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25 NOVEMBER 2025

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3.

Cobolli's comeback win leads Italy to a three-peat
कोबोली की वापसी जीत ने इटली को दिलाया लगातार तीसरा खिताब

UPPSC

25/11/2025

Bollywood's beloved icon Dharmendra is no more

PCS

The Hindu Bureau
MUMBAI

Veteran actor Dharmendra Kewal Krishan Deol, affectionately known as Dharmendra, passed away in Mumbai on Monday.

The 89-year-old Bollywood legend had been in and out of Mumbai's Breach Candy hospital several days earlier this month. He was later discharged and continued his treatment at home.

On Monday, a police statement said that the actor passed away in the morning, and funeral arrangements were being made at the Shree Vile Parle Seva Samaj crematorium.

The actor is survived by his wives Prakash Kaur and Hema Malini, sons Sunny and Bobby Deol, and daughters Vijeta, Ajeeta, Esha and Ahana. Fans thronged the crematorium area causing traffic snarls.

Celebrities, including Salman Khan, Salim Khan, Shah Rukh Khan, Aamir Khan, Amitabh Bachchan, Jaya Bachchan, Abhishek Bachchan, Sanjay Dutt, Govinda, Shatrughan Sinha, Deepika Padukone, Ranveer Singh, Karan Johar, Vicky Kaushal, Shabana Azmi, Akshay Kumar, Kajol, Kareena Kapoor, Chi-



DHARMENDRA (1935 - 2025)

ranjeevi, Saira Banu and others, were present at the crematorium.

Dharmendra's cinematic journey spanned more than six decades, with over 300 films to his credit. Known to fans as Bollywood's "He-Man", "Garam Dharam", and the "Action King," he combined mass appeal with versatility, effortlessly moving between action dramas, comedies, and socially relevant films.

Prime Minister Narendra Modi wrote on X that Dharmendra's demise "marks the end of an era in Indian cinema", calling him an iconic actor admired for his versatility, simplicity, and warmth.

He offered condolences to the actor's family, friends, and fans, concluding

with 'Om Shanti.'

In her condolence message, President Droupadi Murmu said Dharmendra's demise is "a great loss to Indian cinema", remembering him as one of the most popular actors whose legacy will inspire generations.

Union Home Minister Amit Shah called Dharmendra's passing "an irreparable loss to Indian cinema", praising his six-decade-long career and the ability to bring every character to life.

He remembered Dharmendra's humble beginnings and said his art will keep him alive in the hearts of millions.

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Bollywood's beloved icon Dharmendra is no more
बॉलीवुड के प्रिय आइकॉन धर्मेंद्र अब नहीं रहे



- Veteran actor **Dharmendra Kewal Krishan Deol**, affectionately known as Dharmendra, passed away in **Mumbai** on Monday.
दिग्गज अभिनेता **धर्मेन्द्र केवल कृष्णन देओल**, जिन्हें प्यार से धर्मेन्द्र कहा जाता था, का सोमवार को **मुंबई** में निधन हो गया।
- The **89-year-old** Bollywood legend had been in and out of Mumbai's **Breach Candy** hospital several days earlier this month.
89 वर्षीय यह बॉलीवुड दिग्गज इस महीने की शुरुआत में मुंबई के **ब्रीच कैंडी अस्पताल** में भर्ती होते और छुट्टी पाते रहे थे।
- He was later discharged and continued his treatment at home.
बाद में उन्हें छुट्टी दे दी गई और उन्होंने घर पर ही इलाज जारी रखा।
- On Monday, a **police statement** said that the actor passed away in the morning, and funeral arrangements were being made at the **Shree Vile Parle Seva Samaj crematorium**.
सोमवार को एक **पुलिस बयान** में कहा गया कि अभिनेता का सुबह निधन हो गया और अंतिम संस्कार की व्यवस्था **श्री विले पार्ले सेवा समाज श्मशान** में की जा रही है।
- The actor is survived by his wives **Prakash Kaur** and **Hema Malini**, sons **Sunny** and **Bobby Deol**, and daughters **Vijeta**, **Ajeeta**, **Esha** and **Ahana**.
अभिनेता अपने पीछे पत्नियाँ **प्रकाश कौर** और **हेमा मालिनी**, बेटे **सनी** और **बॉबी देओल**, तथा बेटियाँ **विजेता**, **अजीता**, **ईशा** और **अहाना** छोड़ गए हैं।
- Fans thronged the crematorium area causing **traffic snarls**.
प्रशंसक बड़ी संख्या में श्मशान पहुँचे, जिससे **यातायात जाम** की स्थिति बन गई।
- Celebrities including **Salman Khan**, **Salim Khan**, **Shah Rukh Khan**, **Aamir Khan**, **Amitabh Bachchan**, **Jaya Bachchan**, **Abhishek Bachchan**, **Sanjay Dutt**, **Govinda**, **Shatrughan Sinha**, **Deepika Padukone**, **Ranveer Singh**, **Karan Johar**, **Vicky Kaushal**, **Shabana Azmi**, **Akshay Kumar**, **Kajol**, **Kareena Kapoor**, **Chiranjeevi**, **Saira Banu** and others were present at the crematorium.
सलमान खान, **सलीम खान**, **शाहरुख खान**, **आमिर खान**, **अमिताभ बच्चन**, **जया बच्चन**, **अभिषेक बच्चन**, **संजय दत्त**, **गोविंदा**, **शत्रुघ्न सिन्हा**, **दीपिका पादुकोण**, **रणवीर सिंह**, **करण जौहर**, **विककी कौशल**, **शबाना आज़मी**, **अक्षय कुमार**, **काजोल**, **करीना कपूर**, **चिरंजीवी**, **सायरा बानो** और अन्य कई हस्तियाँ श्मशान में उपस्थित थीं।
- Dharmendra's cinematic journey spanned **more than six decades**, with over **300 films** to his credit.
धर्मेन्द्र का फ़िल्मी सफर **छह दशकों** से अधिक फैला रहा, और उनके खाते में **300 से अधिक फिल्में** हैं।
- Known to fans as Bollywood's "**He-Man**", "**Garam Dharam**", and the "**Action King**", he combined mass appeal with versatility, effortlessly moving between action dramas, comedies, and socially relevant films.
प्रशंसकों के बीच वे बॉलीवुड के "**ही-मैन**", "**गरम धरम**", और "**एक्शन किंग**" के नाम से मशहूर थे। वे जनप्रियता और बहुमुखी प्रतिभा का अनोखा संगम थे, जो एक्शन, कॉमेडी और सामाजिक सरोकार वाली फिल्मों में सहजता से काम करते थे।
- Prime Minister **Narendra Modi** wrote on X that Dharmendra's demise "**marks the end of an era in Indian cinema**", calling him an iconic actor admired for his **versatility, simplicity, and warmth**.
प्रधानमंत्री **नरेंद्र मोदी** ने X पर लिखा कि धर्मेन्द्र का निधन "**भारतीय सिनेमा में एक युग का अंत**" है और उन्हें उनकी **बहुमुखी प्रतिभा, सरलता और आत्मीयता** के लिए याद किया।
- He offered condolences to the actor's family, friends, and fans, concluding with '**Om Shanti**.'
उन्होंने अभिनेता के परिवार, मित्रों और प्रशंसकों के प्रति संवेदना व्यक्त की और अंत में '**ॐ शांति**' लिखा।
- In her condolence message, President **Droupadi Murmu** said Dharmendra's demise is "**a great loss to Indian cinema**", remembering him as one of the most popular actors whose legacy will inspire generations.
राष्ट्रपति **द्रौपदी मुर्मू** ने अपने शोक संदेश में कहा कि धर्मेन्द्र का निधन "**भारतीय सिनेमा के लिए एक बड़ी क्षति**" है और उन्हें सबसे लोकप्रिय अभिनेताओं में से एक बताते हुए कहा कि उनकी विरासत आने वाली पीढ़ियों को प्रेरित करेगी।
- Union Home Minister **Amit Shah** called Dharmendra's passing "**an irreparable loss to Indian cinema**", praising his six-decade-long career and the ability to bring every character to life.



