Lanka and elsewhere also fall into the same pattern—agitations led by frustrated youth incidentally toppling pro-India political figures, demanding faster development and better governance. Labeling new political leaders being thrown up everywhere as anti-India just because of the legacies of the past does not seem justified, as seen from the pragmatic readiness shown in Bangladesh and Sri Lanka to cooperate with India, by parties and leaders once seen as unfriendly. Nepal could be a good partner for India in the evolving geopolitical scenario, if both countries try seriously to fashion a clear cut sub-regional strategy for rapid growth.

(K.V. Rajan is former Indian Ambassador to Nepal and Atul K. Thakur is a policy professional. They are the authors of 'Kathmandu Chronicle: Reclaiming India-Nepal Relations'. Views are personal.)

## THE GIST

The people of Nepal have granted Balendra Shah and the RSP a powerful mandate for Nepal's complete transformation. The government now faces the challenge of addressing the issues of unemployment and providing good governance

India has been quick to extend encouragement to the new leadership. Hopefully India and Nepal will seize every opportunity to fashion a forward-looking relationship based on today's realities

## 24Mar. Nepal's political shift opens a strategic window for India नेपाल में राजनीतिक बदलाव भारत के लिए एक रणनीतिक अवसर खोलता है

- The new government in Nepal extends an opportunity to fashion a forward-looking bilateral relationship  
नेपाल की नई सरकार एक भविष्य उन्मुख द्विपक्षीय संबंध बनाने का अवसर प्रदान करती है
- The election results in Nepal have been described as a political earthquake.  
नेपाल में चुनाव परिणाम को एक राजनीतिक भूकंप के रूप में वर्णित किया गया है।
- There has been an emphatic and comprehensive rejection of old leaders and established parties.  
पुराने नेताओं और स्थापित दलों का एक स्पष्ट और व्यापक अस्वीकार हुआ है।
- A younger generation of professionals and tech savvy figures, enjoying the support of Gen Z activists is set to take over.  
युवा पीढ़ी के पेशेवर और तकनीकी रूप से दक्ष लोग, जिन्हें Gen Z कार्यकर्ताओं का समर्थन प्राप्त है, सत्ता संभालने के लिए तैयार हैं।

## Challenges ahead

### आगे की चुनौतियाँ

- By giving the Rastriya Swatantra Party (RSP) a two thirds majority, Nepali voters have granted Balendra Shah and his government, a powerful mandate for Nepal's complete transformation.  
Rashtriya Swatantra Party (RSP) को दो-तिहाई बहुमत देकर नेपाली मतदाताओं ने Balendra Shah और उनकी सरकार को नेपाल के पूर्ण परिवर्तन के लिए एक मजबूत जनादेश दिया है।
- It now has a huge responsibility to answer wide-ranging expectations—enough jobs for the youth, reversing the migration for work abroad, stimulating economic growth, and ensuring good governance.  
अब इस पर विस्तृत अपेक्षाओं को पूरा करने की बड़ी जिम्मेदारी है—युवाओं के लिए पर्याप्त रोजगार, विदेश में काम के लिए प्रवासन को उलटना, आर्थिक विकास को बढ़ावा देना, और सुशासन सुनिश्चित करना।
- It needs to be noted, however, that while voters have demonstrated their impatience with the old order and its decades-old insensitivity to their aspirations, this is not a positive vote for a clear-cut new agenda for reform, political or economic, since it was never spelt out and placed before them.  
हालांकि यह ध्यान देने योग्य है कि मतदाताओं ने पुरानी व्यवस्था के प्रति अधीरता और उनकी आकांक्षाओं के प्रति दशकों पुरानी असंवेदनशीलता को दिखाया है, लेकिन यह किसी स्पष्ट नए सुधार एजेंडा (राजनीतिक या आर्थिक) के पक्ष में सकारात्मक वोट नहीं है, क्योंकि इसे कभी स्पष्ट रूप से प्रस्तुत नहीं किया गया था।
- There is a real possibility of frustration and disillusionment that the new government will have to deal with as it settles down.



एक वास्तविक संभावना है कि **निराशा और मोहभंग** उत्पन्न हो सकता है, जिसका सामना नई सरकार को करना होगा।

- The **first warning shots** were fired by the **caretaker Prime Minister Sushil Karki** even before the election, when she reminded the political class that the **agitations of September 2025** had erupted because of the frustrations of people insisting on **good governance**, and a recurrence was inevitable if the situation lapsed into the same old pattern.  
**पहली चेतावनी कार्यवाहक प्रधानमंत्री Sushil Karki** द्वारा चुनाव से पहले ही दी गई थी, जब उन्होंने राजनीतिक वर्ग को याद दिलाया कि **सितंबर 2025 के आंदोलन** लोगों की **सुशासन की मांग** से उत्पन्न हुए थे, और यदि स्थिति पुराने ढर्रे पर लौटती है तो इसका पुनरावृत्ति अवश्यंभावी है।
- Hopefully the people of Nepal will give the new leaders enough time to address the country's problems.  
आशा है कि नेपाल के लोग नए नेताओं को देश की समस्याओं को हल करने के लिए पर्याप्त समय देंगे।

### Restructuring India-Nepal ties

#### भारत-नेपाल संबंधों का पुनर्गठन

- For now, Nepal deserves every **encouragement possible**.  
फिलहाल नेपाल हर संभव **प्रोत्साहन** का पात्र है।
- India has been quick to extend it, without being **loud or patronising**.  
भारत ने बिना **शोर-शराबे या संरक्षणवादी रवैये** के इसे तुरंत प्रदान किया है।
- India has not been an issue during the **election campaign**.  
**चुनावी अभियान** के दौरान भारत कोई मुद्दा नहीं रहा है।
- Its relationship with Nepal in recent years has focused on the right priorities — **development, infrastructure, digital connectivity, energy**.  
हाल के वर्षों में नेपाल के साथ उसका संबंध सही प्राथमिकताओं—**विकास, अवसंरचना, डिजिटल कनेक्टिविटी, ऊर्जा**—पर केंद्रित रहा है।
- It has played its cards well and can continue to capitalise on the **existing goodwill** as the new leaders in Nepal seek to respond to **development needs** of the people.  
उसने अपने कदम सही तरीके से उठाए हैं और नेपाल के नए नेता जब लोगों की **विकास आवश्यकताओं** को पूरा करने का प्रयास करेंगे, तब वह **मौजूदा सद्भावना** का लाभ उठा सकता है।
- Restructuring of the **India-Nepal relationship** has been long overdue.  
**भारत-नेपाल संबंधों का पुनर्गठन** काफी समय से लंबित रहा है।
- For far too long it has been trapped in the shadows of the **legacy of British India days**.  
यह बहुत लंबे समय से **ब्रिटिश भारत के दौर की विरासत** की छाया में फंसा रहा है।
- Hopefully India and Nepal will seize every opportunity to fashion a **forward-looking relationship** based on today's realities and the immense potential for **expanding cooperation**.  
उम्मीद है कि भारत और नेपाल आज की वास्तविकताओं और **सहयोग के विस्तार की अपार संभावनाओं** के आधार पर एक **भविष्य उन्मुख संबंध** बनाने के हर अवसर का उपयोग करेंगे।
- For this it will be necessary for **policy makers on both sides** to discard **old mindsets**, address **long standing irritants** with fresh approaches, and prioritise **people-centric policies** which can be delivered to keep pace with people's expectations and needs.  
इसके लिए दोनों पक्षों के **नीति निर्माताओं** को **पुरानी सोच** को त्यागना होगा, **लंबे समय से चले आ रहे विवादों** को नए दृष्टिकोण से सुलझाना होगा, और **जन-केंद्रित नीतियों** को प्राथमिकता देनी होगी।
- India also needs to look at the recent developments in Nepal as part of a **wider regional phenomenon** since happenings in **Bangladesh, Sri Lanka and elsewhere** also fall into the same pattern—agitations led by **frustrated youth** incidentally toppling **pro-India political figures**, demanding faster **development** and better **governance**.  
भारत को नेपाल की हालिया घटनाओं को एक **वृहद क्षेत्रीय परिघटना** के रूप में देखना चाहिए क्योंकि **बांग्लादेश, श्रीलंका और अन्य स्थानों** की घटनाएं भी इसी पैटर्न में आती हैं—**निराशा युवाओं** द्वारा संचालित आंदोलन, जो संयोगवश **भारत समर्थक नेताओं** को हटाते हैं और तेज **विकास** व बेहतर **सुशासन** की मांग करते हैं।
- Labeling new political leaders being thrown up everywhere as **anti-India** just because of the **legacies of the past** does not seem justified, as seen from the **pragmatic readiness** shown in Bangladesh and Sri Lanka to cooperate with India, by parties and leaders once seen as unfriendly.



हर जगह उभर रहे नए नेताओं को केवल **अतीत की विरासत** के आधार पर **भारत विरोधी** कहना उचित नहीं है, जैसा कि **बांग्लादेश और श्रीलंका** में पहले असहज माने जाने वाले दलों और नेताओं द्वारा भारत के साथ सहयोग की **व्यावहारिक तत्परता** से स्पष्ट है।

- Nepal could be a good **partner for India** in the evolving **geopolitical scenario**, if both countries try seriously to fashion a **clear cut subregional strategy** for **rapid growth**. यदि दोनों देश **तेजी से विकास** के लिए एक **स्पष्ट उप-क्षेत्रीय रणनीति** बनाने का गंभीर प्रयास करें, तो नेपाल बदलते **भूराजनीतिक परिदृश्य** में भारत का एक अच्छा **साझेदार** बन सकता है।

<b>GS Paper III: Economy,</b>	
<b>TOPICS COVERED</b>	<b>24 March 2026</b>
<b>24Mar</b>	<b>'Biotech industry driving both human and animal nutrition'</b> <b>'बायोटेक उद्योग मानव और पशु दोनों के पोषण को आगे बढ़ा रहा है'</b>
<b>24Mar</b>	<b>Grim future</b> <b>निराशाजनक भविष्य</b>
<b>24Mar</b>	<b>Net FDI negative for fifth straight month</b> <b>शुद्ध FDI लगातार पांचवें महीने नकारात्मक</b>
<b>24Mar</b>	<b>Gold futures dive over 10% amid global rout</b> <b>वैश्विक गिरावट के बीच सोने के वायदा भाव 10% से अधिक गिरे</b>
<b>24Mar</b>	<b>Lok Sabha sends Corporate Law Amendment Bill 2026 to JPC</b> <b>लोकसभा ने कॉर्पोरेट कानून संशोधन विधेयक 2026 को JPC को भेजा</b>

## 'Biotech industry driving both human and animal nutrition'

**GS III: Economy**

**The Hindu Bureau**  
CHENNAI

Biotechnology graduates are the architects of the next animal science revolution in the country, experts said at a webinar on "Biotech Careers: Food and Nutrition" on Sunday.

The webinar was jointly organised by the Vellore Institute of Technology, Chennai, and *The Hindu* as part of the series titled "Biotechnology: Role in Industry 5.0 – Sustainable Future Pathways".

"While the **growth rate** of the food processing market is estimated at 13%, **India's bio-economy rate is projected to be much higher**. This means biotechnology students will have enough career opportunities to steer the growth over the next decade," Anand

**GS III: S&T**



K. Jadi, general manager and plant head, ICML Medak, ITC Ltd., said.

G. Jayaraman, Professor and Dean of the School of Biosciences and Technology at VIT, Chennai, spoke about **biotechnology's increasing influence in various sectors, including agriculture, food, health-care, and research-driven innovation**. He said the **biotech industry was driving both human and animal nutrition**. "It is enhancing the quality and

**quantity of food."**

Chakkaravarthi Saravanan, Associate Professor at the National Institute of Food Technology, Entrepreneurship and Management in Kundli, Haryana, pointed out that **with an ever-increasing population, shrinking land space, and rising food prices, the significance of biotechnology for food was growing**.

Speaking on the **role of biotechnology in the livestock industry**, R. Balaguru, technical director at V.K. Palappa Nadar Poultry Farms Pvt. Ltd., said **70% of the rural poor in the world depended on livestock**. The panellists advocated for establishing a solid foundation for learning new-age technologies.

The webinar can be viewed at <https://newsth.live/THVITFNY>



## 24Mar. 'Biotech industry driving both human and animal nutrition' 'बायोटेक उद्योग मानव और पशु दोनों के पोषण को आगे बढ़ा रहा है'

- **Biotechnology graduates** are the architects of the next **animal science revolution** in the country, experts said at a webinar on "**Biotech Careers: Food and Nutrition**" on Sunday. **बायोटेक्नोलॉजी स्नातक** देश में अगले **पशु विज्ञान क्रांति** के वास्तुकार हैं, यह बात विशेषज्ञों ने रविवार को "**बायोटेक करियर: फूड एंड न्यूट्रिशन**" विषय पर आयोजित वेबिनार में कही।
- The webinar was jointly organised by the **Vellore Institute of Technology, Chennai**, and **The Hindu** as part of the series titled "**Biotechnology: Role in Industry 5.0 — Sustainable Future Pathways**".  
यह वेबिनार **वेल्लोर इंस्टीट्यूट ऑफ टेक्नोलॉजी, चेन्नई** और **द हिंदू** द्वारा "**बायोटेक्नोलॉजी: इंडस्ट्री 5.0 में भूमिका — सतत भविष्य के मार्ग**" श्रृंखला के तहत संयुक्त रूप से आयोजित किया गया था।
- "While the growth rate of the **food processing market** is estimated at **13%**, India's **bio-economy rate** is projected to be much higher.  
"जहां **फूड प्रोसेसिंग बाजार** की वृद्धि दर **13%** आंकी गई है, वहीं भारत की **बायो-इकोनॉमी दर** इससे कहीं अधिक होने का अनुमान है।
- This means biotechnology students will have enough **career opportunities** to steer the growth over the next decade," **Anand K. Jadi**, general manager and plant head, **ICML Medak, ITC Ltd.**, said.  
इसका मतलब है कि बायोटेक्नोलॉजी के छात्रों के पास अगले दशक में विकास को दिशा देने के लिए पर्याप्त **करियर अवसर** होंगे," **आनंद के. जाड़ी**, महाप्रबंधक और प्लांट प्रमुख, **आईसीएमएल मेडक, आईटीसी लिमिटेड** ने कहा।
- **G. Jayaraman**, Professor and Dean of the **School of Biosciences and Technology at VIT, Chennai**, spoke about biotechnology's increasing influence in various sectors, including **agriculture, food, healthcare, and research-driven innovation**.  
**जी. जयरामन**, प्रोफेसर और **VIT, चेन्नई** के **स्कूल ऑफ बायोसाइंसेज एंड टेक्नोलॉजी** के डीन ने **कृषि, खाद्य, स्वास्थ्य और अनुसंधान आधारित नवाचार** सहित विभिन्न क्षेत्रों में बायोटेक्नोलॉजी के बढ़ते प्रभाव के बारे में बताया।
- He said the **biotech industry** was driving both **human and animal nutrition**.  
उन्होंने कहा कि **बायोटेक उद्योग मानव और पशु दोनों के पोषण** को आगे बढ़ा रहा है।
- "It is enhancing the quality and quantity of **food**."  
"यह **खाद्य** की गुणवत्ता और मात्रा दोनों को बढ़ा रहा है।"
- **Chakkaravarthi Saravanan**, Associate Professor at the **National Institute of Food Technology, Entrepreneurship and Management in Kundli, Haryana**, pointed out that with an ever-increasing **population**, shrinking **land space**, and rising **food prices**, the significance of biotechnology for food was growing.  
**चक्करवर्थी सरवनन**, राष्ट्रीय खाद्य प्रौद्योगिकी, उद्यमिता और प्रबंधन संस्थान, कुंडली, हरियाणा के एसोसिएट प्रोफेसर ने बताया कि बढ़ती **जनसंख्या**, घटती **भूमि**, और बढ़ती **खाद्य कीमतों** के कारण खाद्य के लिए बायोटेक्नोलॉजी का महत्व बढ़ रहा है।
- Speaking on the role of biotechnology in the **livestock industry**, **R. Balaguru**, technical director at **V.K. Palappa Nadar Poultry Farms Pvt. Ltd.**, said **70% of the rural poor** in the world depended on livestock.  
**पशुधन उद्योग** में बायोटेक्नोलॉजी की भूमिका पर बोलते हुए, **आर. बालागुरु**, तकनीकी निदेशक, **वी.के. पलप्पा नादर पोल्ट्री फार्म्स प्राइवेट लिमिटेड** ने कहा कि दुनिया के **70% ग्रामीण गरीब** पशुधन पर निर्भर हैं।
- The panellists advocated for establishing a solid foundation for learning **new-age technologies**.  
पैनलिस्टों ने **नई युग की तकनीकों** को सीखने के लिए मजबूत आधार स्थापित करने की वकालत की।



GS III: Economy

## Grim future

India's economic fundamentals need a realistic reassessment

The economy has recently been yielding some discomfiting data, even before the war in West Asia began. The most recent of these was the February 2026 data on the Index of Eight Core Industries. This release showed that growth in the overall Index had dropped to a three-month low in February, half the rate of what it saw in January. This was not a case of a high base effect, either, with growth in February 2025 having been just 3.4%. The sector-wise data reveal further issues. The domestic crude oil industry has been contracting for six consecutive months. In fact, the sector has contracted in 20 out of the last 24 months. The natural gas sector, too, has contracted for the last 20 consecutive months. As context, from about the middle of last year, it had been increasingly clear that there would be some sort of escalation between the U.S. and Iran, even if the exact nature of the war now could not have been predicted then. It is no secret that India is highly dependent on energy imports, especially from the region that would have faced the brunt of any such escalation. As a matter of fact, a large part of the contraction in domestic production was likely because imports were coming cheap. Yet, as tensions increased, it might have been more prudent to have increased domestic oil and gas production over the last eight months so as to at least build reserves, if not to also temporarily reduce import dependence. Permanently reducing such dependence will take time, but a temporary domestic production push – as is belatedly underway – might have considerably alleviated the current supply crunch. Hindsight is 20-20, but that does not excuse a lack of foresight or an inability to learn. The Pradhan Mantri Ujjwala Yojana of 2016 should have triggered a concerted policy to secure LPG supplies and reserves.

This poor core sector performance comes on top of the new series of GDP data showing that the Indian economy is actually smaller than previously thought. Further, between 2022-23 and 2025-26, the contributions to GDP of key engines such as private consumption, capital formation, exports and imports have all fallen. The share of 'change in stocks' has nearly doubled, however, meaning that there is production but not enough sales. Soon, that production too will reduce to fall in line with the subdued demand. All of this leads into the impact of the current crisis. With commercial fuel sources curtailed, oil prices at more than \$100 a barrel, and global economic uncertainty at a high, economists and rating agencies are already downgrading India's growth outlook to about 6.5%. Perhaps, India's much-vaunted macroeconomic fundamentals and resilience need a more realistic assessment.

- It is no secret that India is highly dependent on energy imports, especially from the region that would have faced the brunt of any such escalation. यह स्पष्ट है कि भारत ऊर्जा आयात पर अत्यधिक निर्भर है, विशेष रूप से उस क्षेत्र से जो ऐसे तनाव का मुख्य प्रभाव झेलता।
- As a matter of fact, a large part of the contraction in domestic production was likely because imports were coming cheap. वास्तव में, घरेलू उत्पादन में गिरावट का एक बड़ा कारण यह था कि आयात सस्ते मिल रहे थे।

## 24Mar. Grim future निराशाजनक भविष्य

• India's economic fundamentals need a realistic reassessment

भारत के आर्थिक मूलभूत तत्वों का यथार्थवादी पुनर्मूल्यांकन आवश्यक है

The economy has recently been yielding some discomfiting data / अर्थव्यवस्था से हाल में चिंताजनक आंकड़े सामने आए हैं

• The economy has recently been yielding some discomfiting data, even before the war in West Asia began. अर्थव्यवस्था से हाल में कुछ चिंताजनक आंकड़े सामने आए हैं, यहाँ तक कि पश्चिम एशिया में युद्ध शुरू होने से पहले ही।

• The most recent of these was the February 2026 data on the Index of Eight Core Industries. इनमें सबसे हाल का फरवरी 2026 का आठ कोर उद्योग सूचकांक का डेटा था।

• This release showed that growth in the overall Index had dropped to a three-month low in February, half the rate of what it saw in January.

इसमें दिखा कि फरवरी में समग्र सूचकांक की वृद्धि दर तीन महीने के निचले स्तर पर आ गई, जो जनवरी की तुलना में आधी थी।

• This was not a case of a high base effect, either, with growth in February 2025 having been just 3.4%. यह उच्च आधार प्रभाव का मामला भी नहीं था, क्योंकि फरवरी 2025 में वृद्धि केवल 3.4% थी।

• The sector-wise data reveal further issues. क्षेत्रवार आंकड़े और समस्याओं को उजागर करते हैं।

• The domestic crude oil industry has been contracting for six consecutive months.

घरेलू कच्चे तेल उद्योग में लगातार छह महीने से गिरावट आ रही है।

• In fact, the sector has contracted in 20 out of the last 24 months.

वास्तव में, पिछले 24 महीनों में 20 बार इस क्षेत्र में गिरावट आई है।

• The natural gas sector, too, has contracted for the last 20 consecutive months.

प्राकृतिक गैस क्षेत्र में भी पिछले 20 लगातार महीनों से गिरावट देखी गई है।

• As context, from about the middle of last year, it had been increasingly clear that there would be some sort of escalation between the U.S. and Iran, even if the exact nature of the war now could not have been predicted then. पृष्ठभूमि के रूप में, पिछले वर्ष के मध्य से यह स्पष्ट था कि अमेरिका और ईरान के बीच तनाव बढ़ेगा, भले ही युद्ध का सटीक स्वरूप तब ज्ञात नहीं था।



- Yet, as tensions increased, it might have been more prudent to have increased domestic oil and gas production over the last eight months so as to at least build reserves, if not to also temporarily reduce import dependence.  
लेकिन जैसे-जैसे तनाव बढ़ा, पिछले आठ महीनों में घरेलू तेल और गैस उत्पादन बढ़ाना अधिक उचित होता ताकि भंडार तैयार किया जा सके और आयात निर्भरता कुछ हद तक कम हो।
- Permanently reducing such dependence will take time, but a temporary domestic production push — as is belatedly underway — might have considerably alleviated the current supply crunch.  
ऐसी निर्भरता को स्थायी रूप से कम करने में समय लगेगा, लेकिन अस्थायी रूप से उत्पादन बढ़ाने से वर्तमान आपूर्ति संकट काफी हद तक कम हो सकता था।
- Hindsight is 20-20, but that does not excuse a lack of foresight or an inability to learn.  
बाद में समझ आना आसान होता है, लेकिन यह दूरदर्शिता की कमी या सीखने में असफलता को सही नहीं ठहराता।
- The **Pradhan Mantri Ujjwala Yojana** of 2016 should have triggered a concerted policy to secure LPG supplies and reserves.  
**2016** की **प्रधानमंत्री उज्ज्वला योजना** को एलपीजी आपूर्ति और भंडार सुनिश्चित करने के लिए एक समन्वित नीति शुरू करनी चाहिए थी।
- This poor core sector performance comes on top of the new series of GDP data showing that the Indian economy is actually smaller than previously thought.  
कोर सेक्टर के इस खराब प्रदर्शन के साथ-साथ नए जीडीपी आंकड़े बताते हैं कि भारतीय अर्थव्यवस्था पहले की तुलना में छोटी है।
- Further, between **2022-23 and 2025-26**, the contributions to GDP of key engines such as private consumption, capital formation, exports and imports have all fallen.  
इसके अलावा, **2022-23 से 2025-26** के बीच निजी खपत, पूंजी निर्माण, निर्यात और आयात जैसे प्रमुख घटकों का योगदान घटा है।
- The share of 'change in stocks' has nearly doubled, however, meaning that there is production but not enough sales.  
हालांकि 'स्टॉक में बदलाव' का हिस्सा लगभग दोगुना हो गया है, जिसका अर्थ है कि उत्पादन तो हो रहा है लेकिन बिक्री पर्याप्त नहीं है।
- Soon, that production too will reduce to fall in line with the subdued demand.  
जल्द ही उत्पादन भी कम हो जाएगा ताकि कम मांग के अनुरूप हो सके।
- All of this leads into the impact of the current crisis.  
ये सभी कारक वर्तमान संकट के प्रभाव को बढ़ाते हैं।
- With commercial fuel sources curtailed, oil prices at more than **\$100 a barrel**, and global economic uncertainty at a high, economists and rating agencies are already downgrading India's growth outlook to about **6.5%**.  
व्यावसायिक ईंधन स्रोतों में कमी, तेल की कीमतें **\$100 प्रति बैरल** से अधिक और वैश्विक अनिश्चितता के कारण अर्थशास्त्री और रेटिंग एजेंसियां भारत की विकास दर को लगभग **6.5%** तक घटा रहे हैं।
- Perhaps, India's much-vaunted macroeconomic fundamentals and resilience need a more realistic assessment.  
संभवतः भारत की व्यापक आर्थिक मजबूती और स्थिरता के दावों का अधिक यथार्थवादी मूल्यांकन आवश्यक है।



# Net FDI negative for fifth straight month

GS III: Economy

T.C.A. Sharad Raghavan  
NEW DELHI

Net FDI into India contracted for the fifth consecutive month in January 2026, with outflows exceeding inflows by nearly \$1.4 billion, a three-month high. The data shows this was because inflows into India fell nearly 7% while the amount repatriated out of the country nearly doubled.

According to data released by the Reserve Bank of India on Monday as part of its monthly bulletin, the total amount of money entering India as direct investment, or gross FDI, stood at about \$5.7 billion in January 2026.

This was 7% lower than in January last year, and only two-thirds of the amount that came in December 2025. The RBI, however, looked at a longer time period to draw some positive conclusions.

“During April 2025 - January 2026, gross FDI inflows remained strong, higher than the corresponding period a year ago,” the central bank noted in its report. “Sector-wise, manufacturing re-

ceived the highest share of equity inflows, followed by computer services, electricity and other energy, and financial services — these sectors together accounted for over 60% of total inflows.”

With regard to outflows, the outward FDI by Indian companies increased by 5.4% in January 2026 to \$2.1 billion. This was, however, nearly 30% lower than the outward FDI in December 2025.

“Around 75% of the outward FDI flows were directed to the U.S., Singapore, the UK, and the UAE during the [April 2025 - January 2026] period,” the RBI said. Repatriation and disinvestment by foreign companies doing business in India, on the other hand, increased by 97.3% to \$4.9 billion in January 2026. But this was nearly 18% lower than the amount in December 2025.

As a result, net FDI stood at about -\$1.4 billion, the lowest since October 2025.

The central bank noted that portfolio investments again flowed out more than they flowed in in March this year.

केंद्रीय बैंक ने अपनी रिपोर्ट में कहा।

- “Sector-wise, manufacturing received the highest share of equity inflows, followed by computer services, electricity and other energy, and financial services — these sectors together accounted for over 60% of total inflows.”  
“क्षेत्रवार, विनिर्माण को इक्विटी निवेश का सबसे बड़ा हिस्सा मिला, इसके बाद कंप्यूटर सेवाएं, बिजली और अन्य ऊर्जा, और वित्तीय सेवाएं रहीं — इन क्षेत्रों ने मिलकर कुल प्रवाह का 60% से अधिक हिस्सा प्राप्त किया।”
- With regard to outflows, the outward FDI by Indian companies increased by 5.4% in January 2026 to \$2.1 billion.  
बहिर्वाह के संदर्भ में, भारतीय कंपनियों का बाहरी FDI जनवरी 2026 में 5.4% बढ़कर 2.1 अरब डॉलर हो गया।
- This was, however, nearly 30% lower than the outward FDI in December 2025.  
हालांकि, यह दिसंबर 2025 के बाहरी FDI से लगभग 30% कम था।
- “Around 75% of the outward FDI flows were directed to the U.S., Singapore, the UK, and the UAE during the [April 2025 - January 2026] period,” the RBI said.

## 24Mar.Net FDI negative for fifth straight month

### शुद्ध FDI लगातार पांचवें महीने नकारात्मक

- Net FDI into India contracted for the fifth consecutive month in January 2026, with outflows exceeding inflows by nearly \$1.4 billion, a three-month high.

भारत में शुद्ध FDI जनवरी 2026 में लगातार पांचवें महीने घटा, जिसमें बहिर्वाह प्रवाह से अधिक होकर लगभग 1.4 अरब डॉलर रहा, जो तीन महीने का उच्च स्तर है।

- The data shows this was because inflows into India fell nearly 7% while the amount repatriated out of the country nearly doubled.

आंकड़े बताते हैं कि ऐसा इसलिए हुआ क्योंकि भारत में निवेश प्रवाह लगभग 7% घट गया, जबकि देश से बाहर भेजी गई राशि लगभग दोगुनी हो गई।

- According to data released by the Reserve Bank of India on Monday as part of its monthly bulletin, the total amount of money entering India as direct investment, or gross FDI, stood at about \$5.7 billion in January 2026.

भारतीय रिजर्व बैंक द्वारा सोमवार को जारी मासिक बुलेटिन के अनुसार, जनवरी 2026 में भारत में प्रत्यक्ष निवेश के रूप में आने वाली कुल राशि, यानी सकल FDI, लगभग 5.7 अरब डॉलर थी।

- This was 7% lower than in January last year, and only two-thirds of the amount that came in December 2025.

यह पिछले वर्ष जनवरी की तुलना में 7% कम था और दिसंबर 2025 में आए निवेश का केवल दो-तिहाई था।

- The RBI, however, looked at a longer time period to draw some positive conclusions.

हालांकि, RBI ने कुछ सकारात्मक निष्कर्ष निकालने के लिए लंबे समयवधि पर नजर डाली।

- “During April 2025 - January 2026, gross FDI inflows remained strong, higher than the corresponding period a year ago,” the central bank noted in its report.

“अप्रैल 2025 - जनवरी 2026 के दौरान सकल FDI प्रवाह मजबूत बना रहा, जो पिछले वर्ष की समान अवधि से अधिक था,”



“लगभग 75% बाहरी FDI प्रवाह अमेरिका, सिंगापुर, ब्रिटेन और यूएई की ओर निर्देशित था [अप्रैल 2025 - जनवरी 2026] अवधि के दौरान,” RBI ने कहा।

- **Repatriation and disinvestment** by foreign companies doing business in India, on the other hand, increased by **97.3%** to **\$4.9 billion** in January 2026.  
दूसरी ओर, भारत में व्यापार कर रही विदेशी कंपनियों द्वारा रिपैट्रिएशन और विनिवेश 97.3% बढ़कर जनवरी 2026 में **4.9 अरब डॉलर** हो गया।
- But this was nearly **18% lower** than the amount in **December 2025**.  
लेकिन यह **दिसंबर 2025** की राशि से लगभग **18% कम** था।
- As a result, **net FDI** stood at about **-\$1.4 billion**, the lowest since **October 2025**.  
इसके परिणामस्वरूप, **शुद्ध FDI** लगभग **-1.4 अरब डॉलर** रहा, जो **अक्टूबर 2025** के बाद सबसे कम है।
- The **central bank** noted that **portfolio investments** again flowed out more than they flowed in in **March** this year.  
**केंद्रीय बैंक** ने बताया कि इस वर्ष **मार्च** में **पोर्टफोलियो निवेश** फिर से आने की तुलना में अधिक बाहर चला गया।

## Gold futures dive over 10% amid global rout

**GS III: Economy**  
**Press Trust of India**  
NEW DELHI

Gold prices plummeted sharply by more than 10% to ₹1.29 lakh per 10 grams in futures trade on Monday amid a global sell-off in precious metals driven by macroeconomic pressures.  
On the Multi Commodity

Exchange, the yellow metal dived by ₹14,897, or 10.3%, to ₹1,29,595 per 10 grams. The yellow metal has now declined by ₹63,501, or nearly 33%, from its all-time high of ₹1,93,096 per 10 grams recorded on January 29.

Analysts said the sharp fall was triggered by rising

inflation fears and a surge in crude oil prices, which have clouded the global economic outlook.

Gaurav Garg, research analyst at Lemonn Markets Desk said, a stronger U.S. dollar and rising bond yields have led to liquidity-driven selling, overshadowing the traditional

safe-haven appeal of gold.

Last week, gold had dropped ₹13,974, or 8.82%, to close at around ₹1.44 lakh per 10 grams in the domestic market.

Globally, gold futures for the April contract depreciated \$474.9, or 10.4%, to hit an intraday low of \$4,100 per ounce.

### 24Mar. Gold futures dive over 10% amid global rout

#### वैश्विक गिरावट के बीच सोने के वायदा भाव 10% से अधिक गिरे

- **Gold prices** plummeted sharply by more than **10%** to **₹1.29 lakh per 10 grams** in futures trade on Monday amid a **global sell-off** in precious metals driven by **macroeconomic pressures**.  
सोने की कीमतें सोमवार को वायदा कारोबार में **10% से अधिक** गिरकर **₹1.29 लाख प्रति 10 ग्राम** पर आ गई, जिसका कारण **मैक्रोइकॉनॉमिक दबावों** के चलते कीमती धातुओं में **वैश्विक बिकवाली** रहा।
- On the **Multi Commodity Exchange**, the yellow metal dived by **₹14,897**, or **10.3%**, to **₹1,29,595 per 10 grams**.  
**मल्टी कमोडिटी एक्सचेंज** पर सोना **₹14,897** या **10.3%** गिरकर **₹1,29,595 प्रति 10 ग्राम** पर आ गया।
- The yellow metal has now declined by **₹63,501**, or nearly **33%**, from its **all-time high** of **₹1,93,096 per 10 grams** recorded on **January 29**.  
सोना अब अपने **29 जनवरी** को दर्ज **₹1,93,096 प्रति 10 ग्राम** के **सर्वकालिक उच्च स्तर** से **₹63,501** या लगभग **33%** गिर चुका है।
- Analysts said the sharp fall was triggered by rising **inflation fears** and a surge in **crude oil prices**, which have clouded the **global economic outlook**.  
विश्लेषकों ने कहा कि यह तेज गिरावट बढ़ती **मुद्रास्फीति की आशंकाओं** और **कच्चे तेल की कीमतों** में उछाल के कारण हुई, जिससे **वैश्विक आर्थिक दृष्टिकोण** धुंधला हो गया है।
- **Gaurav Garg**, research analyst at **Lemonn Markets Desk** said, a stronger **U.S. dollar** and rising **bond yields** have led to **liquidity-driven selling**, overshadowing the traditional **safe-haven appeal** of gold.  
**गौरव गर्ग**, **लेमन मार्केट्स डेस्क** के रिसर्च एनालिस्ट ने कहा कि मजबूत **अमेरिकी डॉलर** और बढ़ती **बॉन्ड यील्ड्स** के कारण **लिक्विडिटी आधारित बिकवाली** हुई, जिससे सोने की पारंपरिक **सुरक्षित निवेश** की छवि कमजोर पड़ी।



- Last week, gold had dropped ₹13,974, or 8.82%, to close at around ₹1.44 lakh per 10 grams in the domestic market.  
पिछले सप्ताह, घरेलू बाजार में सोना ₹13,974 या 8.82% गिरकर लगभग ₹1.44 लाख प्रति 10 ग्राम पर बंद हुआ था।
- Globally, gold futures for the April contract depreciated \$474.9, or 10.4%, to hit an intraday low of \$4,100 per ounce.  
वैश्विक स्तर पर, अप्रैल अनुबंध के लिए सोने के वायदा भाव \$474.9 या 10.4% गिरकर \$4,100 प्रति औंस के इंट्राडे निचले स्तर पर पहुंच गए।

## Lok Sabha sends Corporate Law Amendment Bill 2026 to JPC

GS III: Economy

**The Hindu Bureau**  
NEW DELHI

The government introduced the Corporate Laws (Amendment) Bill, 2026 in the Lok Sabha following which the House adopted a motion to send the proposed legislation to a Joint Parliamentary Committee (JPC) for detailed examination.