DHARMENDRA (1935 - 2025)



केंद्रीय गृह मंत्री **अमित शाह** ने धर्मेंद्र के निधन को “**भारतीय सिनेमा के लिए अपूरणीय क्षति**” बताया और उनके छह दशक लंबे करियर तथा हर किरदार को जीवंत बनाने की क्षमता की सराहना की।

- He remembered Dharmendra’s **humble beginnings** and said his art will keep him alive in the hearts of millions.

उन्होंने धर्मेंद्र के **साधारण शुरुआती जीवन** को याद किया और कहा कि उनकी कला उन्हें लाखों दिलों में हमेशा जीवित रखेगी।

PORT SUDAN

Sudan’s top general rejects ‘Quad’ ceasefire proposal citing UAE role



PCS

Sudan’s Army chief **Abdel Fattah al-Burhan** said on Sunday the truce plan sent by U.S. envoy **Massad Boulos** on behalf of **Saudi Arabia, Egypt and the United Arab Emirates** was the “worst yet” and unacceptable. He accused Mr. Boulos of parroting talking points from **Abu Dhabi**, which has been accused of arming the **RSF**. AFP

Sudan’s top general rejects ‘Quad’ ceasefire proposal citing UAE role

सूडान के शीर्ष जनरल ने यूएई की भूमिका का हवाला देते हुए ‘क्वाड’ युद्धविराम प्रस्ताव खारिज किया

- Sudan’s Army chief **Abdel Fattah al-Burhan** said on Sunday the truce plan sent by U.S. envoy **Massad Boulos** on behalf of **Saudi Arabia, Egypt and the United Arab Emirates** was the “worst yet” and unacceptable.

सूडान के सेना प्रमुख **अब्देल फतह अल-बुरहान** ने रविवार को कहा कि **अमेरिका के दूत मस्साद बुलोस** द्वारा **सऊदी अरब, मिस्र और संयुक्त अरब अमीरात** की ओर से भेजी गई युद्धविराम योजना “अब तक की सबसे खराब” है और अस्वीकार्य है।

- He accused Mr. Boulos of parroting talking points from **Abu Dhabi**, which has been accused of arming the **RSF**.

उन्होंने श्री बुलोस पर **अबू धाबी** की बातों को दोहराने का आरोप लगाया, जिस पर **RSF** को हथियार देने का आरोप लगाया गया है।



Cobolli's comeback win leads Italy to a three-peat

He defeats Munar in a thrilling match to secure an unassailable lead after Berrettini gets the better of Busta; the host makes light of the absence of World No. 1 Sinner and Musetti

PCS

DAVIS CUP

Agence France-Presse
BOLOGNA

Italy claimed a third Davis Cup in as many years on Sunday after beating Spain 2-0 in front of delighted home fans in Bologna.

Flavio Cobolli sparked loud celebrations by coming back from a set down to beat Jaume Munar 1-6, 7-6 (5), 7-5 and ensure that Italy retained the title.

Matteo Berrettini had earlier cruised to a 6-3, 6-4 win over Pablo Carreno Busta, setting Filippo Volandri's team up for victory without the doubles match needing to be played.

"This was my dream, we're a really united team, and we tried to recreate the spirit of the Italy team that won the (football) World Cup in 2006," said Cobolli.

"I'm really proud of everyone and our brilliant fans are also part of this team. I've been repeating for three days but it's the best day of my life."

Simone Bolelli and Andrea Vavassori haven't been employed in a doubles contest in northern Italy as the hosts won the Davis Cup without losing a match.

It's an impressive feat by Italy who competed without their two highest-



Cup of joy: The Italian team rose to the occasion to quell the Spanish challenge in the finale. AFP

ranked players in superstar Jannik Sinner and Lorenzo Musetti.

Both players sit in the top 10 of the men's world rankings and were major absences for the tournament, especially as they chose not to take part in the title defence on home soil.

"It doesn't matter who goes out there for us, we have a deep squad and we have a lot of great lads who play great tennis," said Berrettini.

Spain too were missing their top player in world number one Carlos Alcaraz, but the six-time Grand Slam winner would have played had he not suffered a hamstring injury during his ATP Finals showdown



This was my dream, we're a really united team, and we tried to recreate the spirit of the Italy team that won the (football) World Cup in 2006

— COBOLLI

with Sinner a week ago.

Earlier on Sunday, the head of the International Tennis Federation insisted that top players were not snubbing the competition.

"There's this false feeling out there that top players don't represent their nation.

"That's not true," David Haggerty told reporters

ahead of the final.

"Some of those top players that played in the qualifier round or the second qualifier round didn't make it to the finals. And so we had many top players that have played."

American Taylor Fritz, Australian Alex de Minaur, Dane Holger Rune and Norwegian Casper Ruud -- all in the top 20 of the men's rankings -- featured in the early rounds of the competition without managing to reach the finals with their respective nations.

The results:

Italy bt Spain 2-0 (Matteo Berrettini bt Pablo Carreno Busta 6-3, 6-4; Flavio Cobolli bt Jaume Munar 1-6, 7-6(5), 7-5).

Cobolli's comeback win leads Italy to a three-peat

कोबोली की वापसी जीत ने इटली को दिलाया लगातार तीसरा खिताब

- Italy claimed a third Davis Cup in as many years on Sunday after beating Spain 2-0 in front of delighted home fans in Bologna.

इटली ने रविवार को बोलोनिया में उत्साहित घरेलू प्रशंसकों के सामने स्पेन को 2-0 से हराकर लगातार तीसरे वर्ष डेविस कप जीता।

- Flavio Cobolli sparked loud celebrations by coming back from a set down to beat Jaume Munar 1-6, 7-6 (5), 7-5 and ensure that Italy retained the title.



प्लावियो कोबोली ने एक सेट से पीछे होने के बाद **जौमे मुनार** को 1-6, 7-6 (5), 7-5 से हराकर जोरदार जश्न का माहौल बना दिया और इटली को खिताब बरकरार रखने में मदद की।

- **Matteo Berrettini** earlier cruised to a 6-3, 6-4 win over **Pablo Carreno Busta**, setting the team up for victory without the doubles match needing to be played.

माटेयो बेरेटिनी ने इससे पहले **पाब्लो कारेन्यो बुस्टा** को 6-3, 6-4 से हराकर टीम को जीत की ओर अग्रसर किया, जिससे डबल्स मैच की आवश्यकता नहीं रही।