The JPC will comprise members from both Houses of Parliament for detailed analysis and recommendations, Union Finance Minister Nirmala Sitharaman said while proposing the motion for JPC reference. The motion was adopted by a voice vote.

The Bill seeks further amendments to the Limited Liability Partnership



Nirmala Sitharaman

Act, 2008 and the Companies Act, 2013 to facilitate ease of doing business and address the gaps identified by the Company Law Committee in its 2022 report.

The proposed amendments are expected to rationalise penalties, shift several minor procedural lapses from criminal liability

to monetary penalties, and streamline regulatory processes to promote ease of doing business.

The FM said the Bill was aimed at promoting ease of doing business and ease of living for corporates by decriminalising more provisions.

### 'Diluting provisions'

When the Bill was introduced in Lok Sabha, Opposition members Manish Tewari (Congress), Saugata Roy (Trinamool Congress) and T. Sumathy (DMK) opposed the same claiming the legislation sought to dilute the provisions of law under which companies mandatorily had to pay 2% of profit towards corporate social responsibility (CSR).

The FM refuted the

claim and said that the Bill had been introduced after two years of deliberations and the apprehensions of the members were unfounded as the proposed legislation sought to amend only the criteria for net profit, not the entire clause related to CSR.

Mr. Tewari also said since a Parliamentary Standing Committee on Corporate Affairs was already in place, the Bill must be sent there rather than setting up new JPC.

Home Minister Amit Shah, intervening, said none of the Opposition members talked about referring the Bill to a panel and now, when the FM has herself sought it, they were arguing as to which panel the Bill should be sent.

### 24Mar. Lok Sabha sends Corporate Law Amendment Bill 2026 to JPC लोकसभा ने कॉर्पोरेट कानून संशोधन विधेयक 2026 को JPC को भेजा

- The government introduced the Corporate Laws (Amendment) Bill, 2026 in the Lok Sabha following which the House adopted a motion to send the proposed legislation to a Joint Parliamentary Committee (JPC) for detailed examination.  
सरकार ने लोकसभा में कॉर्पोरेट कानून (संशोधन) विधेयक, 2026 पेश किया, जिसके बाद सदन ने इस प्रस्तावित विधेयक को विस्तृत जांच के लिए संयुक्त संसदीय समिति (JPC) को भेजने का प्रस्ताव पारित किया।
- The JPC will comprise members from both Houses of Parliament for detailed analysis and recommendations, Union Finance Minister Nirmala Sitharaman said while proposing the motion for JPC reference.  
JPC में संसद के दोनों सदनों के सदस्य शामिल होंगे जो विस्तृत विश्लेषण और सिफारिशें देंगे, यह बात केंद्रीय वित्त मंत्री निर्मला सीतारमण ने JPC को संदर्भित करने का प्रस्ताव रखते हुए कही।
- The motion was adopted by a voice vote.  
इस प्रस्ताव को ध्वनि मत से पारित किया गया।
- The Bill seeks further amendments to the Limited Liability Partnership Act, 2008 and the Companies Act, 2013 to facilitate ease of doing business and address the gaps identified



by the **Company Law Committee** in its **2022 report**.

यह विधेयक **लिमिटेड लायबिलिटी पार्टनरशिप अधिनियम, 2008** और **कंपनी अधिनियम, 2013** में और संशोधन करना चाहता है ताकि **व्यवसाय करने में आसानी** को बढ़ावा दिया जा सके और **कंपनी लॉ कमेटी की 2022 रिपोर्ट** में पहचानी गई कमियों को दूर किया जा सके।

- The proposed amendments are expected to **rationalise penalties**, shift several minor procedural lapses from **criminal liability** to **monetary penalties**, and streamline regulatory processes to promote **ease of doing business**.  
प्रस्तावित संशोधनों से **दंडों का तर्कसंगतकरण** होगा, कई छोटे प्रक्रियात्मक उल्लंघनों को **आपराधिक दायित्व** से हटाकर **आर्थिक दंड** में बदला जाएगा, और **व्यवसाय करने में आसानी** के लिए नियामक प्रक्रियाओं को सरल बनाया जाएगा।
- The **FM** said the Bill was aimed at promoting **ease of doing business** and **ease of living** for corporates by **decriminalising** more provisions.  
**वित्त मंत्री** ने कहा कि यह विधेयक अधिक प्रावधानों को **अपराधमुक्त (decriminalising)** करके कंपनियों के लिए **व्यवसाय करने में आसानी** और **जीवन को आसान** बनाने के उद्देश्य से लाया गया है।

### 'Diluting provisions' 'प्रावधानों को कमजोर करना'

- When the Bill was introduced in **Lok Sabha**, Opposition members **Manish Tewari (Congress)**, **Saugata Roy (Trinamool Congress)** and **T. Sumathy (DMK)** opposed the same claiming the legislation sought to **dilute the provisions of law** under which companies mandatorily had to pay **2% of profit** towards **corporate social responsibility (CSR)**.  
जब यह विधेयक **लोकसभा** में पेश किया गया, तो विपक्षी सदस्य **मनीष तिवारी (कांग्रेस)**, **सौगत रॉय (तृणमूल कांग्रेस)** और **टी. सुमथि (DMK)** ने इसका विरोध किया और कहा कि यह कानून के उन प्रावधानों को **कमजोर** करता है, जिनके तहत कंपनियों को **कॉर्पोरेट सामाजिक जिम्मेदारी (CSR)** के लिए **लाभ का 2%** देना अनिवार्य था।
- The **FM** refuted the claim and said that the Bill had been introduced after **two years of deliberations** and the apprehensions of the members were unfounded as the proposed legislation sought to amend only the **criteria for net profit**, not the entire clause related to **CSR**.  
**वित्त मंत्री** ने इस दावे को खारिज करते हुए कहा कि यह विधेयक **दो वर्षों की विचार-विमर्श प्रक्रिया** के बाद लाया गया है और सदस्यों की आशंकाएं निराधार हैं क्योंकि प्रस्तावित कानून केवल **शुद्ध लाभ के मानदंड** में संशोधन करता है, न कि पूरे **CSR** प्रावधान में।
- Mr. Tewari** also said since a **Parliamentary Standing Committee on Corporate Affairs** was already in place, the Bill must be sent there rather than setting up new **JPC**.  
**श्री तिवारी** ने यह भी कहा कि चूंकि **कॉर्पोरेट मामलों की संसदीय स्थायी समिति** पहले से मौजूद है, इसलिए विधेयक को नए **JPC** के बजाय वहीं भेजा जाना चाहिए।
- Home Minister Amit Shah**, intervening, said none of the Opposition members talked about referring the Bill to a panel and now, when the **FM** has herself sought it, they were arguing as to which panel the Bill should be sent.  
हस्तक्षेप करते हुए **गृह मंत्री अमित शाह** ने कहा कि विपक्ष के किसी भी सदस्य ने पहले विधेयक को किसी समिति को भेजने की बात नहीं की थी और अब जब **वित्त मंत्री** ने स्वयं यह प्रस्ताव रखा है, तो वे इस पर बहस कर रहे हैं कि इसे किस समिति को भेजा जाए।

### GS Paper III: S&T,

#### TOPICS COVERED

24 March 2026

24Mar

**Generic semaglutide widens access, but comes with risks**  
**जेनेरिक सेमाग्लूटाइड पहुंच बढ़ाता है, लेकिन इसके साथ जोखिम भी हैं**



24Mar	<b>New way helps superconductor break temperature record</b> नई विधि सुपरकंडक्टर को तापमान रिकॉर्ड तोड़ने में मदद करती है
24Mar	<b>The evolving diagnostic landscape for tuberculosis</b> क्षय रोग के लिए विकसित होता निदान परिदृश्य

# Generic semaglutide widens access, but comes with risks

GS III: S&T

**Siddharth Kumar Singh**  
HYDERABAD

A patient walks into a clinic and asks not about **diabetes control**, but about **weight loss drug**. He has seen the results online, heard the name of the drug, and now, with prices falling, wants it. Doctors say such conversations are becoming increasingly common as Indian pharmaceutical companies begin rolling out generic versions of **semaglutide**, a drug used for **type 2 diabetes and obesity**, often described as the 'magic drug'.

With the patent on semaglutide having expired in India, the cost dynamics of the drug are beginning to shift. Earlier, branded versions of semaglutide, primarily marketed by



Prices are expected to drop by 30-60%. GETTY IMAGES/ISTOCK

multinational companies, could cost anywhere between ₹8,000 and ₹12,000 per month depending on the dosage and formulation. With domestic pharmaceutical companies introducing generic versions, prices are expected to drop by 30-60% in the initial phase.

K.V.S. Hari Kumar, endocrinologist and secretary

of the Endocrine Society of India, said the impact of the generic entry is likely to be more gradual than widely assumed. He noted that semaglutide was already being used by a significant number of patients despite its higher price. "It is not that it was accessible only to a very small population. The market itself was sizable," he said.

However, Dr. Kumar raised concerns about manufacturing quality and supply chain requirements. As a protein-based drug similar to insulin, semaglutide requires strict cold-chain maintenance and high manufacturing standards. "If substandard products enter the market, patients may face more harm than benefit, and the entire ecosystem could be affected," he said.

## 24Mar. Generic semaglutide widens access, but comes with risks जेनेरिक सेमाग्लूटाइड पहुंच बढ़ाता है, लेकिन इसके साथ जोखिम भी हैं

- A patient walks into a clinic and asks not about **diabetes control**, but about **weight loss drug**.  
एक मरीज क्लिनिक में आता है और **मधुमेह नियंत्रण** के बारे में नहीं बल्कि **वजन घटाने की दवा** के बारे में पूछता है।
- He has seen the results online, heard the name of the drug, and now, with prices falling, wants it.  
उसने ऑनलाइन इसके परिणाम देखे हैं, दवा का नाम सुना है, और अब कीमत कम होने के कारण वह इसे चाहता है।
- Doctors say such conversations are becoming increasingly common as Indian pharmaceutical companies begin rolling out **generic versions of semaglutide**, a drug used for **type 2 diabetes and obesity**, often described as the 'magic drug'.  
डॉक्टरों का कहना है कि इस तरह की बातचीत अब आम होती जा रही है क्योंकि भारतीय फार्मास्यूटिकल कंपनियां **सेमाग्लूटाइड के जेनेरिक संस्करण** बाजार में ला रही हैं, जो **टाइप 2 मधुमेह और मोटापे** के लिए उपयोग की जाने वाली दवा है, जिसे अक्सर '**मैजिक ड्रग**' कहा जाता है।



- With the **patent on semaglutide** having expired in India, the **cost dynamics** of the drug are beginning to shift.  
भारत में **सेमाग्लूटाइड का पेटेंट** समाप्त होने के साथ, इस दवा की **लागत संरचना** में बदलाव शुरू हो गया है।
- Earlier, **branded versions of semaglutide**, primarily marketed by multinational companies, could cost anywhere between **₹8,000 and ₹12,000 per month** depending on the dosage and formulation.  
पहले, **सेमाग्लूटाइड के ब्रांडेड संस्करण**, जिन्हें मुख्यतः बहुराष्ट्रीय कंपनियां बेचती थीं, उनकी कीमत **₹8,000 से ₹12,000 प्रति माह** तक होती थी, जो खुराक और रूप पर निर्भर करती थी।
- With domestic pharmaceutical companies introducing **generic versions**, prices are expected to drop by **30-60%** in the initial phase.  
घरेलू फार्मास्युटिकल कंपनियों द्वारा **जेनेरिक संस्करण** लाने के साथ, शुरुआती चरण में कीमतों में **30-60%** तक गिरावट आने की उम्मीद है।
- **K.V.S. Hari Kumar**, endocrinologist and secretary of the **Endocrine Society of India**, said the impact of the generic entry is likely to be more gradual than widely assumed.  
**के.वी.एस. हरि कुमार**, एंडोक्राइनोलॉजिस्ट और **एंडोक्राइन सोसाइटी ऑफ इंडिया** के सचिव ने कहा कि जेनेरिक के प्रवेश का प्रभाव व्यापक अनुमान से अधिक धीरे-धीरे होगा।
- He noted that semaglutide was already being used by a **significant number of patients** despite its higher price.  
उन्होंने कहा कि अधिक कीमत के बावजूद सेमाग्लूटाइड का उपयोग पहले से ही **काफी संख्या में मरीजों** द्वारा किया जा रहा था।
- "It is not that it was accessible only to a very small population.  
"ऐसा नहीं है कि यह केवल बहुत कम लोगों के लिए उपलब्ध था।
- The market itself was sizable," he said.  
बाजार खुद ही बड़ा था," उन्होंने कहा।
- However, Dr. Kumar raised concerns about **manufacturing quality** and **supply chain requirements**.  
हालांकि, डॉ. कुमार ने **निर्माण गुणवत्ता** और **आपूर्ति श्रृंखला आवश्यकताओं** को लेकर चिंता जताई।
- As a **protein-based drug** similar to insulin, semaglutide requires strict **cold-chain maintenance** and high manufacturing standards.  
एक **प्रोटीन आधारित दवा** होने के कारण, जो इंसुलिन के समान है, सेमाग्लूटाइड को सख्त **कोल्ड-चेन रखरखाव** और उच्च निर्माण मानकों की आवश्यकता होती है।
- "If substandard products enter the market, patients may face more harm than benefit, and the entire ecosystem could be affected," he said.  
"यदि निम्न गुणवत्ता वाले उत्पाद बाजार में आते हैं, तो मरीजों को लाभ से अधिक नुकसान हो सकता है और पूरा तंत्र प्रभावित हो सकता है," उन्होंने कहा।



# New way helps superconductor break temperature record

While superconductivity is easy to achieve at extremely low temperature, bringing it to room temperature is a holy grail of physics; researchers have achieved much higher temperatures in recent years, up to -43 °C, but only by applying pressure equivalent to that near the earth's core

Yasudevyan Mukunth  
CHENNAI

For more than a century, physicists have looked for a material that conducts electricity with zero resistance at room temperature – practical enough to transform how the world generates and uses energy. But for a long time, the highest temperature at which a material became superconducting at room pressure was -140 °C. Some other materials become superconducting close to room temperature, but only under extraordinary pressure.

In a study published in *Proceedings of the National Academy of Sciences* on March 9, scientists have reported raising the temperature by 18°C, and under only room pressure. They used a new technique called pressure quenching to achieve this.

The result has broken a record that had stood since 1993, when the same material the team used – a copper oxide called Hg1223 – first demonstrated superconductivity at -140°C, itself a landmark that launched decades of research.

'Sounds reasonable'

Superconductors that work at room temperature and normal pressure could one day carry electricity through power grids without losing any energy to resistance – a problem that currently wastes billions of dollars' worth of power every year.

They could also enable faster MRI machines, more efficient electric motors, better transportation systems, and cheaper renewable energy infrastructure.

The team was led by physicists Liangzi Deng and Ching-Wu Chu at the University of Houston.

"The claim sounds reasonable to me," said Sumit Mazumdar, professor of physics, chemistry, and optical sciences at the University of Arizona, in an email to *The Hindu*.

"The authors carefully study high-pressure structures, and when they find first order transitions (which involves latent heat), they do what they call pressure-quenching so that the changed high pressure structure persists even when the pressure is removed," he added.

Intense pressure

Since 1993, the record for ambient pressure superconductivity has been stuck at -140 °C. While superconductivity is easy to achieve at extremely low temperature, bringing it to room temperature is a "holy grail" of physics.

Researchers have achieved much higher temperatures in recent years, up to -43 °C, but only by applying pressure equivalent to that near the earth's core.

These high-pressure states have also disappeared the moment the pressure was released, making them useless for practical technologies like lossless power grids or high-speed trains.

The problem was not that scientists lacked the materials. Under extreme pressure, Hg1223 itself superconducts at -109 °C.

Some compounds rich in hydrogen have also shown hints of becoming superconductors at near room temperature. But they have all required intense pressure as well.

Reproducible data

The Houston team's insight was to stop looking for new materials and to focus on preserving a known high-pressure state in Hg1223.

For this, the scientists developed the pressure-quench protocol (PQP) – a three-stage process designed to freeze a high-pressure superconducting state in place by removing pressure fast enough and at a low enough temperature.

They loaded a small crystal of Hg1223 into a diamond anvil cell and compressed it to up to 30 billion pascals (GPa), raising its superconducting temperature to over -123°C, while keeping track of its superconducting properties. Then they cooled the sample to -269 °C, just above absolute zero.

Finally, they rapidly released the pressure. Because the material was so cold, the atoms lacked the energy to relax back into their normal structure, effectively trapping the material's desirable electronic properties at the normal atmospheric pressure.

Across five tests with different pressures and quenching conditions, the team consistently retained the transition temperature between -122 °C and -134 °C. They achieved the higher -122 °C by quenching from approximately 19 GPa at



Ching-Wu Chu holds a diamond anvil cell in a University of Houston lab. UNIVERSITY OF HOUSTON

-269 °C. They could also reproduce it, a sign that it is likely real rather than an artifact in the data.

The 122 °C reading is 18 °C higher than the previous record held by the same material in its relaxed state.

The scientists also used synchrotron X-ray diffraction at the U.S. Argonne National Laboratory to find that while the material retained its original crystal structure after quenching, there were new defects in the structure and additional internal strain.

These defects helped lock the crystal into a state where it mimicked the effects of pressure even after the pressure was removed. The team confirmed that roughly 78% of the material's volume became superconducting, so it wasn't a surface or filamentary effect.

If superconductivity is filamentary, it means electricity is only traveling through microscopic channels, called filaments, within the material. These filaments can only carry a very small amount of electrical current before they break and return to a normal state.