- "This was my dream... the best day of my life," said Cobolli, praising the united Italian team and fans.
"यह मेरा सपना था... मेरे जीवन का सबसे अच्छा दिन है," कोबोली ने कहा, एकजुट इटैलियन टीम और प्रशंसकों की सराहना करते हुए।
- Simone **Bolelli** and Andrea **Vavassori** were not needed in doubles as Italy won the Davis Cup without losing a match.
सिमोने **बोलेली** और एंड्रिया **वावास्सोरी** की डबल्स में जरूरत ही नहीं पड़ी क्योंकि इटली ने बिना कोई मैच गंवाए डेविस कप जीता।
- It's an impressive feat as **Italy competed without their top-ranked players Jannik Sinner and Lorenzo Musetti**.
यह उपलब्धि इसलिए भी खास है क्योंकि इटली ने अपने शीर्ष खिलाड़ी **जानिक सिनर** और **लोरेंजो मुसेट्टी** के बिना ही प्रतियोगिता खेली।
- Both players are in the world's top 10 but chose not to participate in the title defence on home soil.
दोनों खिलाड़ी विश्व रैंकिंग के शीर्ष 10 में हैं, लेकिन उन्होंने घरेलू मैदान पर खिताब बचाव में हिस्सा नहीं लिया।
- Berrettini said Italy's deep squad ensures performance regardless of which player takes the court.
बेरेटिनी ने कहा कि इटली की गहरी टीम सुनिश्चित करती है कि चाहे कोई भी कोर्ट पर उतरे, प्रदर्शन मजबूत रहता है।
- **Spain too was missing world number one Carlos Alcaraz**, who suffered a hamstring injury during the ATP Finals.
स्पेन भी विश्व नंबर 1 **कार्लोस अल्कारेज़** की कमी से जूझ रहा था, जिन्हें एटीपी फाइनल्स के दौरान हैमस्ट्रिंग चोट लगी।
- Earlier, ITF chief David Haggerty insisted top players were not "snubbing" the competition.
इससे पहले, आईटीएफ प्रमुख डेविड हैगर्टी ने जोर दिया कि शीर्ष खिलाड़ी प्रतियोगिता को "नज़रअंदाज़" नहीं कर रहे हैं।
- He said many top players participated in qualifying rounds even if they didn't reach the finals.
उन्होंने कहा कि कई शीर्ष खिलाड़ियों ने क्वालीफ़ायर राउंड में हिस्सा लिया, भले ही वे फ़ाइनल तक न पहुंच पाए।
- Players like **Taylor Fritz**, **Alex de Minaur**, **Holger Rune** and **Casper Ruud** competed in early rounds but couldn't take their nations to the finals.
टेलर फ़्रिट्ज़, **एलेक्स डी मिनौर**, **होलगर रूने** और **कैस्पेर रूड** जैसे खिलाड़ी शुरुआती दौर में खेले, लेकिन अपनी टीमों को फ़ाइनल तक नहीं पहुंचा पाए।



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GS Paper 1: History, Society and Geography	
TOPICS COVERED	25 November 2025
Geography	
India braces for disruption of air travel after Ethiopia's Hayli Gubbi volcano erupts इथियोपिया के हाइली गब्बी ज्वालामुखी के फटने के बाद भारत हवाई यात्रा में व्यवधान के लिए तैयार	
Time granted by Mozambique to firms to build LNG facilities मोज़ाम्बिक द्वारा कंपनियों को एलएनजी सुविधाएँ बनाने के लिए दिया गया समय	
Why do infant deaths persist in tribal-dominated Melghat? जनजातीय-प्रधान मेलघाट में शिशु मृत्यु क्यों बनी रहती है?	

Geography	25/11/2025
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PATRIOTICIAS



India braces for disruption of air travel after Ethiopia's Hayli Gubbi volcano erupts

GS I: Geography

Jagriti Chandra
NEW DELHI

India is bracing for potential disruption to air travel with volcanic ash from Sunday's eruption of Ethiopia's Hayli Gubbi volcano forecast to drift towards mainland India.

The Directorate General of Civil Aviation (DGCA) has issued advisories urging airlines to strictly steer clear of affected altitudes and regions to ensure flight safety as volcanic ash can harm aircraft engines due to its abrasive, glass-like particles that melt at high temperatures. When ash is ingested, it can melt on hot engine components, harden into a glass-like substance, and stick to turbine blades. Airlines have also been advised to report any suspected impact of ash on engine performance or



Ash clouds from the Hayli Gubbi volcanic eruption (in photo) has entered the Indian subcontinent from western Rajasthan. AP

cabin smoke or odour.

Airports too have been told to inspect runways for contamination and suspend or restrict flight operations, if need be.

Large plumes of smoke were initially visible over Ethiopia though the volcanic eruption stopped. After travelling over Yemen and Oman, ash clouds entered the Indian subconti-

ment from western Rajasthan on Monday and were moving north-east wards. Over the course of the night, they are expected to sweep across central parts of the country and cross Delhi close to midnight, and travel over parts of Uttar Pradesh, parts of Bihar and in the North East over Sikkim and Arunachal Pradesh.

India braces for disruption of air travel after Ethiopia's Hayli Gubbi volcano erupts

इथियोपिया के हाइली गब्बी ज्वालामुखी के फटने के बाद भारत हवाई यात्रा में व्यवधान के लिए तैयार

- India is bracing for potential disruption to air travel with **volcanic ash** from Sunday's eruption of Ethiopia's **Hayli Gubbi volcano** forecast to drift towards mainland India.
भारत रविवार को इथियोपिया के **हाइली गब्बी ज्वालामुखी** के विस्फोट से निकली **ज्वालामुखीय राख** के भारत की ओर बढ़ने की आशंका के चलते हवाई यात्रा में संभावित व्यवधान के लिए तैयार हो रहा है।
- The **Directorate General of Civil Aviation (DGCA)** has issued advisories urging airlines to strictly steer clear of affected altitudes and regions to ensure **flight safety** as **volcanic ash can harm aircraft engines due to its abrasive, glass-like particles that melt at high temperatures.**
नागरिक उड्डयन महानिदेशालय (DGCA) ने एडवाइजरी जारी कर एयरलाइंस से प्रभावित ऊंचाइयों और



क्षेत्रों से दूर रहने को कहा है ताकि उड़ान सुरक्षा सुनिश्चित की जा सके, क्योंकि ज्वालामुखीय राख के कांच जैसे घर्षणकारी कण विमान इंजनों को नुकसान पहुंचा सकते हैं और उच्च तापमान पर पिघल जाते हैं।

- **When ash is ingested, it can melt on hot engine components, harden into a glass-like substance, and stick to turbine blades.**
जब राख इंजन में प्रवेश करती है, तो यह गर्म हिस्सों पर पिघलकर कांच जैसी ठोस परत बन जाती है और **टर्बाइन ब्लेड्स** से चिपक जाती है।
- **Airlines have also been advised to report any suspected impact of ash on engine performance or cabin smoke or odour.**



एयरलाइंस को यह भी सलाह दी गई है कि यदि इंजन प्रदर्शन पर राख का कोई प्रभाव या केबिन में धुआं या गंध महसूस हो तो इसकी रिपोर्ट करें।

- **Airports too have been told to inspect runways for contamination and suspend or restrict flight operations, if necessary.**
हवाई अड्डों को भी **रनवे में प्रदूषण** की जांच करने और आवश्यकता पड़ने पर उड़ान संचालन को निलंबित या सीमित करने को कहा गया है।
- **Large plumes of smoke** were initially visible over Ethiopia though the volcanic eruption stopped.
ज्वालामुखी विस्फोट बंद होने के बाद भी इथियोपिया के ऊपर बड़े-बड़े धुएं के गुबार दिखाई दे रहे थे।
- After travelling over **Yemen and Oman**, ash clouds entered the Indian subcontinent from **western Rajasthan** on Monday and were moving **north-eastwards**.
यमन और ओमान के ऊपर से गुजरने के बाद राख के बादल सोमवार को **पश्चिमी राजस्थान** से भारतीय उपमहाद्वीप में प्रवेश कर गए और **उत्तर-पूर्व दिशा** की ओर बढ़ रहे थे।
- **Over the night, they are expected to sweep across central India, cross Delhi close to midnight, and travel over Uttar Pradesh, Bihar, and further into the North East over Sikkim and Arunachal Pradesh.**
रात भर में इनके **मध्य भारत** से गुजरने, आधी रात के आसपास **दिल्ली** के ऊपर से निकलने, तथा आगे **उत्तर प्रदेश, बिहार** और पूर्वोत्तर के **सिक्किम व अरुणाचल प्रदेश** तक पहुंचने की उम्मीद है।

Time granted by Mozambique to firms to build LNG facilities

GS I: Geography: Location

30 years. Mozambique has granted its top state-owned companies, including national oil firm ENH, a 30-year concession to **build and operate natural gas facilities** at the **Port of Beira** and the smaller **Inhassoro** site, the government said on Monday. REUTERS

▶ Time granted by Mozambique to firms to build LNG facilities

मोज़ाम्बिक द्वारा कंपनियों को एलएनजी सुविधाएँ बनाने के लिए दिया गया समय

- 30 years. Mozambique has granted its top state-owned companies, including national oil firm **ENH**, a **30-year concession** to build and operate **natural gas facilities** at the **Port of Beira** and the smaller **Inhassoro** site, the government said on Monday.
30 वर्ष। मोज़ाम्बिक ने अपनी शीर्ष सरकारी कंपनियों, जिनमें राष्ट्रीय तेल कंपनी **ENH** शामिल है, को **30 वर्ष की रियायत** दी है ताकि वे **बेइरा बंदरगाह** और छोटे **इनहासोरो** स्थल पर **प्राकृतिक गैस सुविधाओं** का निर्माण और संचालन कर सकें, यह जानकारी सरकार ने सोमवार को दी।

LNG stands for **Liquefied Natural Gas**, which is natural gas (mainly methane) that has been cooled to about **-162°C** to convert it into a liquid form.



- Liquefaction reduces gas volume by **600 times**, making it easier and cheaper to transport over long distances.
- Lower emissions (SOx, NOx, particulate matter).

Why do infant deaths persist in tribal-dominated Melghat?

How have officials responded to the Bombay High Court's statements?

GS I Society
Snehal Mutha

MCB

The story so far:

The Bombay High Court, on November 12, pulled up the Maharashtra and Union governments for an "extremely casual" approach to the disturbing number of infant deaths due to malnutrition in the tribal-dominated region of Melghat in Amravati. During the hearing, a petitioner claimed that from June 2025, 65 infants aged between zero and six months had died due to malnutrition in Melghat, while more than 220 children were in the Severe Acute Malnutrition (SAM) category, out of which 50% may die if no help is provided.

What is the situation in Melghat?

The issue of infant and maternal deaths due to malnutrition and lack of maternal healthcare has always persisted in Melghat, home to Korku tribal

communities, despite three decades of government interventions. Fatalities have fluctuated over the past decade.

According to data from the Amravati Zilla Parishad, from April 2024 to March 2025, 96 infants died, and in the last seven months of this year, 61 children have died. Officials from the Zilla Parishad office, however, state that most of these deaths are not just because of malnutrition but other underlying causes such as anaemia, sickle cell disease, pneumonia, delays in treatment due to lack of connectivity, and others. "All these deaths are not because of malnutrition but other issues. We are running a hot food scheme in the Melghat areas, providing eggs and bananas four times a week. We have set up the village child development centre (VDC) in all gram panchayats to monitor SAM cases," said Amravati ZP Chief Executive Officer, Sanjita Mohapatra, adding that peripheral issues still needed to be addressed. The petitioner argued that even though the

cause of death has been recorded as pneumonia or other causes, malnutrition is also a reason.

Maharashtra's Women and Child Welfare Department Minister stated that Poshan tracker data recorded 1,82,443 malnourished children across the State. The Indian Institute of Population Sciences noted that Maharashtra continues to perform poorly on child nutrition, with 35% of children under five stunted and 35% underweight.

What are the challenges?

Peripheral issues that the State government point to include lack of proper roads to reach a hospital in time, inadequate electricity supply to homes, lack of primary healthcare centres, the prevalence of substance abuse and more. According to experts working in Melghat, multiple government departments that execute programmes operate in silos, resulting in inconsistent supplement

delivery, irregular monitoring, and weak coordination to sustain policies.

Finding and retaining doctors, including paediatricians, gynaecologists, and other hospital staff members, remains a major challenge as the absconding rate (absent from work) is high. Ms. Mohapatra says that even though salary and incentives have increased, the mindset of doctors remain unchanged. She also pointed out that the Infant Mortality Rate (IMR), which is a key indicator of child health, has improved in Melghat to 16.5 while Maharashtra's IMR is 15 as per the Sample Registration System data of 2024-25. Intergenerational malnutrition presents another challenge, as women often enter pregnancy severely underweight and anaemic, leading to low-birth-weight babies, who then have weakened immunity and are vulnerable to infections.

What are expert-approved solutions?

The eradication of malnutrition is not limited to providing mid-day meals or food supplies, say experts. It also involves creating a well-oiled healthcare system, where nutrition is provided for both mothers and children; creating a cadre of ASHA workers with a strong knowledge of health; caring for co-morbidities through health and nutrition programmes; promoting community-centred behavioural change, and developing civic and health infrastructure.

THE GIST

▼ The issue of infant and maternal deaths due to malnutrition and lack of maternal healthcare has always persisted in Melghat, home to Korku tribal communities, despite three decades of government interventions.

▼ Peripheral issues that the State government point to include lack of proper roads to reach a hospital in time, inadequate electricity supply to homes, lack of primary healthcare centres, the prevalence of substance abuse and more.

▼ The eradication of malnutrition is not limited to providing mid-day meals or food supplies say officials.

Why do infant deaths persist in tribal-dominated Melghat?

जनजातीय-प्रधान मेलघाट में शिशु मृत्यु क्यों बनी रहती है?

- The **Bombay High Court**, on **November 12**, pulled up the **Maharashtra and Union governments** for an "extremely casual" approach to the disturbing number of infant deaths due to malnutrition in the tribal-dominated region of **Melghat in Amravati**.
- During the hearing, a petitioner claimed that **from June 2025, 65 infants** aged between zero and six months had died due to malnutrition in Melghat, while more than **220 children** were in the **Severe Acute Malnutrition (SAM)** category, out of which **50% may die** if no help is provided.

सुनवाई के दौरान एक याचिकाकर्ता ने दावा किया कि **जून 2025** से शून्य से छह महीने की आयु वाले **65 शिशुओं** की मेलघाट में कुपोषण से मौत हुई, जबकि **220 से अधिक बच्चे गंभीर तीव्र कुपोषण (SAM)** श्रेणी में थे, जिनमें से **50% मर सकते हैं** यदि सहायता नहीं मिली।

What is the situation in Melghat?

मेलघाट में स्थिति क्या है?

- The issue of infant and maternal deaths due to malnutrition and lack of maternal healthcare has always persisted in **Melghat, home to Korku tribal communities**, despite three decades of government interventions.
- कुपोषण और मातृ स्वास्थ्य सेवाओं की कमी के कारण शिशु और



Melghat, home to Korku communi

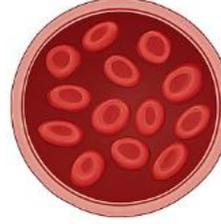




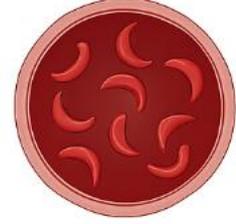
मातृ मृत्यु का मुद्दा, **कोरकू जनजातीय समुदायों** के घर मेलघाट में, सरकारी हस्तक्षेप के तीन दशक बाद भी जारी है।

- Fatalities have fluctuated over the past decade. पिछले एक दशक में मृत्यु संख्या में उतार-चढ़ाव रहा है।
- According to data from the **Amravati Zilla Parishad**, from **April 2024 to March 2025, 96 infants** died, and in the last seven months of this year, **61 children** have died.
अमरावती जिला परिषद के आंकड़ों के अनुसार **अप्रैल 2024 से मार्च 2025** तक **96 शिशुओं** की मौत हुई और इस वर्ष के पिछले सात महीनों में **61 बच्चों** की मौत हुई।
- Officials from the Zilla Parishad office, however, state that most of these deaths are not just because of malnutrition but other underlying causes such as **anaemia, sickle cell disease, pneumonia, delays in treatment due to lack of connectivity, and others.**