If the bulk is superconducting, as the researchers reported, the material can be expected to reliably carry large currents, which is required to transport power on run high-speed trains.

The quenched phase was stable for at least three days when stored in liquid nitrogen. Warming above -73 °C reduced the effect while room temperature (23 °C) partially reversed it. One experiment also produced a hint of superconductivity at -101 °C but the team wasn't able to reproduce it.

'Woodstock of physics'

The study's lead investigator, Ching-Wu Chu, is a pioneer of high-temperature superconductivity. In 1987, Prof. Chu and his team made a landmark discovery when they synthesised a material called yttrium barium copper oxide (YBCO) that became a superconductor at -180 °C.

Until then, scientists only had materials that became superconducting below -269 °C, which meant they had to be cooled using expensive liquid helium.

However, -180 °C was above the boiling point of liquid nitrogen (-196 °C), which meant scientists could cool YBCO using this much cheaper coolant, paving the way for more research and potential applications.

That same year, the American Physical Society held a special session on high-temperature superconductivity that ran past midnight and drew thousands of attendees – an event that has since been called the 'Woodstock of physics'. Prof. Chu was one of the central figures there and presented his team's results to a



The method, if it works out in other cases, has great promise for a room-pressure superconductor. Not yet for room-temperature. The latter is not essential for technological applications

SUMIT MAZUMDAR  
Professor at the University of Arizona

packed and electrified audience. The session captured the excitement of a field that, in that moment, seemed to be on the edge of transforming technology.

His work earned him numerous honours, including the National Medal of Science in 1994.

Now, beyond breaking a 33-year-old record, according to the new study's authors, their work may also open the door for scientists to 'stabilise' exotic electronic properties in other materials that arise under pressure and make them available at ordinary conditions.

"The method, if it works out in other cases, has great promise for a room-pressure superconductor. Not yet for room-temperature," according to Prof. Mazumdar. "The latter is not essential for technological applications. The entire issue therefore revolves around what the authors call pressure-quenching [and] whether structural changes that occur under pressure can really be retained post-quenching."

He added that while this issue is beyond his expertise, it is not impossible.

"This result will be widely noted in the superconductivity community, and I expect that many experimentalist groups will apply the same methodology to other candidate materials," Brookhaven National Laboratory, New York, physicist Ivan Božović, who wasn't involved in the study but reviewed it for the journal, told *Physics*.

The paper's authors themselves wrote: "We ... believe that the record-breaking results at ambient pressure reported here represent only the beginning of an extremely fruitful scientific journey."

Recent controversies

High-temperature superconductivity research has been shadowed by controversy for much of the past decade and understanding that backdrop has come to matter when evaluating new claims in the field.

These episodes have made the research community acutely sensitive to the claims of new studies, particularly whether a given material's resistance can really drop to zero – the hallmark of

superconductivity – and if the data showing that is because the instruments are actually measuring the sample.

The most prominent case involved Ranga Dias at the University of Rochester in the U.S. Dias published papers claiming room-temperature superconductivity in carbonaceous sulphur hydrides in 2020 and nitrogen-doped lutetium hydrides in 2023. Dias and his team retracted both papers, published in *Nature*, after allegations that the magnetic susceptibility measurements had been manipulated to show signs of superconductivity.

Multiple independent labs also failed to reproduce the findings. Dias contested the retractions and the dispute has already become one of the most acrimonious data-integrity controversies in physics.

In 2023, a group of researchers from South Korea said they had made a lead-based material called LK-99 that was a superconductor at room-pressure and room-temperature.

The result generated intense public interest but soon, other scientists who recreated the experiment couldn't find signs of superconductivity in LK-99.

Later studies revealed that some of the measurements the South Korean team had made were "polluted" by unexpected ferromagnetic behaviour in LK-99.

The episode further exhausted the public appetite for superconductivity news.

'Decades-old reputation'

Both Dias's work and the new University of Houston study use diamond anvil cells. However, unlike the materials in Dias's work, Hg1223 is well-understood and has a record going back to the 1980s.

The team also focused on a unique state of the material – one that arises under intense pressure – rather than claim a new phase, experts said.

The study also directly addressed the primary criticism of the Dias episode: whether superconductivity is a bulk property of filamentary.

As noted earlier, the team found that some 78% of the material was superconducting. Dias and others didn't perform these tests.

"The dubious claims ... came from people who were practically unknown prior to their claims of novelty," Prof. Mazumdar said. "The principal author Chu in this case came close to winning the Nobel Prize [and] is the recipient of the US National Medal of Science. His current paper's ref. 22 goes back to 1968."

"He is not going to risk his decades-old reputation writing fraudulent stuff." [mukunth.v@thehindu.co.in](mailto:mukunth.v@thehindu.co.in)

24Mar. New way helps superconductor break temperature record  
नई विधि सुपरकंडक्टर को तापमान रिकॉर्ड तोड़ने में मदद करती है



- For more than a century, physicists have looked for a material that conducts electricity with zero resistance at room temperature — practical enough to transform how the world generates and uses energy.  
एक सदी से अधिक समय से, भौतिकविद् ऐसे पदार्थ की खोज कर रहे हैं जो **कमरे के तापमान पर शून्य प्रतिरोध** के साथ बिजली का संचालन करें — इतना व्यावहारिक कि यह दुनिया में ऊर्जा के उत्पादन और उपयोग के तरीके को बदल सके।
- But for a long time, the highest temperature at which a material became superconducting at room pressure was **-140 °C**.  
लेकिन लंबे समय तक, जिस अधिकतम तापमान पर कोई पदार्थ **सामान्य दाब** पर अतिचालक बना, वह **-140 °C** था।
- Some other materials become superconducting close to room temperature, but only under extraordinary pressure.  
कुछ अन्य पदार्थ कमरे के तापमान के करीब अतिचालक बन जाते हैं, लेकिन केवल **अत्यधिक दबाव** के तहत।
- In a study published in **Proceedings of the National Academy of Sciences** on **March 9**, scientists have reported raising the temperature by **18°C**, and under only room pressure.  
**9 मार्च** को **राष्ट्रीय विज्ञान अकादमी की कार्यवाही** में प्रकाशित एक अध्ययन में वैज्ञानिकों ने तापमान को **18°C** तक बढ़ाने की सूचना दी है, वह भी केवल **सामान्य दाब** पर।
- They used a new technique called **pressure quenching** to achieve this.  
इसे प्राप्त करने के लिए उन्होंने **दाब शमन तकनीक** नामक नई विधि का उपयोग किया।
- **The result has broken a record / परिणाम ने एक रिकॉर्ड तोड़ा है**
- The result has broken a record that had stood since **1993**, when the same material the team used — a copper oxide called **Hg1223** — first demonstrated superconductivity at **-140°C**, itself a landmark that launched decades of research.  
इस परिणाम ने **1993** से चला आ रहा रिकॉर्ड तोड़ दिया, जब इसी पदार्थ — एक तांबा ऑक्साइड **Hg1223** — ने पहली बार **-140°C** पर अतिचालकता प्रदर्शित की थी, जो दशकों के शोध की शुरुआत का एक मील का पत्थर था।

### 'Sounds reasonable' / 'उचित लगता है'

- Superconductors that work at room temperature and normal pressure could one day carry electricity through power grids without losing any energy to resistance — a problem that currently wastes billions of dollars' worth of power every year.  
ऐसे अतिचालक जो **कमरे के तापमान** और **सामान्य दाब** पर काम करते हैं, एक दिन बिजली ग्रिड के माध्यम से बिना किसी ऊर्जा हानि के बिजली ले जा सकते हैं — जो वर्तमान में हर साल अरबों डॉलर की बिजली बर्बाद करती है।
- They could also enable faster **MRI machines**, more efficient electric motors, better transportation systems, and cheaper renewable energy infrastructure.  
वे तेज़ **चुंबकीय अनुनाद इमेजिंग मशीनों**, अधिक कुशल इलेक्ट्रिक मोटर्स, बेहतर परिवहन प्रणालियों और सस्ते नवीकरणीय ऊर्जा ढांचे को भी संभव बना सकते हैं।
- The team was led by physicists **Liangzi Deng** and **Ching-Wu Chu** at the **University of Houston**.  
इस टीम का नेतृत्व भौतिकविद् **Liangzi Deng** और **Ching-Wu Chu** ने **ह्यूस्टन विश्वविद्यालय** में किया।
- "The claim sounds reasonable to me," said **Sumit Mazumdar**, professor of physics, chemistry, and optical sciences at the **University of Arizona**, in an email to The Hindu.  
"यह दावा मुझे उचित लगता है," **Sumit Mazumdar**, जो **एरिज़ोना विश्वविद्यालय** में भौतिकी, रसायन और प्रकाशिकी विज्ञान के प्रोफेसर हैं, ने एक ईमेल में कहा।
- "The authors carefully study high-pressure structures, and when they find first order transitions (which involves latent heat), they do what they call pressure-quenching so that the changed high pressure structure persists even when the pressure is removed," he added.  
"लेखक उच्च दबाव संरचनाओं का सावधानीपूर्वक अध्ययन करते हैं, और जब उन्हें **प्रथम कोटि संक्रमण** (जिसमें **गुप्त ऊष्मा** शामिल होती है) मिलते हैं, तो वे **दाब शमन** करते हैं ताकि बदली हुई उच्च दबाव संरचना दबाव हटाने के बाद भी बनी रहे," उन्होंने जोड़ा।

Intense pressure / अत्यधिक दबाव



- Since **1993**, the record for ambient pressure superconductivity has been stuck at **-140 °C**.  
**1993** से, सामान्य दाब पर अतिचालकता का रिकॉर्ड **-140 °C** पर ही बना हुआ है।
- While superconductivity is easy to achieve at extremely low temperature, bringing it to room temperature is a “holy grail” of physics.  
हालांकि अतिचालकता को अत्यधिक निम्न तापमान पर प्राप्त करना आसान है, इसे कमरे के तापमान तक लाना भौतिकी का एक अत्यंत महत्वपूर्ण लक्ष्य माना जाता है।
- Researchers have achieved much higher temperatures in recent years, up to **-13 °C**, but only by applying pressure equivalent to that near the earth’s core.  
शोधकर्ताओं ने हाल के वर्षों में तापमान को **-13 °C** तक बढ़ाया है, लेकिन केवल पृथ्वी के कोर के पास के बराबर दबाव लागू करके।
- These high-pressure states have also disappeared the moment the pressure was released, making them useless for practical technologies like lossless power grids or high-speed trains.  
ये उच्च-दबाव अवस्थाएँ दबाव हटाते ही समाप्त हो जाती हैं, जिससे वे **व्यावहारिक तकनीकों** जैसे बिना हानि वाले बिजली ग्रिड या उच्च गति वाली ट्रेनों के लिए बेकार हो जाती हैं।
- The problem was not that scientists lacked the materials. Under extreme pressure, **Hg1223** itself superconducts at **-109 °C**.  
समस्या यह नहीं थी कि वैज्ञानिकों के पास सामग्री की कमी थी। अत्यधिक दबाव में **Hg1223** स्वयं **-109 °C** पर अतिचालक बन जाता है।
- Some compounds rich in hydrogen have also shown hints of becoming superconductors at near room temperature. But they have all required intense pressure as well.  
कुछ **हाइड्रोजन-समृद्ध यौगिकों** ने भी कमरे के तापमान के करीब अतिचालक बनने के संकेत दिए हैं, लेकिन उन्हें भी **अत्यधिक दबाव** की आवश्यकता होती है।

### Reproducible data / पुनरुत्पादित किए जा सकने वाले आंकड़े

- The Houston team's insight was to stop looking for new materials and to focus on preserving a known high-pressure state in **Hg1223**.  
ह्यूस्टन टीम की समझ यह थी कि नए पदार्थों की खोज बंद कर दी जाए और **Hg1223** में ज्ञात **उच्च दबाव अवस्था** को संरक्षित करने पर ध्यान दिया जाए।
- For this, the scientists developed the **pressure-quench protocol (PQP)** — a three-stage process designed to freeze a high-pressure superconducting state in place by removing pressure fast enough and at a low enough temperature.  
इसके लिए वैज्ञानिकों ने **दाब शमन प्रोटोकॉल (PQP)** विकसित किया — एक **तीन-चरणीय प्रक्रिया** जो उच्च दबाव अतिचालक अवस्था को तेज़ी से दबाव हटाकर और कम तापमान पर स्थिर करने के लिए बनाई गई है।
- They loaded a small crystal of **Hg1223** into a diamond anvil cell and compressed it to up to **30 billion pascals (GPa)**, raising its superconducting temperature to over **-123°C**, while keeping track of its superconducting properties.  
उन्होंने **Hg1223** के एक छोटे क्रिस्टल को **हीरा निहाई यंत्र** में रखा और इसे **30 अरब पास्कल (GPa)** तक संपीड़ित किया, जिससे इसका अतिचालक तापमान **-123°C** से अधिक हो गया, साथ ही इसके गुणों पर नज़र रखी।
- Then they cooled the sample to **-269 °C**, just above absolute zero.  
फिर उन्होंने नमूने को **-269 °C** तक ठंडा किया, जो **परम शून्य** के ठीक ऊपर है।
- Finally, they rapidly released the pressure.  
अंत में, उन्होंने दबाव को तेज़ी से हटा दिया।
- Because the material was so cold, the atoms lacked the energy to relax back into their normal structure, effectively trapping the material’s desirable electronic properties at the normal atmospheric pressure.  
क्योंकि पदार्थ बहुत ठंडा था, परमाणुओं के पास अपनी सामान्य संरचना में लौटने के लिए ऊर्जा नहीं थी, जिससे उसके वांछित **इलेक्ट्रॉनिक गुण** सामान्य वायुमंडलीय दबाव पर ही स्थिर हो गए।
- Across five tests with different pressures and quenching conditions, the team consistently retained the transition temperature between **-122 °C** and **-134 °C**.  
विभिन्न दबाव और शमन स्थितियों के साथ पाँच परीक्षणों में, टीम ने लगातार **-122 °C** से **-134 °C** के बीच संक्रमण तापमान बनाए रखा।
- They achieved the higher **-122 °C** by quenching from approximately **19 GPa** at **-269 °C**.  
उन्होंने लगभग **19 GPa** से **-269 °C** पर शमन करके अधिकतम **-122 °C** प्राप्त किया।



- They could also reproduce it, a sign that it is likely real rather than an artifact in the data.  
वे इसे पुनः प्राप्त करने में भी सक्षम थे, जो यह संकेत देता है कि यह परिणाम वास्तविक है, न कि आंकड़ों में कोई त्रुटि।
- The **122 °C** reading is **18 °C** higher than the previous record held by the same material in its relaxed state.  
यह **122 °C** का मान उसी पदार्थ के सामान्य अवस्था में पिछले रिकॉर्ड से **18 °C** अधिक है।
- The scientists also used synchrotron **X-ray diffraction** at the U.S. Argonne National Laboratory to find that while the material retained its original crystal structure after quenching, there were new defects in the structure and additional internal strain.  
वैज्ञानिकों ने अमेरिका के **Argonne National Laboratory** में **सिंक्रोट्रॉन एक्स-रे विवर्तन** का उपयोग किया और पाया कि शमन के बाद पदार्थ ने अपनी मूल क्रिस्टल संरचना बनाए रखी, लेकिन उसमें नए दोष और अतिरिक्त आंतरिक तनाव उत्पन्न हो गए।
- These defects helped lock the crystal into a state where it mimicked the effects of pressure even after the pressure was removed.  
इन दोषों ने क्रिस्टल को ऐसी अवस्था में स्थिर करने में मदद की, जिसमें वह दबाव हटाने के बाद भी दबाव के प्रभाव की नकल करता रहा।
- The team confirmed that roughly **78%** of the material's volume became superconducting, so it wasn't a surface or filamentary effect.  
टीम ने पुष्टि की कि लगभग **78%** आयतन अतिचालक बन गया, इसलिए यह केवल सतही या सूक्ष्म तंतु प्रभाव नहीं था।
- If superconductivity is filamentary, it means electricity is only traveling through microscopic channels, called filaments, within the material.  
यदि अतिचालकता सूक्ष्म तंतु रूप में होती है, तो इसका अर्थ है कि बिजली केवल पदार्थ के अंदर छोटे-छोटे चैनलों से गुजरती है।
- These filaments can only carry a very small amount of electrical current before they break and return to a normal state.  
ये तंतु केवल बहुत कम मात्रा में विद्युत धारा वहन कर सकते हैं, उसके बाद वे टूटकर सामान्य अवस्था में लौट आते हैं।
- If the bulk is superconducting, as the researchers reported, the material can be expected to reliably carry large currents, which is required to transport power on run high-speed trains.  
यदि संपूर्ण आयतन अतिचालक है, जैसा कि शोधकर्ताओं ने बताया, तो यह पदार्थ बड़ी विद्युत धारा को विश्वसनीय रूप से वहन कर सकता है, जो उच्च गति ट्रेनों के लिए आवश्यक है।
- The quenched phase was stable for at least **three days** when stored in liquid nitrogen.  
शमन की गई अवस्था तरल नाइट्रोजन में रखने पर कम से कम **तीन दिन** तक स्थिर रही।
- Warming above **-73 °C** reduced the effect while room temperature (**23 °C**) partially reversed it.  
**-73 °C** से ऊपर तापमान बढ़ाने पर प्रभाव कम हो गया, जबकि कमरे का तापमान (**23 °C**) इसे आंशिक रूप से उलट देता है।
- One experiment also produced a hint of superconductivity at **-101 °C** but the team wasn't able to reproduce it.  
एक प्रयोग में **-101 °C** पर अतिचालकता के संकेत मिले, लेकिन टीम इसे दोबारा प्राप्त नहीं कर सकी।

### 'Woodstock of physics' / 'भौतिकी का वुडस्टॉक'

- The study's lead investigator, **Ching-Wu Chu**, is a pioneer of high-temperature superconductivity.  
अध्ययन के प्रमुख अन्वेषक **Ching-Wu Chu** उच्च तापमान अतिचालकता के अग्रणी वैज्ञानिक हैं।
- In **1987**, Prof. Chu and his team made a landmark discovery when it synthesised a material called **yttrium barium copper oxide (YBCO)** that became a superconductor at **-180 °C**.  
**1987** में, प्रो. चू और उनकी टीम ने एक महत्वपूर्ण खोज की जब उन्होंने **yttrium barium copper oxide (YBCO)** नामक पदार्थ का संश्लेषण किया, जो **-180 °C** पर अतिचालक बन गया।
- Until then, scientists only had materials that became superconducting below **-269 °C**, which meant they had to be cooled using expensive liquid helium.  
उस समय तक वैज्ञानिकों के पास केवल ऐसे पदार्थ थे जो **-269 °C** से नीचे अतिचालक बनते थे, जिसके कारण उन्हें महंगे **द्रव हीलियम** से ठंडा करना पड़ता था।



- However, **-180 °C** was above the boiling point of liquid nitrogen (**-196 °C**), which meant scientists could cool YBCO using this much cheaper coolant, paving the way for more research and potential applications.  
लेकिन **-180 °C**, **द्रव नाइट्रोजन** के क्वथनांक (**-196 °C**) से ऊपर था, जिससे वैज्ञानिक इस सस्ते शीतलक का उपयोग करके YBCO को ठंडा कर सकते थे और इससे आगे के शोध व अनुप्रयोगों का मार्ग प्रशस्त हुआ।
- That same year, the **American Physical Society** held a special session on high-temperature superconductivity that ran past midnight and drew thousands of attendees — an event that has since been called the **‘Woodstock of physics’**.  
उसी वर्ष, **American Physical Society** ने उच्च तापमान अतिचालकता पर एक विशेष सत्र आयोजित किया जो आधी रात से भी आगे चला और जिसमें हजारों लोग शामिल हुए — इस घटना को बाद में **‘भौतिकी का वुडस्टॉक’** कहा गया।
- Prof. Chu was one of the central figures there and presented his team’s results to a packed and electrified audience.  
प्रो. चू वहाँ के प्रमुख व्यक्तियों में से एक थे और उन्होंने अपनी टीम के परिणामों को उत्साहित और भरे हुए दर्शकों के सामने प्रस्तुत किया।
- The session captured the excitement of a field that, in that moment, seemed to be on the edge of transforming technology.  
इस सत्र ने उस क्षेत्र के उत्साह को दर्शाया जो उस समय तकनीक को बदलने के कगार पर प्रतीत हो रहा था।
- His work earned him numerous honours, including the **National Medal of Science** in **1994**.  
उनके कार्य ने उन्हें कई सम्मान दिलाए, जिनमें **1994** में **National Medal of Science** शामिल है।
- Now, beyond breaking a **33-year-old** record, according to the new study’s authors, their work may also open the door for scientists to ‘stabilise’ exotic electronic properties in other materials that arise under pressure and make them available at ordinary conditions.  
अब, **33 वर्ष पुराने** रिकॉर्ड को तोड़ने के अलावा, नए अध्ययन के लेखकों के अनुसार, उनका कार्य वैज्ञानिकों के लिए अन्य पदार्थों में दबाव के तहत उत्पन्न होने वाले विशेष इलेक्ट्रॉनिक गुणों को ‘स्थिर’ करने का मार्ग खोल सकता है और उन्हें सामान्य परिस्थितियों में उपलब्ध करा सकता है।
- “The method, if it works out in other cases, has great promise for a room-pressure superconductor. Not yet for room-temperature,” according to Prof. Mazumdar.  
प्रो. मजूमदार के अनुसार, “यह विधि यदि अन्य मामलों में सफल होती है, तो सामान्य दाब पर अतिचालक के लिए बहुत संभावनाएँ रखती है, हालांकि अभी कमरे के तापमान के लिए नहीं।”
- “The latter is not essential for technological applications. The entire issue therefore revolves around what the authors call pressure-quenching [and] whether structural changes that occur under pressure can really be retained post-quenching.”  
“यह बाद वाली बात तकनीकी अनुप्रयोगों के लिए अनिवार्य नहीं है। पूरा मुद्दा इस बात पर निर्भर करता है कि जिसे लेखक दाब शमन कहते हैं और क्या दबाव में होने वाले संरचनात्मक परिवर्तन शमन के बाद वास्तव में बने रह सकते हैं।”
- He added that while this issue is beyond his expertise, it is not impossible.  
उन्होंने जोड़ा कि यद्यपि यह विषय उनकी विशेषज्ञता से बाहर है, फिर भी यह असंभव नहीं है।
- “This result will be widely noted in the superconductivity community, and I expect that many experimentalist groups will apply the same methodology to other candidate materials,”  
**Brookhaven National Laboratory**, New York, physicist **Ivan Božović**, who wasn’t involved in the study but reviewed it for the journal, told Physics.  
न्यूयॉर्क के **Brookhaven National Laboratory** के भौतिकविद् **Ivan Božović** ने कहा कि यह परिणाम अतिचालकता समुदाय में व्यापक रूप से ध्यान आकर्षित करेगा और कई प्रयोगात्मक समूह इस पद्धति को अन्य संभावित पदार्थों पर लागू करेंगे।
- The paper’s authors themselves wrote: “We ... believe that the record-breaking results at ambient pressure reported here represent only the beginning of an extremely fruitful scientific journey.”  
शोधपत्र के लेखकों ने स्वयं लिखा: “हम मानते हैं कि सामान्य दाब पर प्राप्त ये रिकॉर्ड तोड़ परिणाम एक अत्यंत फलदायी वैज्ञानिक यात्रा की केवल शुरुआत हैं।”

### Recent controversies / हालिया विवाद

- High-temperature superconductivity research has been shadowed by controversy for much of the past decade and understanding that backdrop has come to matter when evaluating new claims in the field.



उच्च तापमान अतिचालकता अनुसंधान पिछले एक दशक से विवादों से घिरा रहा है और इस पृष्ठभूमि को समझना नए दावों के मूल्यांकन में महत्वपूर्ण हो गया है।

- These episodes have made the research community acutely sensitive to the claims of new studies, particularly whether a given material's resistance can really drop to zero — the hallmark of superconductivity — and if the data showing that is because the instruments are actually measuring the sample.  
इन घटनाओं ने शोध समुदाय को नए अध्ययनों के दावों के प्रति अत्यधिक संवेदनशील बना दिया है, विशेषकर यह कि क्या किसी पदार्थ का प्रतिरोध वास्तव में **शून्य** तक गिर सकता है — जो अतिचालकता की पहचान है — और क्या इसके आंकड़े वास्तव में नमूने के मापन से प्राप्त हुए हैं।
- The most prominent case involved **Ranga Dias** at the **University of Rochester** in the U.S. Dias published papers claiming room-temperature superconductivity in carbonaceous sulphur hydrides in **2020** and nitrogen-doped lutetium hydrides in **2023**.  
सबसे प्रमुख मामला अमेरिका के **University of Rochester** के **Ranga Dias** से जुड़ा था। उन्होंने **2020** में कार्बन युक्त सल्फर हाइड्राइड और **2023** में नाइट्रोजन मिश्रित ल्यूटेटियम हाइड्राइड में कमरे के तापमान पर अतिचालकता का दावा किया।
- Dias and his team retracted both papers, published in **Nature**, after allegations that the magnetic susceptibility measurements had been manipulated to show signs of superconductivity.  
**Nature** में प्रकाशित दोनों शोधपत्रों को Dias और उनकी टीम ने वापस ले लिया, जब आरोप लगे कि **चुंबकीय संवेदनशीलता मापों** में हेरफेर कर अतिचालकता के संकेत दिखाए गए थे।
- Multiple independent labs also failed to reproduce the findings.  
कई स्वतंत्र प्रयोगशालाएँ भी इन परिणामों को दोहराने में विफल रहीं।
- Dias contested the retractions and the dispute has already become one of the most acrimonious data-integrity controversies in physics.  
Dias ने इन वापसी निर्णयों को चुनौती दी और यह विवाद भौतिकी में सबसे तीखे **डेटा विश्वसनीयता विवादों** में से एक बन गया।
- In **2023**, a group of researchers from South Korea said they had made a lead-based material called **LK-99** that was a superconductor at room-pressure and room-temperature.  
**2023** में दक्षिण कोरिया के शोधकर्ताओं के एक समूह ने दावा किया कि उन्होंने **LK-99** नामक सीसा-आधारित पदार्थ बनाया है जो सामान्य दाब और कमरे के तापमान पर अतिचालक है।
- The result generated intense public interest but soon, other scientists who recreated the experiment couldn't find signs of superconductivity in **LK-99**.  
इस परिणाम ने व्यापक जन रुचि उत्पन्न की, लेकिन जल्द ही अन्य वैज्ञानिकों को **LK-99** में अतिचालकता के संकेत नहीं मिले।
- Later studies revealed that some of the measurements the South Korean team had made were 'polluted' by unexpected ferromagnetic behaviour in **LK-99**.  
बाद के अध्ययनों से पता चला कि दक्षिण कोरियाई टीम के कुछ मापन **अप्रत्याशित फेरोचुंबकीय व्यवहार** से प्रभावित थे।
- The episode further exhausted the public appetite for superconductivity news.  
इस घटना ने अतिचालकता से संबंधित समाचारों के प्रति जनता की रुचि को और कम कर दिया।
- **'Decades-old reputation' / 'दशकों पुरानी प्रतिष्ठा'**
- Both Dias's work and the new **University of Houston** study use diamond anvil cells.  
Dias के कार्य और नए **University of Houston** अध्ययन दोनों में **हीरा निहाई यंत्र** का उपयोग किया गया।
- However, unlike the materials in Dias's work, **Hg1223** is well-understood and has a record going back to the **1980s**.  
हालांकि, Dias के कार्य के पदार्थों के विपरीत, **Hg1223** अच्छी तरह से समझा गया है और इसका रिकॉर्ड **1980 के दशक** से है।
- The team also focused on a unique state of the material — one that arises under intense pressure — rather than claim a new phase, experts said.  
विशेषज्ञों के अनुसार, टीम ने नए चरण का दावा करने के बजाय पदार्थ की एक विशिष्ट अवस्था पर ध्यान दिया जो **अत्यधिक दबाव** में उत्पन्न होती है।
- The study also directly addressed the primary criticism of the Dias episode: whether superconductivity is a bulk property or filamentary.  
अध्ययन ने Dias प्रकरण की मुख्य आलोचना को सीधे संबोधित किया: क्या अतिचालकता एक **संपूर्ण गुण** है या केवल सूक्ष्म तंतु रूप में।



- As noted earlier, the team found that some **78%** of the material was superconducting. Dias and others didn't perform these tests.  
जैसा कि पहले बताया गया, टीम ने पाया कि लगभग **78%** पदार्थ अतिचालक था। Dias और अन्य ने ऐसे परीक्षण नहीं किए थे।
- "The dubious claims ... came from people who were practically unknown prior to their claims of novelty," Prof. Mazumdar said.  
प्रो. मजूमदार ने कहा कि "संदिग्ध दावे उन लोगों से आए थे जो अपने नए दावों से पहले लगभग अज्ञात थे।"
- "The principal author Chu in this case came close to winning the Nobel Prize [and] is the recipient of the US National Medal of Science. His current paper's ref. 22 goes back to **1968**.  
"इस मामले में प्रमुख लेखक Chu नोबेल पुरस्कार के करीब पहुंचे थे और उन्हें **अमेरिकी राष्ट्रीय विज्ञान पदक** प्राप्त हुआ है। उनके वर्तमान शोधपत्र का संदर्भ **1968** तक जाता है।"
- "He is not going to risk his decades-old reputation writing fraudulent stuff."  
"वह अपनी **दशकों पुरानी प्रतिष्ठा** को जोखिम में डालकर कोई धोखाधड़ी नहीं करेंगे।"

A curated selection of articles on the Editorial and Opinion pages for World TB Day, March 24

## The evolving diagnostic landscape for tuberculosis

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Two weeks ago, in the run-up to **World Tuberculosis (TB) Day** (which falls on **March 24**), the World Health Organization (WHO) formally recommended the use of **new near point-of-care (NPOC) molecular tests for diagnosing TB**. WHO also endorsed the use of tongue swab samples for TB testing and sputum pooling strategies to potentially improve testing efficiencies at scale. These are the latest developments in what has been an unusually remarkable decade for the TB diagnostic landscape, a decade when new technologies have not only emerged but have also been tested, swiftly recommended and utilised to advance global efforts to eliminate TB.

Probably the best example is the rapidly expanding use of **portable chest X-ray (CXR)**, in tandem with artificial intelligence (AI) solutions for TB screening. In India, the **National Tuberculosis Elimination Programme (NTEP)** has made available hundreds of portable CXR machines that are being utilised for the **Pradhan Mantri TB Mukh Bharat Abhiyaan**, in an effort to take active TB screening into the community.

Until recently, X-ray access was limited to hospital settings and dependent on the availability of technicians and radiologists to record the X-ray and interpret the findings. Today, active case-finding efforts are in full swing through mobile vans equipped with portable CXR with AI, making it more convenient. While this takes diagnostic services into the community, we must ensure on-the-spot collection of sputum samples for those with any CXR findings to significantly reduce attrition in the diagnostic cascade. Further, those with CXR lesions other than TB (for example, lung cancer) must get the referral and treatment services they need. Systematic microplanning will also help to refine these screening efforts to focus on those who are most vulnerable, particularly in urban and tribal settings.

The use of AI also presents a credible option for opportunistic screening. Tens of thousands of X-rays are performed daily across India in public and private clinics and hospitals for various reasons. Installing AI algorithms in digital X-ray machines that can swiftly identify suspicious lesions, whether for TB or other respiratory disorders, can reduce delays in diagnosis. Building health system capacity, particularly at the service delivery level, to use AI effectively is an important first step.

### The diagnostic landscape is shifting

India has long relied on sputum smear microscopy as the primary test for diagnosing TB, despite its low sensitivity and inability to identify drug-resistance. In 2016, India began scaling up **molecular testing – starting with the Cartridge-based Nucleic Acid Amplification Test**



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Strengthening the tuberculosis testing infrastructure with an expanded diagnostic toolbox will improve outcomes and support TB elimination efforts

(CBNAAT) and later adopting the **indigenous Truenat** in 2020. Today, many more Indian products are available, and decentralised access to molecular testing is central to the TB programme.

However, access to up-front molecular testing remains uneven. To achieve 100% testing through NAAT prior to treatment initiation, we must also strengthen sputum collection and transportation mechanisms, especially for the elderly, people with disabilities, and those who live in hard-to-reach areas. To complete the diagnostic cascade swiftly, we must reduce delays in first-line and second-line drug resistance testing and work with the general health system to leverage diagnostic human resource capacity. Minimising test turnaround time will ensure that people with drug-resistant TB are started on the correct treatment regimen at the earliest.

With WHO's endorsement of **near point-of-care Nucleic Acid Amplification Tests (nPOC-NAAT)**, there are now more options for molecular testing at the primary-care level that are not heavily dependent on infrastructure. The use of non-sputum samples, such as tongue swabs, are especially useful for those who find it difficult to produce a good sputum sample, including children.

It is important to acknowledge that none of these tools is a complete solution in itself. What this growing collection of new tests offers is a comprehensive toolbox for TB diagnosis. Diagnostic network optimisation can help identify which tools to best use, individually and in combination, and where they should be located, to establish a diagnostic cascade that is accessible, affordable and person-centered. India must field-test these tools through robust implementation research that matches the pace of innovation, so that solutions can be tested in specific settings and decisions taken for scale-up.

Indian innovators have made a significant contribution, bringing to the market screening and diagnostic tools for global use, and will continue to play an important role in taking them to scale across the country. Over the years, we must examine the evidence to evolve clear diagnostic algorithms that are operationally feasible, involving the use of both AI-enabled CXR and molecular tests for diagnosing TB and identifying any antibiotic resistance.

### Research and innovation priorities

Simultaneously, we must streamline innovation assessment and procurement pathways so that all evidence is rigorously reviewed by the Indian Council of Medical Research (ICMR), comprehensive health technology assessments address clinical, social, economic, and ethical concerns, and only recommended tools are

procured and distributed in both public and private sectors. Several areas still require research and innovation.

First, as India is scaling up testing for TB infection and access to TB preventive therapy (TPT), we need more cost-effective and easy-to-use biomarkers that can identify and predict those at high risk for disease progression. Studies have shown that 'test and treat' approaches are more likely to convince people with TB infection to start on TPT, if they are at higher risk for disease, particularly in the private sector.

Second, the National TB Survey shows that asymptomatic TB is a serious issue, making symptom-based screening alone insufficient. Increased access to chest X-ray is a step in the right direction but we also need faster, less invasive diagnostic tools that use saliva and other non-sputum samples. More feasibility studies are required to understand utility and performance in real-world settings, particularly among individuals with low bacterial load.

Third, diagnosing TB in children remains challenging. Children cannot produce sputum as they often have low bacillary levels. Testing using stool samples has been tried in some countries and we need more implementation research in this area. We need far greater investment – and urgency – in finding the right new tools for diagnosing TB in children.

Finally, **diagnosing extra-pulmonary TB (EP-TB) – which is almost a quarter of India's TB burden – remains difficult**, often inaccessible and very expensive. Misdiagnosis as well as delayed diagnosis of EP-TB contributes to both catastrophic costs for families and poor outcomes for individuals. There are some pilots being done globally using AI-enabled portable ultrasound devices alongside molecular testing using new tools; we need India-specific evidence on this, including on cost-effectiveness.

Investing in strengthening the diagnostic landscape can be the greatest return on investment for the public health system. The sooner a person with TB is diagnosed, ideally before they are very ill, the more likely they are to recover fully, with fewer long-term post-treatment morbidities. Early diagnosis can not only improve treatment outcomes and long-term lung health but also dramatically reduce transmission within communities. A careful but swift and streamlined public sector expansion of diagnostics can also significantly reduce out-of-pocket expenditure for families affected by TB. An evidence-based, strong and expanded diagnostic toolbox can be a powerful lever to accelerate pathways to TB elimination in India.