हालांकि, जिला परिषद कार्यालय के अधिकारियों का कहना है कि इन मौतों का कारण केवल कुपोषण नहीं है बल्कि **अनीमिया, सिकल सेल रोग, न्यूमोनिया**, संपर्क की कमी के कारण उपचार में देरी आदि भी कारण हैं।



Normal red blood cells



Sickle-shaped red blood cells

- “All these deaths are not because of malnutrition but other issues. We are running a **hot food scheme** in the Melghat areas, providing **eggs and bananas four times a week.** We have set up the **village child development centre (VCDC)** in all gram panchayats to monitor SAM cases,” said Amravati ZP Chief Executive Officer, **Sanjita Mohapatra**, adding that peripheral issues still needed to be addressed.
“ये सभी मौतें कुपोषण के कारण नहीं हैं बल्कि अन्य कारण हैं। हम मेलघाट में **हॉट फूड स्कीम** चला रहे हैं और **सप्ताह में चार बार अंडे और केले** दे रहे हैं। सभी ग्राम पंचायतों में **ग्राम बाल विकास केंद्र (VCDC)** स्थापित किए हैं,” अमरावती जिला परिषद की मुख्य कार्यकारी अधिकारी **संजीता मोहापात्रा** ने कहा, साथ ही बताया कि परिधीय समस्याओं का समाधान अभी भी आवश्यक है।
- The petitioner argued that even though the cause of death has been recorded as pneumonia or other causes, **malnutrition is also a reason.**
याचिकाकर्ता ने तर्क दिया कि भले ही मृत्यु का कारण न्यूमोनिया या अन्य कारण बताया गया है, **कुपोषण भी एक कारण** है।
- **Maharashtra's Women and Child Welfare Department Minister** stated that **Poshan tracker data** recorded **1,82,443 malnourished children** across the State.
महाराष्ट्र के महिला और बाल कल्याण विभाग मंत्री ने कहा कि **पोषण ट्रैकर डेटा** में राज्य में **1,82,443 कुपोषित बच्चों** को दर्ज किया गया है।
- The **Indian Institute of Population Sciences** noted that Maharashtra continues to perform poorly on child nutrition, with **35% of children under five stunted** and **35% underweight.**
भारतीय जनसंख्या विज्ञान संस्थान ने बताया कि महाराष्ट्र बाल पोषण में अब भी खराब प्रदर्शन कर रहा है, जहां **पांच वर्ष से कम आयु के 35% बच्चे ठिगने** और **35% कम वज़न** के हैं।

What are the challenges?

चुनौतियाँ क्या हैं?

- Peripheral issues that the State government points to include **lack of proper roads to reach a hospital in time, inadequate electricity supply, lack of primary healthcare centres, the prevalence of substance abuse** and more.
राज्य सरकार जिन परिधीय मुद्दों की ओर संकेत करती है, उनमें अस्पताल तक समय पर पहुंचने के लिए सही सड़कें नहीं होना, **बिजली आपूर्ति** की कमी, **प्राथमिक स्वास्थ्य केंद्रों** की कमी, **नशा दुरुपयोग** की व्यापकता आदि शामिल हैं।
- According to experts working in Melghat, multiple government departments that execute programmes operate in **silos**, resulting in inconsistent supplement delivery, irregular monitoring, and **weak coordination** to sustain policies.
मेलघाट में काम करने वाले विशेषज्ञों के अनुसार, कार्यक्रम चलाने वाले कई सरकारी विभाग **अलग-थलग** काम करते हैं, जिससे पोषण सप्लीमेंट की आपूर्ति असंगत, निगरानी अनियमित और नीतियों को बनाए रखने में **कमजोर समन्वय** होता है।



- Finding and retaining doctors, including **paediatricians, gynaecologists**, and other hospital staff members, remains a major challenge as the **absconding rate** is high.
बाल रोग विशेषज्ञों, स्त्रीरोग विशेषज्ञों और अन्य अस्पताल कर्मियों सहित डॉक्टरों को ढूंढना और रोकना एक बड़ी चुनौती है क्योंकि **अनुपस्थित रहने की दर** अधिक है।
- Ms. Mohapatra says that **even though salary and incentives have increased, the mindset of doctors remains unchanged**.
सुश्री मोहापात्रा का कहना है कि वेतन और प्रोत्साहन बढ़ने के बावजूद डॉक्टरों की **मानसिकता** नहीं बदली है।
- She also pointed out that the **Infant Mortality Rate (IMR)** has improved in Melghat to **16.5** while Maharashtra's IMR is **15** as per the **SRS data 2024-25**.
उन्होंने यह भी बताया कि मेलघाट में **शिशु मृत्यु दर (IMR) 16.5** तक सुधरी है, जबकि महाराष्ट्र की **IMR 15** है, **SRS डेटा 2024-25** के अनुसार।
- Intergenerational malnutrition** presents another challenge, as women often enter pregnancy **severely underweight and anaemic**, leading to **low-birth-weight babies**, who then have **weakened immunity and are vulnerable to infections**.
पीढ़ी-दर-पीढ़ी कुपोषण एक और चुनौती है, क्योंकि महिलाएँ अक्सर गर्भावस्था में **गंभीर रूप से कम वजन और अनीमिक** होती हैं, जिससे **कम वजन वाले शिशु** जन्म लेते हैं जिनकी प्रतिरक्षा कमजोर होती है और वे संक्रमणों के प्रति अधिक संवेदनशील होते हैं।

What are expert-approved solutions?

विशेषज्ञ-स्वीकृत समाधान क्या हैं?

- The eradication of malnutrition is not limited to providing mid-day meals or food supplies, say experts.
विशेषज्ञों का कहना है कि कुपोषण का उन्मूलन केवल मध्याह्न भोजन या खाद्य आपूर्ति देने तक सीमित नहीं है।
- It also involves **creating a well-oiled healthcare system, where nutrition is provided for both mothers and children**; creating a cadre of **ASHA workers** with a strong knowledge of health; caring for **co-morbidities** through health and nutrition programmes; **promoting community-centred behavioural change**, and **developing civic and health infrastructure**.
इसमें एक **सुचारू स्वास्थ्य प्रणाली** बनाना शामिल है, जहाँ माँ और बच्चे दोनों को पोषण मिले; स्वास्थ्य की मजबूत जानकारी वाले **आशा कार्यकर्ताओं** की एक टीम तैयार करना; स्वास्थ्य और पोषण कार्यक्रमों के माध्यम से **सह-रुग्णताओं** की देखभाल करना; **समुदाय-केंद्रित व्यवहार परिवर्तन** को बढ़ावा देना, और **नागरिक तथा स्वास्थ्य अवसंरचना** का विकास करना शामिल है।

GS Paper II: Polity, Governance, And International Relations

TOPICS COVERED

25 November 2025

Polity	
1.	Supreme Court to examine petition to stop cash donations to political parties सुप्रीम कोर्ट राजनीतिक दलों को नकद चंदा रोकने की याचिका की सुनवाई करेगा
2.	What does the SC's advisory opinion imply? सुप्रीम कोर्ट की सलाहकार राय का क्या अर्थ है?
3.	The amplitude of gubernatorial discretion राज्यपालीय विवेकाधिकार की व्यापकता
Governance	



3.	Bridging India's numeracy gap भारत की संख्यात्मकता की खाई को पाटना
	International Relations
4.	Missing 'Ubuntu' लापता 'उबंटू'
5.	Widely quoted WHO norm of 1 doctor per 1,000 people is not official प्रायः उद्धृत WHO का 1 डॉक्टर प्रति 1,000 जनसंख्या का मानक आधिकारिक नहीं है

Polity

25/11/2025

Supreme Court to examine petition to stop cash donations to political parties

GS II: Polity: Election

Krishnadas Rajagopal
NEW DELHI

The Supreme Court on Monday agreed to examine a petition to stop cash donations of even up to ₹2,000 to parties for the sake of transparency, and to bring every political contribution, no matter what the amount, under the income tax regime.

A Bench of Justices Vikram Nath and Sandeep Mehta issued notice on the plea that the Election Commission must not spare parties from disclosing even cash donations up to ₹2,000, and they should be made to divulge complete details of their donors.

“Political parties must disclose the name and all other particulars of the person paying any amount of money to it and no amount can be received in cash so as to maintain transparency in the political funding,” the petition said.

The petition has arraigned, besides the EC, the Union government, Central Board of Direct Taxes and 13 parties, including the BJP, Congress, Dravida Munnetra Kazhagam, Communist Party of India (Marxist), Trinamool Congress, Samajwadi Par-

ty, AAP, as respondents.

The petition, filed by Khem Singh Bhati, challenged the legality of clause (d) of Section 13A of the Income Tax Act, 1961. Section 13A is a special provision permitting tax exemption to political parties. Clause (d) of the provision allows parties to accept donations worth ₹2,000 in cash.

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Section 13A is a special provision permitting tax exemption to political parties.

Clause (d) of the provision allows parties to accept donations worth ₹2,000 in cash.

Supreme Court to examine petition to stop cash donations to political parties सुप्रीम कोर्ट राजनीतिक दलों को नकद चंदा रोकने की याचिका की सुनवाई करेगा

- The Supreme Court on Monday agreed to examine a petition to stop cash donations of even up to ₹2,000 to parties for the sake of transparency, and to bring every political contribution, no matter what the amount, under the income tax regime.

सुप्रीम कोर्ट ने सोमवार को पारदर्शिता के लिए राजनीतिक दलों को ₹2,000 तक की नकद देनदारी रोकने और हर राजनीतिक योगदान को, राशि चाहे कितनी भी हो, आयकर व्यवस्था के अंतर्गत लाने की याचिका पर विचार करने के लिए सहमति दी।

- A Bench of Justices Vikram Nath and Sandeep Mehta issued notice on the plea that the Election Commission must not spare parties from disclosing even cash donations up to ₹2,000, and they should be made to divulge complete details of their donors.

न्यायमूर्ति विक्रान्त नाथ और संदीप मेहता की पीठ ने नोटिस जारी किया, जिसमें कहा गया कि चुनाव आयोग को राजनीतिक दलों को ₹2,000 तक के नकद दान का भी खुलासा करने से नहीं बचाना चाहिए और उनसे दानदाताओं का पूरा विवरण मांगा जाना चाहिए।



- “Political parties must disclose the name and all other particulars of the person paying any amount of money to it and no amount can be received in cash so as to maintain **transparency in political funding**,” the petition said.
याचिका में कहा गया, “राजनीतिक दलों को किसी भी व्यक्ति द्वारा दी गई किसी भी राशि का नाम और पूरा विवरण बताना चाहिए और राजनीतिक फंडिंग में पारदर्शिता बनाए रखने के लिए किसी भी राशि को नकद के रूप में स्वीकार नहीं किया जाना चाहिए।”
- The petition has been arraigned, besides the EC, the **Union government, Central Board of Direct Taxes (CBDT) and 13 political parties**, including the **BJP, Congress, DMK, CPI(M), Trinamool Congress, Samajwadi Party, AAP**, as respondents.
याचिका में चुनाव आयोग (EC) के साथ-साथ केंद्र सरकार, केंद्रीय प्रत्यक्ष कर बोर्ड (CBDT) और 13 राजनीतिक दलों, जिनमें भाजपा, कांग्रेस, डीएमके, सीपीआई(एम), तृणमूल कांग्रेस, समाजवादी पार्टी, आप शामिल हैं, को पक्षकार बनाया गया है।
- The petition, filed by **Khem Singh Bhati**, challenged the legality of **clause (d) of Section 13A of the Income Tax Act, 1961**.
खेम सिंह भाटी द्वारा दायर याचिका में आयकर अधिनियम, 1961 की धारा 13A के खंड (d) की वैधता को चुनौती दी गई है।
- Section 13A is a special provision **permitting tax exemption to political parties**.
धारा 13A राजनीतिक दलों को कर छूट देने का एक विशेष प्रावधान है।
- Clause (d) of the provision **allows parties to accept donations worth ₹2,000 in cash**.
इस प्रावधान के खंड (d) के तहत राजनीतिक दलों को ₹2,000 तक के नकद दान स्वीकार करने की अनुमति है।

What does the SC's advisory opinion imply?

What were the questions raised by the Presidential reference as a result of a judgment delivered in April 2025? What were the key points delivered by the Supreme Court in its opinion? Should Governors act on the aid and advice of the Council of Ministers?

IGS II: Polity

MOB

EXPLAINER

Rangarajan.R

The story so far:

The Supreme Court has provided its opinion on a Presidential reference made under Article 143. In its opinion, it has largely negated the decision of a two-judge Bench that was delivered in April 2025.

What was the Presidential reference?
The current reference is the result of a two-judge Bench judgment in *State of Tamil Nadu versus Governor of Tamil Nadu* in April 2025, that had specified a timeline of three months for Governors and the President to act on Bills passed by State legislatures. The court held that decisions by Governors and the President on such Bills are subject to judicial review. It had exercised its extraordinary power under Article 142 and granted 'deemed assent' to Bills passed by Tamil Nadu assembly that were not assented to by the Governor.

The present reference had raised 14 questions, primarily surrounding the interpretation of Articles 200 and 201, for the court's opinion. These questions deal with the authority of the courts to prescribe timelines when they are not specified in the Constitution. The government had questioned whether the actions of Governors and the President can be made justiciable at a stage prior to the enactment of a Bill into a law. The reference also sought an opinion on the extent of powers that can be exercised by the Supreme Court under Article 142.

What is the current opinion?

A five-judge Bench of the top Court delivered its opinion on the questions raised. It stated that this reference was a 'functional reference', that strikes at the root of day-to-day functioning of constitutional functionaries and the interplay between State legislature, Governor and the President. Key points of



The Supreme Court of India. GETTY IMAGES

the opinion are summarised below.

First, the Governor has three constitutional options under Article 200 when a Bill passed by State legislature is presented for his/her assent, namely to assent, or reserve the Bill for consideration of the President, or withhold assent and return the Bill to legislature with comments. Second, the Governor enjoys discretion in choosing from these three options and is not bound by the aid and advice of the Council of Ministers. Third, the discharge of functions by the Governor under Article 200 is not justiciable but in case of glaring circumstances of prolonged and unexplained inaction, the court can issue a limited mandamus for the Governor to discharge his/her function on Bills presented. Fourth, in the absence of

constitutionally prescribed time limits, the court cannot judicially prescribe timelines for action by the President or Governor. Fifth, the decisions of the President and Governor under Articles 201 and 200 respectively are not justiciable before a Bill is enacted into a law. Finally, the powers of the Supreme Court under Article 142 cannot substitute the powers vested on the President/Governor under the Constitution. Hence, there is no allowance for the concept of 'deemed assent' of Bills.

What are the issues?

The Sarkaria Commission (1987), had opined that it is only the reservation of Bills for consideration of the President, that too under rare cases of patent

unconstitutionality, that can be implied as a discretionary power of the Governor. The Supreme Court in various cases including in *Shamsher Singh (1974)* and *Nabam Rebia (2016)*, had held that the Governors should act on the aid and advice of the Council of Ministers. However, in the present opinion, the court has interpreted these cases to conclude that actions under Article 200, with respect to a Bill presented for assent, fall under the discretionary powers of the Governor. This has the potential to derail the legislative intent of popularly elected State governments.