**24Mar. The evolving diagnostic landscape for tuberculosis**  
क्षय रोग के लिए विकसित होता निदान परिदृश्य



- Two weeks ago, in the run-up to **World Tuberculosis (TB) Day** (which falls on **March 24**), the **World Health Organization (WHO)** formally recommended the use of new near point-of-care (**NPOC**) molecular tests for diagnosing TB.  
दो सप्ताह पहले, **विश्व तपेदिक दिवस (24 मार्च)** से पहले, **विश्व स्वास्थ्य संगठन (WHO)** ने तपेदिक के निदान के लिए नए **निकट सेवा केंद्र आधारित आणविक परीक्षण** की सिफारिश की।
- WHO also endorsed the use of **tongue swab samples** for TB testing and sputum pooling strategies to potentially improve testing efficiencies at scale.  
WHO ने तपेदिक जांच के लिए **जीभ स्वाब नमूने** और बलगम संयोजन रणनीतियों को भी समर्थन दिया ताकि बड़े स्तर पर परीक्षण की दक्षता बढ़ाई जा सके।
- These are the latest developments in what has been an unusually remarkable decade for the TB diagnostic landscape, a decade when new technologies have not only emerged but have also been tested, swiftly recommended and utilised to advance global efforts to eliminate TB. ये विकास तपेदिक निदान के क्षेत्र के एक महत्वपूर्ण दशक का हिस्सा हैं, जिसमें नई तकनीकों का विकास, परीक्षण और उपयोग तेज़ी से हुआ है।
- Probably the best example is the rapidly expanding use of portable **chest X-ray (CXR)**, in tandem with **artificial intelligence (AI)** solutions for TB screening.  
सबसे अच्छा उदाहरण **पोर्टेबल छाती एक्स-रे** और **कृत्रिम बुद्धिमत्ता** के साथ तपेदिक जांच का तेज़ी से बढ़ता उपयोग है।
- In India, the **National Tuberculosis Elimination Programme (NTEP)** has made available hundreds of portable CXR machines that are being utilised for the **Pradhan Mantri TB Mukh Bharat Abhiyaan**, in an effort to take active TB screening into the community.  
भारत में **राष्ट्रीय तपेदिक उन्मूलन कार्यक्रम** के तहत सैकड़ों पोर्टेबल एक्स-रे मशीनें उपलब्ध कराई गई हैं, जिनका उपयोग **प्रधानमंत्री टीबी मुक्त भारत अभियान** के लिए किया जा रहा है।
- Until recently, X-ray access was limited to hospital settings and dependent on the availability of technicians and radiologists to record the X-ray and interpret the findings.  
हाल तक एक्स-रे सुविधा केवल अस्पतालों तक सीमित थी और तकनीशियन तथा विशेषज्ञों पर निर्भर थी।
- Today, active case-finding efforts are in full swing through mobile vans equipped with portable CXR with AI, making it more convenient.  
आज सक्रिय खोज अभियान मोबाइल वैन के माध्यम से चल रहे हैं, जिनमें पोर्टेबल एक्स-रे और कृत्रिम बुद्धिमत्ता लगी है, जिससे यह अधिक सुविधाजनक हो गया है।
- While this takes diagnostic services into the community, we must ensure on-the-spot collection of sputum samples for those with any CXR findings to significantly reduce attrition in the diagnostic cascade.  
हालांकि इससे जांच सेवाएं समुदाय तक पहुंच रही हैं, लेकिन जिन लोगों में एक्स-रे में संकेत मिलते हैं उनके लिए तुरंत बलगम नमूना संग्रह सुनिश्चित करना आवश्यक है ताकि जांच प्रक्रिया में कमी न आए।
- Further, those with CXR lesions other than TB (for example, lung cancer) must get the referral and treatment services they need.  
इसके अलावा, जिनमें अन्य रोग जैसे **फेफड़ों का कैंसर** पाया जाता है, उन्हें उचित उपचार और रेफरल मिलना चाहिए।
- Systematic microplanning will also help to refine these screening efforts to focus on those who are most vulnerable, particularly in urban and tribal settings.  
संगठित सूक्ष्म योजना इन प्रयासों को और बेहतर बनाकर सबसे अधिक संवेदनशील समूहों, विशेषकर शहरी और जनजातीय क्षेत्रों पर ध्यान केंद्रित करने में मदद करेगी।
- The use of AI also presents a credible option for opportunistic screening.  
कृत्रिम बुद्धिमत्ता का उपयोग अवसरवादी जांच के लिए भी एक विश्वसनीय विकल्प प्रस्तुत करता है।
- Tens of thousands of X-rays are performed daily across India in public and private clinics and hospitals for various reasons.  
भारत में प्रतिदिन हजारों एक्स-रे सार्वजनिक और निजी अस्पतालों में किए जाते हैं।
- Installing AI algorithms in digital X-ray machines that can swiftly identify suspicious lesions, whether for TB or other respiratory disorders, can reduce delays in diagnosis.  
डिजिटल एक्स-रे मशीनों में कृत्रिम बुद्धिमत्ता लगाने से संदिग्ध घावों की पहचान जल्दी हो सकती है और निदान में देरी कम हो सकती है।
- Building health system capacity, particularly at the service delivery level, to use AI effectively is an important first step.



स्वास्थ्य प्रणाली की क्षमता बढ़ाना, विशेषकर सेवा स्तर पर, कृत्रिम बुद्धिमत्ता के प्रभावी उपयोग के लिए महत्वपूर्ण पहला कदम है।

### The diagnostic landscape is shifting / निदान परिदृश्य में बदलाव

- India has long relied on sputum smear microscopy as the primary test for diagnosing TB, despite its low sensitivity and inability to identify drug-resistance.  
भारत लंबे समय से तपेदिक निदान के लिए बलगम सूक्ष्मदर्शी परीक्षण पर निर्भर रहा है, जबकि इसकी संवेदनशीलता कम है और यह दवा प्रतिरोध का पता नहीं लगा सकता।
- In **2016**, India began scaling up molecular testing — starting with the **Cartridge-based Nucleic Acid Amplification Test (CBNAAT)** and later adopting the indigenous **Truenat** in **2020**.  
**2016** में भारत ने आणविक परीक्षण का विस्तार शुरू किया — पहले **सीबीएनएएटी** और बाद में **2020** में स्वदेशी **ट्रूनेट** को अपनाया।
- Today, many more Indian products are available, and decentralised access to molecular testing is central to the TB programme.  
आज कई भारतीय उत्पाद उपलब्ध हैं और विकेंद्रीकृत स्तर पर आणविक परीक्षण तक पहुंच तपेदिक कार्यक्रम का मुख्य हिस्सा बन गई है।
- However, access to up-front molecular testing remains uneven.  
हालांकि, प्रारंभिक आणविक परीक्षण तक पहुंच अभी भी असमान है।
- To achieve **100% testing through NAAT** prior to treatment initiation, we must also strengthen sputum collection and transportation mechanisms, especially for the elderly, people with disabilities, and those who live in hard-to-reach areas.  
उपचार शुरू करने से पहले **NAAT के माध्यम से 100% परीक्षण** प्राप्त करने के लिए, बलगम संग्रह और परिवहन तंत्र को मजबूत करना आवश्यक है, विशेषकर बुजुर्गों, दिव्यांगों और दूरदराज क्षेत्रों में रहने वालों के लिए।
- To complete the diagnostic cascade swiftly, we must reduce delays in first-line and second-line drug resistance testing and work with the general health system to leverage diagnostic human resource capacity.  
निदान प्रक्रिया को तेजी से पूरा करने के लिए, पहली और दूसरी पंक्ति के दवा प्रतिरोध परीक्षण में देरी कम करनी होगी और स्वास्थ्य प्रणाली की मानव संसाधन क्षमता का उपयोग करना होगा।
- Minimising test turnaround time will ensure that people with drug-resistant TB are started on the correct treatment regimen at the earliest.  
परीक्षण समय को कम करने से दवा प्रतिरोधी तपेदिक के मरीजों को सही उपचार जल्द शुरू किया जा सकेगा।
- With WHO's endorsement of near point-of-care **Nucleic Acid Amplification Tests (nPOC-NAAT)**, there are now more options for molecular testing at the primary-care level that are not heavily dependent on infrastructure.  
WHO द्वारा **निकट सेवा केंद्र आधारित आणविक परीक्षण** की सिफारिश के बाद, प्राथमिक स्वास्थ्य स्तर पर अब ऐसे परीक्षण उपलब्ध हैं जो बुनियादी ढांचे पर अधिक निर्भर नहीं हैं।
- The use of non-sputum samples, such as tongue swabs, are especially useful for those who find it difficult to produce a good sputum sample, including children.  
बलगम के अलावा अन्य नमूनों जैसे जीभ स्वाब का उपयोग उन लोगों के लिए उपयोगी है जो अच्छा बलगम नमूना नहीं दे पाते, जैसे बच्चे।
- It is important to acknowledge that none of these tools is a complete solution in itself.  
यह स्वीकार करना महत्वपूर्ण है कि इनमें से कोई भी उपकरण अकेले पूर्ण समाधान नहीं है।
- What this growing collection of new tests offers is a comprehensive toolbox for TB diagnosis.  
इन नए परीक्षणों का समूह तपेदिक निदान के लिए एक व्यापक उपकरण किट प्रदान करता है।
- Diagnostic network optimisation can help identify which tools to best use, individually and in combination, and where they should be located, to establish a diagnostic cascade that is accessible, affordable and person-centered.  
निदान नेटवर्क का अनुकूलन यह तय करने में मदद करेगा कि कौन से उपकरण कहाँ और कैसे उपयोग किए जाएं ताकि सुलभ और किफायती निदान प्रणाली बनाई जा सके।
- India must field-test these tools through robust implementation research that matches the pace of innovation, so that solutions can be tested in specific settings and decisions taken for scale-up.



भारत को इन उपकरणों का परीक्षण मजबूत कार्यान्वयन अनुसंधान के माध्यम से करना चाहिए ताकि उन्हें विभिन्न परिस्थितियों में परखा जा सके और विस्तार के निर्णय लिए जा सकें।

- Indian innovators have made a significant contribution, bringing to the market screening and diagnostic tools for global use, and will continue to play an important role in taking them to scale across the country.  
भारतीय नवप्रवर्तकों ने वैश्विक उपयोग के लिए जांच और निदान उपकरण विकसित करने में महत्वपूर्ण योगदान दिया है और वे आगे भी इन्हें विस्तार देने में भूमिका निभाएंगे।
- Over the years, we must examine the evidence to evolve clear diagnostic algorithms that are operationally feasible, involving the use of both **AI-enabled CXR** and molecular tests for diagnosing TB and identifying any antibiotic resistance.  
समय के साथ हमें ऐसे स्पष्ट निदान मानक विकसित करने होंगे जिनमें **कृत्रिम बुद्धिमत्ता आधारित एक्स-रे** और आणविक परीक्षण दोनों का उपयोग शामिल हो।

### Research and innovation priorities / अनुसंधान और नवाचार प्राथमिकताएँ

- Simultaneously, we must streamline innovation assessment and procurement pathways so that all evidence is rigorously reviewed by the **Indian Council of Medical Research (ICMR)**, comprehensive health technology assessments address clinical, social, economic, and ethical concerns, and only recommended tools are procured and distributed in both public and private sectors.  
साथ ही, नवाचार मूल्यांकन और खरीद प्रक्रियाओं को सरल बनाना होगा ताकि सभी प्रमाणों की समीक्षा **भारतीय आयुर्विज्ञान अनुसंधान परिषद** द्वारा की जा सके और केवल स्वीकृत उपकरण ही उपयोग में लाए जाएं।
- Several areas still require research and innovation.  
कई क्षेत्रों में अभी भी अनुसंधान और नवाचार की आवश्यकता है।
- First, as India is scaling up testing for TB infection and access to **TB preventive therapy (TPT)**, we need more cost-effective and easy-to-use biomarkers that can identify and predict those at high risk for disease progression.  
पहला, जैसे-जैसे भारत तपेदिक संक्रमण परीक्षण और **रोकथाम चिकित्सा** का विस्तार कर रहा है, ऐसे सस्ते और आसान जैव संकेतकों की आवश्यकता है जो उच्च जोखिम वाले लोगों की पहचान कर सकें।
- Studies have shown that 'test and treat' approaches are more likely to convince people with TB infection to start on TPT, if they are at higher risk for disease, particularly in the private sector.  
अध्ययनों से पता चला है कि 'जांच और उपचार' दृष्टिकोण उच्च जोखिम वाले लोगों को उपचार शुरू करने के लिए अधिक प्रेरित करता है, विशेषकर निजी क्षेत्र में।

### Research and innovation priorities (continued) / अनुसंधान और नवाचार प्राथमिकताएँ (जारी)

- Second, the National TB Survey shows that **asymptomatic TB** is a serious issue, making symptom-based screening alone insufficient.  
दूसरा, राष्ट्रीय तपेदिक सर्वेक्षण दर्शाता है कि **लक्षण रहित तपेदिक** एक गंभीर समस्या है, जिससे केवल लक्षण आधारित जांच पर्याप्त नहीं है।
- Increased access to **chest X-ray** is a step in the right direction but we also need faster, less invasive diagnostic tools that use saliva and other non-sputum samples.  
**छाती एक्स-रे** तक बढ़ी पहुंच सही दिशा में कदम है, लेकिन हमें ऐसे तेज़ और कम आक्रामक परीक्षण चाहिए जो लार और अन्य नमूनों का उपयोग करें।
- More feasibility studies are required to understand utility and performance in real-world settings, particularly among individuals with low bacterial load.  
वास्तविक परिस्थितियों में उपयोगिता और प्रदर्शन समझने के लिए अधिक व्यवहार्यता अध्ययन आवश्यक हैं, विशेषकर कम जीवाणु भार वाले लोगों में।
- Third, diagnosing TB in children remains challenging.  
तीसरा, बच्चों में तपेदिक का निदान अभी भी चुनौतीपूर्ण है।
- Children cannot produce sputum as they often have low bacillary levels.  
बच्चे बलगम नहीं दे पाते क्योंकि उनमें जीवाणु स्तर कम होता है।
- Testing using stool samples has been tried in some countries and we need more implementation research in this area.



कुछ देशों में मल नमूनों के माध्यम से जांच की गई है और इस क्षेत्र में अधिक कार्यान्वयन अनुसंधान की आवश्यकता है।

- We need far greater investment — and urgency — in finding the right new tools for diagnosing TB in children.  
बच्चों में तपेदिक निदान के लिए नए उपकरणों की खोज में अधिक निवेश और तात्कालिकता की आवश्यकता है।
- Finally, diagnosing **extra-pulmonary TB (EP-TB)** — which is almost a quarter of India's TB burden — remains difficult, often inaccessible and very expensive.  
अंत में, **फेफड़ों के बाहर होने वाला तपेदिक**, जो भारत के कुल मामलों का लगभग एक चौथाई है, का निदान कठिन, सीमित और महंगा है।
- Misdiagnosis as well as delayed diagnosis of EP-TB contributes to both catastrophic costs for families and poor outcomes for individuals.  
गलत या देर से निदान परिवारों पर भारी आर्थिक बोझ डालता है और रोगियों के परिणाम खराब करता है।
- There are some pilots being done globally using **AI-enabled portable ultrasound devices** alongside molecular testing using new tools; we need India-specific evidence on this, including on cost-effectiveness.  
दुनिया भर में **कृत्रिम बुद्धिमत्ता आधारित पोर्टेबल अल्ट्रासाउंड** और नए परीक्षणों के साथ प्रयोग किए जा रहे हैं; इसके लिए भारत-विशिष्ट प्रमाण आवश्यक हैं।
- Investing in strengthening the diagnostic landscape can be the greatest return on investment for the public health system.  
निदान प्रणाली को मजबूत करना सार्वजनिक स्वास्थ्य प्रणाली के लिए सबसे बड़ा निवेश प्रतिफल दे सकता है।
- The sooner a person with TB is diagnosed, ideally before they are very ill, the more likely they are to recover fully, with fewer long-term post-treatment morbidities.  
जितनी जल्दी तपेदिक का निदान होगा, उतनी अधिक संभावना होगी कि रोगी पूरी तरह ठीक हो सके और दीर्घकालिक समस्याएं कम हों।
- Early diagnosis can not only improve treatment outcomes and long-term lung health but also dramatically reduce transmission within communities.  
प्रारंभिक निदान उपचार परिणाम और फेफड़ों के स्वास्थ्य को सुधारता है और समुदाय में संक्रमण को कम करता है।
- A careful but swift and streamlined public sector expansion of diagnostics can also significantly reduce out-of-pocket expenditure for families affected by TB.  
सार्वजनिक क्षेत्र में तेजी से और व्यवस्थित विस्तार से परिवारों का व्यक्तिगत खर्च भी कम किया जा सकता है।
- An evidence-based, strong and expanded diagnostic toolbox can be a powerful lever to accelerate pathways to TB elimination in India.  
साक्ष्य आधारित और मजबूत निदान प्रणाली भारत में तपेदिक उन्मूलन की दिशा में एक प्रभावी साधन बन सकती है।

### GS Paper III: Environment,

#### TOPICS COVERED

24 March 2026

24Mar	<b>Hope builds for nations to save bird that flies 30,000 km</b> 30,000 km उड़ने वाले पक्षी को बचाने के लिए देशों में उम्मीद बढ़ रही है
24Mar	<b>How do we know climate science is credible?</b> हम कैसे जानते हैं कि जलवायु विज्ञान विश्वसनीय है?



# Hope builds for nations to save bird that flies 30,000 km

GS III: Environment  
Agence France-Presse

Chasing an endless summer, one shorebird species undertakes a gruelling annual journey from the Arctic to the tip of South America and back -- a feat increasingly fraught with peril.

The Hudsonian godwit (*Limosa haemastica*) is one of the world's most remarkable travellers, but its population has plunged 95% in four decades due to a complex mix of environmental changes across multiple countries.

It is one of 42 species proposed for international protection at a meeting of parties to the UN Convention on the Conservation of Migratory Species (CMS) that starts in Brazil on March 23.

Iconic creatures like the snowy owl -- of Harry Potter fame -- striped hyena and hammerhead shark are also on the list deemed in danger of extinction and needing conservation by the countries they pass through.

**The Hudsonian godwit (*Limosa haemastica*) is one of the world's most remarkable travellers, but its population has plunged 95% in four decades due to a complex mix of environmental changes**

Migratory birds are facing "rapid and dramatic declines," said Nathan Senner, an ecologist and ornithology professor at the University of Massachusetts Amherst who has studied the Hudsonian godwit for 20 years.

Migratory birds are facing "rapid and dramatic declines," said Nathan Senner, an ecologist and ornithology professor at the University of Massachusetts Amherst who has studied the Hudsonian godwit for 20 years.

Scientists are still unravelling the mysteries of the shorebird, which can fly up to 11,000 km in one stretch without stopping to eat, drink or sleep.

And it is only part of the 30,000 km that the godwit travels every year from their breeding grounds in the Arctic to Patagonia where they spend the southern summer.

In order to do this "epic flight," they need "really predictable, abundant food resources" at every step of the journey, Senner told AFP.

That predictability is crumbling. In the Arctic, shifting spring timing attributed to climate change has created a mismatch between when chicks hatch and the peak availability of insects they feed on.

One of the puzzles Senner is currently working on is why Hudsonian godwits have begun migrating later by six days than they did a decade ago.

Something "has either disrupted the cues that they use to time their migration or their ability to successfully and rapidly prepare for the migration," he said.

In southern Chile, a boom in salmon and oyster farming has led to a build-up of infrastructure and the presence of people in the intertidal zones where they feed. And in the United States, changes in farming practices are making the shallow water wetlands that the godwits rely on rarer and less predictable -- meaning they spend more time looking for a place to stop and feed.

"I think that is emblematic of lots of species, that most species can respond to one kind of change, but not a whole bunch of them all at the same time," said Senner.

"Climate change is taking a heavy toll on species that rely on a 'geological clock' for their survival; many are disappearing, Rodrigo Agostinho, president of Brazil's environmental agency (Ibama) said.

These are some of the issues CMS parties will tackle at their meeting in Brazil's biodiversity-rich Pantanal, one of the world's most important global meetings for wildlife conservation.

These countries are legally obliged to protect species listed as at risk of extinction, conserve and restore their habitats, prevent obstacles to migration and cooperate with other range states.

24Mar. Hope builds for nations to save bird that flies 30,000 km  
30,000 km उड़ने वाले पक्षी को बचाने के लिए देशों में उम्मीद बढ़ रही है



- Chasing an endless summer, one shorebird species undertakes a gruelling annual journey from the Arctic to the tip of South America and back -- a feat increasingly fraught with peril. अंतहीन गर्मी का पीछा करते हुए, एक तटीय पक्षी प्रजाति आर्कटिक से दक्षिण अमेरिका के सिरे तक और वापस एक कठिन वार्षिक यात्रा करती है — जो लगातार अधिक खतरनाक होती जा रही है।
- The **Hudsonian godwit (Limosa haemastica)** is one of the world's most remarkable travellers, but its population has plunged **95%** in **four decades** due to a complex mix of environmental changes across multiple countries.  
**Hudsonian godwit (Limosa haemastica)** दुनिया के सबसे अद्भुत यात्रियों में से एक है, लेकिन इसकी आबादी **चार दशकों में 95%** घट गई है, जो कई देशों में पर्यावरणीय परिवर्तनों के जटिल मिश्रण के कारण है।
- It is one of **42 species** proposed for international protection at a meeting of parties to the **UN Convention on the Conservation of Migratory Species (CMS)** that starts in Brazil on **March 23**.  
यह उन **42 प्रजातियों** में से एक है जिन्हें **संयुक्त राष्ट्र प्रवासी प्रजाति संरक्षण सम्मेलन (CMS)** की बैठक में अंतरराष्ट्रीय संरक्षण के लिए प्रस्तावित किया गया है, जो **23 मार्च** को ब्राजील में शुरू होती है।
- Iconic creatures like the **snowy owl** -- of Harry Potter fame -- striped hyena and hammerhead shark are also on the list deemed in danger of extinction and needing conservation by the countries they pass through.  
प्रसिद्ध जीव जैसे **snowy owl**, धारीदार लकड़बग्घा और हैमरहेड शार्क भी इस सूची में हैं जिन्हें विलुप्ति के खतरे में माना गया है और जिनके लिए उनके मार्ग वाले देशों द्वारा संरक्षण आवश्यक है।
- Migratory birds are facing "rapid and dramatic declines," said **Nathan Senner**, an ecologist and ornithology professor at the **University of Massachusetts Amherst** who has studied the Hudsonian godwit for **20 years**.  
प्रवासी पक्षी "तेज़ और गंभीर गिरावट" का सामना कर रहे हैं, ऐसा **Nathan Senner**, जो **University of Massachusetts Amherst** में पारिस्थितिकी और पक्षी विज्ञान के प्रोफेसर हैं और जिन्होंने **20 वर्षों** तक इस पक्षी का अध्ययन किया है, ने कहा।
- Scientists are still unravelling the mysteries of the shorebird, which can fly up to **11,000 km** in one stretch without stopping to eat, drink or sleep.  
वैज्ञानिक अभी भी इस तटीय पक्षी के रहस्यों को समझ रहे हैं, जो बिना खाए, पिए या सोए एक बार में **11,000 किमी** तक उड़ सकता है।
- And it is only part of the **30,000 km** that the godwit travels every year from their breeding grounds in the Arctic to Patagonia where they spend the southern summer.  
और यह केवल उस **30,000 किमी** यात्रा का हिस्सा है जो यह पक्षी हर साल आर्कटिक से पटागोनिया तक करता है, जहां यह दक्षिणी गर्मी बिताता है।
- In order to do this "epic flight," they need "really predictable, abundant food resources" at every step of the journey, Senner told AFP.  
इस "महाकाव्य उड़ान" को पूरा करने के लिए उन्हें यात्रा के हर चरण में "नियमित और प्रचुर भोजन संसाधनों" की आवश्यकता होती है, ऐसा Senner ने कहा।
- That predictability is crumbling. In the Arctic, shifting spring timing attributed to climate change has created a mismatch between when chicks hatch and the peak availability of insects they feed on.  
यह स्थिरता अब टूट रही है। आर्कटिक में जलवायु परिवर्तन के कारण वसंत के समय में बदलाव से चूजों के निकलने और उनके भोजन के रूप में उपलब्ध कीड़ों के समय में असंतुलन पैदा हो गया है।
- One of the puzzles Senner is currently working on is why Hudsonian godwits have begun migrating later by **six days** than they did a decade ago.  
Senner जिस पहली पर काम कर रहे हैं, वह यह है कि Hudsonian godwit अब एक दशक पहले की तुलना में **छह दिन** देर से प्रवास क्यों कर रहे हैं।
- Something "has either disrupted the cues that they use to time their migrations or their ability to successfully and rapidly prepare for the migration," he said.  
उन्होंने कहा कि "या तो उनके प्रवास के समय निर्धारण संकेत प्रभावित हुए हैं या फिर उनकी प्रवास के लिए तैयारी करने की क्षमता।"
- In southern Chile, a boom in salmon and oyster farming has led to a build-up of infrastructure and the presence of people in the intertidal zones where they feed.  
दक्षिणी चिली में सैल्मन और ऑयस्टर खेती के विस्तार से उनके भोजन वाले तटीय क्षेत्रों में ढांचे का निर्माण और मानव उपस्थिति बढ़ गई है।
- And in the United States, changes in farming practices are making the shallow water wetlands that the godwits rely on rarer and less predictable -- meaning they spend more time looking



for a place to stop and feed.

संयुक्त राज्य में खेती के तरीकों में बदलाव से उथले जल वाले आर्द्रभूमि, जिन पर ये पक्षी निर्भर हैं, कम और अनिश्चित हो रही हैं — जिससे उन्हें भोजन के लिए अधिक समय तक स्थान ढूँढना पड़ता है।

- "I think that is emblematic of lots of species, that most species can respond to one kind of change, but not a whole bunch of them all at the same time," said Senner. Senner ने कहा कि "यह कई प्रजातियों के लिए प्रतीकात्मक है कि वे एक प्रकार के परिवर्तन का सामना कर सकती हैं, लेकिन कई परिवर्तनों को एक साथ नहीं।"
- "Climate change is taking a heavy toll on species that rely on a 'geological clock' for their survival; many are disappearing," **Rodrigo Agostinho**, president of Brazil's environmental agency (**Ibama**) said.

**Rodrigo Agostinho**, जो ब्राजील की पर्यावरण एजेंसी **Ibama** के प्रमुख हैं, ने कहा कि "जलवायु परिवर्तन उन प्रजातियों पर भारी प्रभाव डाल रहा है जो अपने अस्तित्व के लिए प्राकृतिक समय चक्र पर निर्भर हैं; कई समाप्त हो रही हैं।"

- These are some of the issues CMS parties will tackle at their meeting in Brazil's biodiversity-rich **Pantanal**, one of the world's most important global meetings for wildlife conservation. ये कुछ मुद्दे हैं जिन पर CMS के सदस्य ब्राजील के जैव विविधता से समृद्ध **Pantanal** में होने वाली बैठक में चर्चा करेंगे, जो वन्यजीव संरक्षण की दुनिया की महत्वपूर्ण बैठकों में से एक है।
- These countries are legally obliged to protect species listed as at risk of extinction, conserve and restore their habitats, prevent obstacles to migration and cooperate with other range states.

ये देश कानूनी रूप से बाध्य हैं कि वे विलुप्ति के खतरे वाली प्रजातियों की रक्षा करें, उनके आवासों का संरक्षण और पुनर्स्थापन करें, प्रवास में बाधाओं को रोकें और अन्य देशों के साथ सहयोग करें।

PATRIOTIC IAS



# How do we know climate science is credible?

On what aspects did a recent paper in the Science of Climate Change journal question the foundations of climate change, and how robust are its arguments?

CS III: Environment  
Vasudevan Mukunth

**I**n March 10, a journal called Science of Climate Change published a paper calling into question the foundations of climate change. The paper concluded that after accounting for some sources of uncertainty in the climate data, the 'correct' changes in the oceans' heat content and Earth's energy imbalance are practically zero. In other words, the oceans are not warming, Earth's surface is not accumulating heat, and global warming is not happening.

The paper is more sophisticated than it seems at first sight and makes three claims with different levels of merit.

There is value in addressing them in detail because doing so reveals how we know that climate science is credible.

## How are changes in ocean heat measured?

The paper's foremost claim is that temperature is an intensive property – meaning its value does not depend on the mass of the material – and thus scientists cannot average it in a meaningful way when estimating the amount of heat oceans hold.

Scientists have already addressed this claim. First, by the same logic, we cannot measure average air temperature, average atmospheric pressure, average sea level rise, and so on.

Second, and more importantly, scientists do not just measure and average the temperatures of different water bodies to determine the heat content. They also calculate the thermal energy. Temperature is nothing but the average kinetic energy of the atoms or molecules in a body. And thermal energy is the total kinetic energy of the water molecules.

This is an extensive quantity – it depends on the number of molecules – and can be averaged. Its value has been increasing over time as well, and it also clarifies that the way scientists are handling the temperature data is correct.

Next, the paper takes issue with the Argo floats data. According to the U.S. National Oceanic and Atmospheric Administration, "Argo is an international program that collects information from inside the ocean using free drifting [devices called] profiling floats. These floats drift with the ocean currents and move up and down between the surface and a mid-water level. The floats are distributed over the global ocean to measure temperature and salinity in the upper 2,000 m."

According to the paper, the data the floats collect have some gaps, which has created uncertainties in the final processed data that have gone underreported. To the paper's credit, scientists have already raised and addressed the numbers it has cited on phenomena called mesoscale aliasing and deep ocean ignorance in the research literature. However, the paper's authors inflate these uncertainties and add them up in unscientific ways. For instance, some of the errors they add up have the same underlying cause, so adding them as if they were separate errors ends up counting the same causes more than once.

To avoid this pitfall, oceanographers



Thinning ice: A penguin stands on an iceberg in Yankee Harbour, Antarctica in 2018. REUTERS

run the whole calculation in different ways and check whether they keep getting roughly the same answer. They check whether the calculation predicts temperatures at locations where they actually have measurements to compare with – and whether the overall estimate holds up when they remove data from the calculations. This way, they make sure their methods are robust and do not over-count uncertainties.

Finally, if scientists have an independent estimate of total sea level rise (from altimetry satellites that use radar, say) and an independent estimate of how much new water has been added (from the GRACE satellites that use gravity), they can estimate how much the ocean has 'expanded'. Then they compare this figure with Argo data about the ocean's heat content. If the two match – as they do – it would mean Argo arrived at the same result as altimetry and GRACE (Gravity Recovery and Climate Experiment) satellites but from completely different starting points.

## What is 'Balancing' and 'Filling'?

Finally, the paper says the CERES-Argo cross-calibration is "circular". This is probably the most rhetorically effective

piece for 'climate doubters' because it genuinely sounds damning. However, that is really because it misrepresents what a particular 'adjustment' does.

CERES is a suite of scientific instruments in Earth orbit operated by NASA. Its name stands for 'Clouds and the Earth's Radiant Energy System'. The instruments measure incoming solar radiation and outgoing shortwave radiation (which includes visible light) and longwave radiation (mostly heat) at the top of the atmosphere. By subtracting the incoming rate of energy from the outgoing rate, scientists can say how much heat is being 'left behind' in the planet's atmosphere and on the surface.

Now, the CERES instruments have been calibrated such that they are accurate to around 1% for shortwave radiation and 0.75% for longwave. This implies an absolute uncertainty of roughly 2 W/m<sup>2</sup> in the net energy flux. The paper says the raw CERES uncertainty is around 3-5 W/m<sup>2</sup>, which is slightly inflated in favour of the paper's claims.

To address this, a process called EBAF – short for 'Energy Balanced And Filled' – makes a one-time change to shortwave and longwave fluxes at the top of the

atmosphere to ensure the global mean net flux for July 2005 to June 2015 is consistent with the value measured by Argo: 0.71 W/m<sup>2</sup>.

'Balancing' and 'Filling' are separate adjustments. CERES instruments cannot see through clouds, so 'Filling' patches gaps in the map where data is missing. However, the paper treats the whole EBAF product as if it is just the adjustment for calibration, i.e. 'Balancing'.

Nonetheless, as things stand, the paper's circularity argument is partly correct: CERES data is 'corrected' using Argo data while Argo-derived estimates of the oceans' heat content are validated using CERES data.

## What does CERES do?

But then the paper goes wrong. The 'Balance' of EBAF only adjusts the mean energy flux. It does not interact in any way with the increases and drops in the temperature data over time. That comes from the CERES instruments' raw data and is what contains evidence of the warming trend.

Specifically, the CERES instruments continuously measure the radiation coming from the Sun into the atmosphere and the outgoing longwave and shortwave radiation at the top of the atmosphere. Then computers produce a monthly global mean net flux value for every month from March 2000 to the present. These raw monthly data are off from the 0.7 W/m<sup>2</sup> measured by Argo, so EBAF 'adds' or 'subtracts' some flux over every monthly value in the record to bring the long-period mean in line with the Argo estimate.

The monthly values after this adjustment are thus higher or lower than the raw values by exactly the same amount in every single month. This means the difference between any two months – March 2005 and March 2015, say – is unaffected by EBAF. For example, if EBAF adds 3.6 W/m<sup>2</sup> to the measured values, the difference between 4 and 5 in the raw data is the same as the difference between 7.6 and 8.6 in the processed data, which is 1 W/m<sup>2</sup>.

The idea that Earth's energy imbalance has been increasing over the satellite record is based on these differences, which Argo data is unconcerned with. As a result, the circularity objection proves less than what the paper has claimed it does.

## What sustains credibility?

For added measure, scientists have also estimated Earth's energy imbalance (outgoing minus incoming) using atmospheric reanalyses, deep ocean temperature records from research vessels, and physical models informed by observed surface warming – all of which have been consistent with the CERES-Argo figures. If the imbalance were actually zero, the independent estimates would all have to be wrong for independent reasons. And the odds of that are extremely low.

In fact, the answer to whether the paper could be right is not that one of its authors is a "clarinet instructor" (which he was at the time he worked on the paper), that its rhetoric is often obscurantist, that some of its other authors have done questionable things in the past or even that it has not passed peer-review by a "prestigious" journal. It is that the paper does not perform any independent tests of the data the way credible studies do.

That is in fact the bedrock of the credibility of climate science as a whole. And any efforts that claim to overturn that must also convincingly explain how independent checks arrived at the same result while being flawed in independent ways.

24Mar. How do we know climate science is credible?  
हम कैसे जानते हैं कि जलवायु विज्ञान विश्वसनीय है?