With respect to time limits, the Punchhi Commission (2010), had recommended that the Governor should take a decision with respect to a Bill presented for his/her assent within a period of six months. The court in its own judgment in the *K. M. Singh* case (2020), had stipulated a time limit of three months for Speakers to decide on disqualification petitions though no time limit has been prescribed in the Constitution. The verdict of the division bench in the *State of Tamil Nadu* case to provide time limits to Governors and the President was a purposive and progressive interpretation of the Constitution. The current opinion has negated this position.

What can be the way forward?

The underlying disease that has plagued our federal set up has been the politicisation of the gubernatorial post. The Governor acts as an appointee of the Centre for maintaining unity and integrity of the nation. However, federalism is also a basic feature of our Constitution. This opinion should not become an alibi for the Governor's office to thwart the policies of popularly elected houses in the States. The Governors should display responsible urgency in providing assent to Bills passed by State legislatures.

Rangarajan.R is a former IAS officer and author of 'Courseware on Polity Simplified'. He currently trains at Officers IAS Academy'. Views expressed are personal.

THE GIST

The current reference is the result of the judgment in *State of Tamil Nadu versus Governor of Tamil Nadu* that had specified a timeline of three months for Governors and the President to act on Bills passed by State legislatures.

The present reference had raised 14 questions, primarily surrounding the interpretation of Articles 200 and 201, for the court's opinion.

With respect to time limits, the Punchhi Commission (2010), had recommended that the Governor should take a decision with respect to a Bill presented for his/her assent within a period of six months.



What does the SC's advisory opinion imply? सुप्रीम कोर्ट की सलाहकार राय का क्या अर्थ है?

Supreme Court Opinion on Presidential Reference राष्ट्रपति संदर्भ पर सुप्रीम कोर्ट की राय

- The Supreme Court has provided its opinion on a Presidential reference made under **Article 143**. In its opinion, it has largely negated the decision of a two-judge Bench that was delivered in **April 2025**.
सुप्रीम कोर्ट ने **अनुच्छेद 143** के तहत किए गए राष्ट्रपति संदर्भ पर अपनी राय दी है। अपनी राय में, इसने **अप्रैल 2025** में दिए गए दो-न्यायाधीश पीठ के निर्णय को बड़े पैमाने पर नकार दिया है।

What was the Presidential reference? राष्ट्रपति संदर्भ क्या था?

- The current reference is the result of a two-judge Bench judgment in **State of Tamil Nadu versus Governor of Tamil Nadu (April 2025)**, that had specified a timeline of **three months** for Governors and the President to act on Bills passed by State legislatures.
मौजूदा संदर्भ **तमिलनाडु राज्य बनाम तमिलनाडु के राज्यपाल (अप्रैल 2025)** के दो-न्यायाधीश पीठ के फैसले का परिणाम है, जिसमें राज्य विधानमंडलों द्वारा पारित विधेयकों पर राज्यपाल और राष्ट्रपति द्वारा कार्रवाई के लिए **तीन महीने** की समयसीमा तय की गई थी।
- The court held that decisions by Governors and the President on such Bills are **subject to judicial review**.
अदालत ने माना कि ऐसे विधेयकों पर राज्यपालों और राष्ट्रपति के निर्णय **न्यायिक समीक्षा के अधीन** हैं।
- It had exercised its extraordinary power under **Article 142** and granted '**deemed assent**' to Bills passed by Tamil Nadu assembly that were not assented to by the Governor.
अदालत ने **अनुच्छेद 142** के तहत अपनी असाधारण शक्ति का उपयोग किया था और तमिलनाडु विधानसभा द्वारा पारित उन विधेयकों को '**मानी हुई स्वीकृति (deemed assent)**' प्रदान की थी जिन पर राज्यपाल ने स्वीकृति नहीं दी थी।
- The present reference had raised **14 questions**, primarily surrounding the interpretation of **Articles 200 and 201**, for the court's opinion.
मौजूदा संदर्भ ने कोर्ट की राय के लिए **14 प्रश्न** उठाए थे, जो मुख्य रूप से **अनुच्छेद 200 और 201** की व्याख्या से जुड़े थे।
- These questions deal with whether courts can prescribe **timelines** when they are not mentioned in the Constitution.
ये प्रश्न इस बात से संबंधित थे कि क्या न्यायालय **समयसीमा** निर्धारित कर सकते हैं जब संविधान में ऐसी समयसीमा नहीं दी गई है।
- The government had questioned whether actions of Governors and the President can be made **justiciable** before a Bill becomes a law.
सरकार ने पूछा था कि क्या किसी विधेयक के कानून बनने से पहले राज्यपाल और राष्ट्रपति की कार्यवाही **न्यायिक समीक्षा योग्य** हो सकती है।
- The reference also sought an opinion on the **extent of powers that the Supreme Court can exercise under Article 142**.
संदर्भ ने यह राय भी मांगी थी कि सुप्रीम कोर्ट **अनुच्छेद 142** के तहत कितनी शक्तियों का इस्तेमाल कर सकता है।



What is the current opinion? मौजूदा राय क्या है?



- A **five-judge Bench** of the top Court delivered its opinion on the questions raised.
सुप्रीम कोर्ट की **पांच-न्यायाधीश पीठ** ने उठाए गए प्रश्नों पर अपनी राय दी।
- It stated that this reference was a '**functional reference**', affecting day-to-day functioning of constitutional authorities and the relationship between State legislature, Governor and the President.
इसने कहा कि यह संदर्भ एक '**कार्यात्मक संदर्भ (functional reference)**' है, जो संवैधानिक प्राधिकरणों के दैनिक कामकाज और राज्य विधानमंडल, राज्यपाल और राष्ट्रपति के संबंधों को प्रभावित करता है।
- First, the Governor has **three options** under **Article 200** — assent, reserve for President, or withhold and return with comments.
पहला, राज्यपाल के पास **अनुच्छेद 200** के तहत **तीन विकल्प** हैं — स्वीकृति, राष्ट्रपति के विचारार्थ आरक्षण, या टिप्पणियों सहित विधेयक वापस करना।
- **Second, the Governor enjoys discretion in choosing from these options and is not bound by the aid and advice of the Council of Ministers.**
दूसरा, राज्यपाल इन विकल्पों में से चुनने में **विवेकाधिकार** रखते हैं और मंत्रिपरिषद की सलाह से **बाध्य नहीं** हैं।
- Third, the Governor's actions under Article 200 are **not justiciable**, but in cases of prolonged and unexplained delay, the **court can issue a limited mandamus.**
तीसरा, अनुच्छेद 200 के तहत राज्यपाल की कार्यवाही **न्यायिक समीक्षा योग्य नहीं** है, लेकिन लंबे और अनुचित विलंब के मामलों में अदालत **सीमित मंडेमस** जारी कर सकती है।
- Fourth, since the Constitution does not prescribe **time limits**, the court cannot judicially prescribe them.
चौथा, चूंकि संविधान में **समयसीमा** निर्धारित नहीं है, इसलिए अदालत उन्हें निर्धारित नहीं कर सकती।
- Fifth, decisions of the President and Governor under **Articles 201 and 200** are **not justiciable** before a Bill becomes law.
पाँचवाँ, **अनुच्छेद 201 और 200** के तहत राष्ट्रपति और राज्यपाल के निर्णय विधेयक के कानून बनने से पहले **न्यायिक समीक्षा योग्य नहीं** हैं।
- Finally, **powers of the Supreme Court under Article 142 cannot substitute powers of the President/Governor, hence the concept of 'deemed assent' is not permissible.**
अंत में, सुप्रीम कोर्ट की **अनुच्छेद 142** के तहत शक्तियाँ राष्ट्रपति/राज्यपाल की शक्तियों का स्थान नहीं ले सकतीं, अतः '**मानी हुई स्वीकृति (deemed assent)**' का सिद्धांत मान्य नहीं है।

What are the issues?