- On **March 10**, a journal called **Science of Climate Change** published a paper calling into question the **foundations of climate change**.  
**10 मार्च** को **Science of Climate Change** नामक पत्रिका ने एक पेपर प्रकाशित किया, जिसमें **जलवायु परिवर्तन की बुनियाद** पर सवाल उठाया गया।
- The paper concluded that after accounting for some sources of **uncertainty in the climate data**, the 'correct' changes in the oceans' **heat content** and Earth's **energy imbalance** are practically **zero**.  
पेपर ने निष्कर्ष निकाला कि **जलवायु डेटा की अनिश्चितताओं** को ध्यान में रखने के बाद महासागरों की **ऊष्मा सामग्री** और पृथ्वी के **ऊर्जा असंतुलन** में 'सही' बदलाव लगभग **शून्य** हैं।
- In other words, the oceans are not **warming**, Earth's surface is not **accumulating heat**, and **global warming** is not happening.  
दूसरे शब्दों में, महासागर **गर्म नहीं हो रहे हैं**, पृथ्वी की सतह **ऊष्मा जमा नहीं कर रही है**, और **ग्लोबल वार्मिंग** नहीं हो रही है।
- The paper is more **sophisticated** than it seems at first sight and makes **three claims** with different levels of merit.  
यह पेपर पहली नजर में जितना लगता है उससे अधिक **जटिल** है और विभिन्न स्तरों की वैधता के साथ **तीन दावे** करता है।
- There is value in addressing them in detail because doing so reveals how we know that **climate science is credible**.  
इन्हें विस्तार से समझना महत्वपूर्ण है क्योंकि इससे यह स्पष्ट होता है कि **जलवायु विज्ञान विश्वसनीय** कैसे है।

#### How are changes in ocean heat measured? महासागरों की ऊष्मा में परिवर्तन कैसे मापा जाता है?

- The paper's foremost claim is that **temperature is an intensive property** — meaning its value does not depend on the **mass of the material** — and thus scientists cannot average it in a meaningful way when estimating the amount of heat oceans hold.  
पेपर का मुख्य दावा है कि **तापमान एक सघन गुण (intensive property)** है — अर्थात् इसका मान **पदार्थ के द्रव्यमान** पर निर्भर नहीं करता — इसलिए वैज्ञानिक महासागरों की ऊष्मा का अनुमान लगाने के लिए इसे सार्थक तरीके से औसत नहीं कर सकते।
- Scientists have already addressed this claim.  
वैज्ञानिक इस दावे को पहले ही संबोधित कर चुके हैं।
- First, by the same logic, we cannot measure **average air temperature, average atmospheric pressure, average sea level rise**, and so on.  
पहला, इसी तर्क से हम **औसत वायु तापमान, औसत वायुमंडलीय दाब, औसत समुद्र स्तर वृद्धि** आदि को भी नहीं माप सकते।
- Second, and more importantly, scientists do not just measure and average the **temperatures of different water bodies** to determine the heat content.  
दूसरा, और अधिक महत्वपूर्ण यह है कि वैज्ञानिक केवल विभिन्न जल निकायों के **तापमान का औसत** नहीं निकालते।
- They also calculate the **thermal energy**.  
वे **ऊष्मीय ऊर्जा** की भी गणना करते हैं।
- Temperature is nothing but the **average kinetic energy** of the atoms or molecules in a body.  
तापमान वस्तुतः किसी पिंड के परमाणुओं या अणुओं की **औसत गतिज ऊर्जा** है।
- And thermal energy is the **total kinetic energy** of the water molecules.  
और ऊष्मीय ऊर्जा जल अणुओं की **कुल गतिज ऊर्जा** होती है।
- This is an **extensive quantity** — it depends on the **number of molecules** — and can be averaged.  
यह एक **व्यापक गुण (extensive quantity)** है — जो **अणुओं की संख्या** पर निर्भर करता है — और इसका औसत निकाला जा सकता है।
- Its value has been **increasing over time** as well, and it also clarifies that the way scientists are handling the **temperature data is correct**.  
इसका मान **समय के साथ बढ़ रहा है**, और यह भी स्पष्ट करता है कि वैज्ञानिक **तापमान डेटा को सही तरीके से संभाल रहे हैं**।



- Next, the paper takes issue with the **Argo floats data**.  
इसके बाद पेपर **Argo floats डेटा** पर सवाल उठाता है।
- According to the **U.S. National Oceanic and Atmospheric Administration**, “Argo is an international program that collects information from inside the ocean using free drifting [devices called] profiling floats.”  
**U.S. National Oceanic and Atmospheric Administration** के अनुसार, “Argo एक अंतरराष्ट्रीय कार्यक्रम है जो समुद्र के भीतर से डेटा एकत्र करता है, जिसमें मुक्त रूप से तैरने वाले **profiling floats** का उपयोग होता है।”
- These floats drift with the **ocean currents** and move up and down between the **surface** and a **mid-water level**.  
ये फ्लोट्स **समुद्री धाराओं** के साथ बहते हैं और **सतह** तथा **मध्य जल स्तर** के बीच ऊपर-नीचे चलते हैं।
- The floats are distributed over the **global ocean** to measure **temperature and salinity** in the upper **2,000 m**.  
ये फ्लोट्स पूरे **वैश्विक महासागर** में फैले होते हैं और ऊपरी **2000 मीटर** में **तापमान और लवणता** मापते हैं।
- According to the paper, the data the floats collect have some **gaps**, which has created **uncertainties** in the final processed data that have gone **underreported**.  
पेपर के अनुसार, इन फ्लोट्स द्वारा एकत्रित डेटा में कुछ **खामियाँ** हैं, जिससे अंतिम डेटा में **अनिश्चितताएँ** उत्पन्न हुई हैं, जिन्हें **कम करके दिखाया गया है**।
- To the paper’s credit, scientists have already raised and addressed the numbers it has cited on phenomena called **mesoscale aliasing** and **deep ocean ignorance** in the research literature.  
पेपर के पक्ष में यह है कि वैज्ञानिक पहले ही **mesoscale aliasing** और **deep ocean ignorance** जैसे घटनाओं पर इसके द्वारा दिए गए आंकड़ों को उठाकर संबोधित कर चुके हैं।
- However, the paper’s authors **inflate these uncertainties** and add them up in **unscientific ways**.  
हालांकि, पेपर के लेखक इन **अनिश्चितताओं को बढ़ा-चढ़ाकर अवैज्ञानिक तरीकों** से जोड़ते हैं।
- For instance, some of the errors they add up have the same **underlying cause**, so adding them as if they were separate errors ends up **counting the same causes more than once**.  
उदाहरण के लिए, कुछ त्रुटियों का **मूल कारण समान** होता है, लेकिन उन्हें अलग-अलग जोड़ने से **एक ही कारण को कई बार गिना जाता है**।
- To avoid this pitfall, oceanographers run the whole calculation in **different ways** and check whether they keep getting roughly the **same answer**.  
इस समस्या से बचने के लिए महासागर वैज्ञानिक गणनाएँ **विभिन्न तरीकों** से करते हैं और देखते हैं कि क्या उन्हें लगभग **एक जैसा परिणाम** मिलता है।
- They check whether the calculation predicts **temperatures at locations** where they actually have **measurements to compare with**.  
वे यह भी जांचते हैं कि क्या गणना उन स्थानों के **तापमान की सही भविष्यवाणी** करती है जहाँ उनके पास **वास्तविक माप उपलब्ध हैं**।
- and whether the overall estimate holds up when they **remove data from the calculations**.  
और यह भी कि जब वे **कुछ डेटा हटाते हैं** तो भी कुल अनुमान सही रहता है या नहीं।
- This way, they make sure their methods are **robust** and do not **over-count uncertainties**.  
इस प्रकार वे सुनिश्चित करते हैं कि उनकी विधियाँ **मजबूत (robust)** हैं और **अनिश्चितताओं को अधिक नहीं गिनतीं**।
- Finally, if scientists have an **independent estimate of total sea level rise** (from **altimetry satellites** that use radar, say) and an independent estimate of how much **new water has been added** (from the **GRACE satellites** that use gravity), they can estimate how much the ocean has **‘expanded’**.  
अंततः, यदि वैज्ञानिकों के पास **समुद्र स्तर वृद्धि का स्वतंत्र अनुमान** (जैसे **altimetry satellites** से) और **नए जल की मात्रा का स्वतंत्र अनुमान** (जैसे **GRACE satellites** से) हो, तो वे महासागर के **‘विस्तार’** का अनुमान लगा सकते हैं।
- Then they compare this figure with **Argo data** about the ocean’s **heat content**.  
फिर वे इस आंकड़े की तुलना महासागर की **ऊष्मा सामग्री** से संबंधित **Argo डेटा** से करते हैं।
- If the two match — as they do — it would mean Argo arrived at the same result as **altimetry and GRACE (Gravity Recovery and Climate Experiment) satellites** but from completely **different starting points**.



यदि दोनों मेल खाते हैं — जैसा कि होता है — तो इसका अर्थ है कि **Argo, altimetry और GRACE (Gravity Recovery and Climate Experiment) satellites** की तरह ही परिणाम देता है, लेकिन पूरी तरह **अलग प्रारंभिक बिंदुओं** से।

### What is 'Balancing' and 'Filling'?

#### 'Balancing' और 'Filling' क्या है?

- Finally, the paper says the **CERES-Argo cross-calibration** is "circular".  
अंततः, पेपर कहता है कि **CERES-Argo cross-calibration "circular"** है।
- This is probably the most **rhetorically effective** piece for 'climate doubters' because it genuinely sounds **damning**.  
यह 'climate doubters' के लिए सबसे **प्रभावी तर्क** है क्योंकि यह वास्तव में **गंभीर आरोप** जैसा लगता है।
- However, that is really because it **misrepresents** what a particular 'adjustment' does.  
हालांकि, यह इसलिए है क्योंकि यह एक विशेष 'adjustment' के कार्य को **गलत तरीके से प्रस्तुत** करता है।
- **CERES** is a suite of **scientific instruments** in Earth orbit operated by **NASA**.  
**CERES** पृथ्वी की कक्षा में स्थित **वैज्ञानिक उपकरणों** का समूह है, जिसे **NASA** संचालित करता है।
- Its name stands for '**Clouds and the Earth's Radiant Energy System**'.  
इसका पूरा नाम '**Clouds and the Earth's Radiant Energy System**' है।
- The instruments measure **incoming solar radiation** and **outgoing shortwave radiation** (which includes visible light) and **longwave radiation** (mostly heat) at the **top of the atmosphere**.  
ये उपकरण **आने वाली सौर विकिरण, निकलने वाली shortwave radiation** (जिसमें दृश्य प्रकाश शामिल है) और **longwave radiation** (मुख्यतः ऊष्मा) को **वायुमंडल के शीर्ष** पर मापते हैं।
- By subtracting the incoming rate of energy from the outgoing rate, scientists can say how much **heat is being 'left behind'** in the planet's atmosphere and on the surface.  
आने वाली ऊर्जा दर को निकलने वाली ऊर्जा दर से घटाकर वैज्ञानिक यह बता सकते हैं कि कितनी **ऊष्मा 'बची रह गई'** है।
- Now, the **CERES instruments** have been calibrated such that they are accurate to around **1% for shortwave radiation** and **0.75% for longwave**.  
**CERES उपकरणों** को इस प्रकार कैलिब्रेट किया गया है कि वे **shortwave radiation के लिए 1% और longwave के लिए 0.75%** तक सटीक हैं।
- This implies an **absolute uncertainty** of roughly **2 W/m<sup>2</sup>** in the **net energy flux**.  
इसका अर्थ है कि **net energy flux** में लगभग **2 W/m<sup>2</sup>** की **absolute uncertainty** है।
- The paper says the raw CERES uncertainty is around **3-5 W/m<sup>2</sup>**, which is slightly **inflated** in favour of the paper's claims.  
पेपर के अनुसार, CERES की मूल अनिश्चितता **3-5 W/m<sup>2</sup>** है, जो थोड़ी **बढ़ा-चढ़ाकर** बताई गई है।
- To address this, a process called **EBAF** — short for '**Energy Balanced And Filled**' — makes a **one-time change** to shortwave and longwave fluxes at the top of the atmosphere to ensure the global mean net flux for **July 2005 to June 2015** is consistent with the value measured by **Argo: 0.71 W/m<sup>2</sup>**.  
इसे ठीक करने के लिए **EBAF (Energy Balanced And Filled)** प्रक्रिया **एक बार परिवर्तन** करती है ताकि **July 2005 से June 2015 तक** का वैश्विक औसत flux **Argo के 0.71 W/m<sup>2</sup>** के अनुरूप हो।
- '**Balancing**' and '**Filling**' are **separate adjustments**.  
'**Balancing**' और '**Filling**' **अलग-अलग adjustments** हैं।
- CERES instruments cannot see through **clouds**, so '**Filling**' patches gaps in the map where **data is missing**.  
CERES उपकरण **बादलों के पार नहीं देख सकते**, इसलिए '**Filling**' उन जगहों को भरता है जहाँ **डेटा नहीं है**।
- However, the paper treats the whole **EBAF product** as if it is just the adjustment for calibration, i.e. '**Balancing**'.  
लेकिन पेपर पूरे **EBAF उत्पाद** को केवल '**Balancing**' के रूप में प्रस्तुत करता है।
- Nonetheless, as things stand, the paper's **circularity argument** is partly correct: CERES data is '**corrected**' using **Argo data** while Argo-derived estimates are validated using **CERES data**.



फिर भी, पेपर का **circularity argument** आंशिक रूप से सही है: CERES डेटा को **Argo डेटा** से ठीक किया जाता है और Argo के अनुमान **CERES डेटा** से सत्यापित होते हैं।

### What does CERES do?

#### CERES क्या करता है?

- But then the paper goes wrong.  
लेकिन यहाँ पेपर गलत हो जाता है।
- The '**Balance**' of EBAF only adjusts the **mean energy flux**.  
EBAF का '**Balance**' केवल **औसत ऊर्जा प्रवाह** को समायोजित करता है।
- It does not interact in any way with the **increases and drops in the temperature data over time**.  
यह समय के साथ **तापमान में वृद्धि या गिरावट** को प्रभावित नहीं करता।
- That comes from the CERES instruments' **raw data** and is what contains evidence of the **warming trend**.  
यह जानकारी CERES के **मूल डेटा** से आती है, जिसमें **warming trend** का प्रमाण होता है।
- Specifically, the CERES instruments continuously measure the radiation coming from the **Sun** and the outgoing **longwave and shortwave radiation**.  
विशेष रूप से, CERES उपकरण लगातार **सूर्य से आने वाली विकिरण** और बाहर जाने वाली **longwave व shortwave radiation** को मापते हैं।
- Then computers produce a **monthly global mean net flux value** for every month from **March 2000 to the present**.  
इसके बाद कंप्यूटर **March 2000 से वर्तमान तक** हर महीने का **वैश्विक औसत flux** निकालते हैं।
- These raw monthly data are off from the **0.7 W/m<sup>2</sup> measured by Argo**, so EBAF 'adds' or 'subtracts' some flux to bring the long-period mean in line.  
ये डेटा **Argo के 0.7 W/m<sup>2</sup>** से अलग होते हैं, इसलिए EBAF उन्हें **जोड़कर या घटाकर** संतुलित करता है।
- The monthly values after this adjustment are thus higher or lower than the raw values by exactly the **same amount** in every single month.  
इस adjustment के बाद हर महीने के मान मूल डेटा से **समान मात्रा** से ऊपर या नीचे होते हैं।
- This means the difference between any two months — **March 2005 and March 2015**, say — is **unaffected** by EBAF.  
इसका मतलब है कि दो महीनों के बीच अंतर — जैसे **March 2005 और March 2015** — EBAF से **प्रभावित नहीं होता**।
- For example, if EBAF adds **3.6 W/m<sup>2</sup>**, the difference between **4 and 5** is the same as between **7.6 and 8.6**, which is **1 W/m<sup>2</sup>**.  
उदाहरण के लिए, यदि EBAF **3.6 W/m<sup>2</sup>** जोड़ता है, तो **4 और 5** के बीच अंतर वही रहेगा जो **7.6 और 8.6** के बीच है, यानी **1 W/m<sup>2</sup>**।
- The idea that Earth's **energy imbalance** has been increasing is based on these **differences**, which Argo data is unconcerned with.  
पृथ्वी के **energy imbalance** के बढ़ने का विचार इन्हीं **अंतर** पर आधारित है, जिनसे Argo डेटा संबंधित नहीं है।
- As a result, the **circularity objection** proves less than what the paper has claimed.  
इसलिए, **circularity objection** उतना मजबूत नहीं है जितना पेपर दावा करता है।

### What sustains credibility?

#### विश्वसनीयता को क्या बनाए रखता है?

- For added measure, scientists have also estimated Earth's energy imbalance using **atmospheric reanalyses, deep ocean temperature records, and physical models** informed by observed surface warming.  
अतिरिक्त रूप से, वैज्ञानिकों ने **atmospheric reanalyses, deep ocean temperature records, और physical models** के माध्यम से भी ऊर्जा असंतुलन का अनुमान लगाया है।
- All of which have been **consistent** with the **CERES-Argo figures**.  
ये सभी **CERES-Argo आंकड़ों** के साथ संगत हैं।



- If the imbalance were actually **zero**, the independent estimates would all have to be **wrong for independent reasons**.  
यदि असंतुलन वास्तव में **शून्य** होता, तो सभी स्वतंत्र अनुमान **अलग-अलग कारणों से गलत** होते।
- And the odds of that are **extremely low**.  
और इसकी संभावना **बहुत कम** है।
- In fact, the answer is not that one author was a “**clarinet instructor**”, or that the rhetoric is **obscurantist**, or that authors have done **questionable things**, or even lack of **prestigious peer-review**.  
वास्तव में, इसका कारण यह नहीं है कि लेखक “**clarinet instructor**” था, या भाषा **जटिल** है, या लेखकों का इतिहास **संदिग्ध** है, या **प्रसिद्ध peer-review** का अभाव है।
- It is that the paper does not perform any **independent tests of the data** the way credible studies do.  
बल्कि कारण यह है कि पेपर **डेटा के स्वतंत्र परीक्षण** नहीं करता जैसा विश्वसनीय अध्ययन करते हैं।
- That is the **bedrock of credibility** of climate science.  
यही **जलवायु विज्ञान की विश्वसनीयता का आधार** है।
- And any efforts that claim to overturn that must explain how **independent checks** arrived at the same result while being flawed independently.  
और जो भी इसे चुनौती देते हैं, उन्हें यह समझाना होगा कि **स्वतंत्र जांच** कैसे एक ही परिणाम पर पहुँची जबकि वे अलग-अलग रूप से गलत थीं।

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