मुद्दे क्या हैं?

- The **Sarkaria Commission (1987)** had said that only the reservation of Bills for the President, and only in rare cases, can be implied as a **discretionary power** of the Governor.
सरकारिया आयोग (1987) ने कहा था कि केवल दुर्लभ मामलों में राष्ट्रपति के विचारार्थ विधेयक आरक्षित करना ही राज्यपाल की **विवेकाधीन शक्ति** माना जा सकता है।
- The **Supreme Court in Shamsher Singh (1974) and Nabam Rebia (2016)** held that **Governors should act on aid and advice.**
सुप्रीम कोर्ट ने **शमशेर सिंह (1974)** और **नाबम रेबिया (2016)** में कहा था कि राज्यपालों को **सहायता और सलाह** पर कार्य करना चाहिए।
- **However, the present opinion interprets these cases to say that actions under Article 200 fall under discretionary powers, which may derail legislative intent of elected governments.**
लेकिन वर्तमान राय इन मामलों की व्याख्या इस तरह करती है कि अनुच्छेद 200 के तहत कार्यवाहियाँ **विवेकाधीन शक्तियाँ** हैं, जो निर्वाचित सरकारों के विधायी इरादों को बाधित कर सकती हैं।
- **With respect to time limits, the Punchhi Commission (2010) recommended a six-month limit for Governors.**
समयसीमा के संदर्भ में, **पुण्छी आयोग (2010)** ने राज्यपालों के लिए **छह महीने** की सीमा सुझाई थी।
- The **Supreme Court in K.M. Singh (2020)** imposed a **three-month limit on Speakers, even though it was not in the Constitution.**
सुप्रीम कोर्ट ने **के.एम. सिंह (2020)** में स्पीकरों पर **तीन महीने** की सीमा तय की थी, जबकि संविधान में ऐसी सीमा नहीं थी।
- The division bench verdict in **Tamil Nadu (2025)** giving time limits was a **purposive and progressive** interpretation.



तमिलनाडु (2025) के विभाजन पीठ के फैसले में समयसीमा देना एक उद्देश्यपूर्ण और प्रगतिशील व्याख्या थी।

- The current opinion has negated this position.
वर्तमान राय ने इस स्थिति को नकार दिया है।

What can be the way forward?

आगे का रास्ता क्या हो सकता है?

- The real issue is the **politicisation of the gubernatorial post**.
वास्तविक समस्या **राज्यपाल पद का राजनीतिकरण** है।
- Federalism is a **basic feature** of the Constitution, and this opinion should not become an excuse for Governors to block policies of elected State governments.
संघवाद संविधान की एक **मूलभूत विशेषता** है, और यह राय राज्यपालों के लिए निर्वाचित सरकारों की नीतियाँ रोकने का बहाना नहीं बननी चाहिए।
- Governors should show **responsible urgency** in providing assent to Bills passed by State legislatures.
राज्यपालों को राज्य विधानमंडलों द्वारा पारित विधेयकों पर स्वीकृति देने में **जिम्मेदार तात्कालिकता** दिखानी चाहिए।

Governance

25/11/2025

PATRIOTICIAS



Bridging India's numeracy gap

GS II: Governance

MOB

The National Education Policy 2020 rightly identifies Foundational Literacy and Numeracy (FLN) as the cornerstone of all future learning. The NIPUN Bharat Mission has translated this policy intent into action by focusing on learning outcomes rather than just inputs. Foundational learning outcomes – stagnant for decades – have shown measurable improvement, as confirmed by government as well as independent surveys.

Despite these gains, numeracy continues to lag behind literacy. The Annual State of Education Report 2024 report shows that while 48.7% of Class 5 students can read fluently, only 30.7% can solve a basic division problem – an 18% point gap. No State reports higher numeracy than literacy outcomes. This situation makes it essential to examine numeracy more closely on the path to achieving foundational learning.

Integrated learning

The root of the numeracy problem lies in the cumulative nature of mathematics. Unlike language learning, where partial comprehension allows some progress, math is hierarchical and builds on itself. A missed concept in the lower grades, such as place value, can make future concepts like addition and decimals inaccessible. As a result, once gaps form, they tend to widen over time.

Traditional syllabus-driven teaching worsens the issue, as it advances without ensuring that students have grasped earlier concepts. Research and field experience from Teaching at the Right Level, an approach developed by the NGO Pratham, show that instruction must be aligned with a child's learning level rather than the curriculum. Without remedial interventions, grade-level teaching simply bypasses most learners, deepening existing disparities.

This gap is also evident in the disconnect between school



Jatin Goyal

A civil servant presently serving in the Union Territory of Dadra Nagar Haveli and Daman and Diu. Views are personal

Strengthening middle-grade support, introducing Foundational Literacy and Numeracy+ skills, and making math more connected to everyday life can transform India's early gains into lasting numeracy progress

learning and real-life application. A study by the Abdul Latif Jameel Poverty Action Lab shows that students who perform well on classroom math assessments often struggle to apply that knowledge in real-life market situations. Conversely, children engaged in real-world tasks, such as working in a shop, often find it difficult to transfer those skills into classroom-based math problems. This two-way disconnect underscores the need for integrated learning that brings real-life problem-solving into classrooms.

The practical consequences of the numeracy gap are significant. Students who lack foundational numeracy skills struggle in both math and science – subjects which record far higher failure rate than others – in board exams. Many adolescents exit school even before reaching the board exam stage, not because of a lack of access or interest, but because persistent learning gaps make classroom instruction incomprehensible, especially in middle and secondary school. The dread of math is therefore real, and results in closing the doors of higher education for many who can't pass Class 10 board exams or drop out earlier.

A multi-pronged response

Addressing this challenge calls for a multi-pronged response that builds on NIPUN's gains. The most urgent step is to extend interventions up to Class 8, given that about 70% of Class 5 and more than 50% of Class 8 students are still unable to perform basic division, as per the ASER 2024 report. Limiting foundational interventions to Class 3 is inadequate when upper primary children continue to miss out, many having lost crucial primary years due to COVID-19 disruptions. Experiences from the Union Territory of Dadra and Nagar Haveli and Daman and Diu, where extending FLN interventions into middle grades significantly improved outcomes as shown in

the Parakh Rashtriya Survekshan 2024, confirm the value of such an approach.

Alongside this extension, it is equally important to move beyond "foundational" skills and introduce what may be called FLN+ skills – fractions, decimals, percentages, ratios, and integers – since these are critical for board exam success and later academic progression. ASER 2024's finding that nearly 70% of Class 5 students cannot solve division suggests that an overwhelming majority also lack higher-level skills, such as adding simple fractions (for example, $2/3 + 1/2$). This must change through a concerted effort.

Pedagogy, too, must evolve, especially beyond the NIPUN hours: child-friendly, activity-based methods already used for FLN should be adapted for higher-level concepts, ensuring teaching aligns with students' actual learning levels rather than rigid grade-based syllabi. Finally, the classroom must connect more meaningfully with the outside world. By embedding literacy and numeracy in real-life contexts and encouraging everyday problem-solving, schools can make learning not only more relevant but also more enduring.

In conclusion, India's numeracy gap is both widespread and deep, intensifying as children progress through school. Its causes lie in the cumulative nature of mathematics and instructional approaches that fail to meet students where they are. The consequences – poor learning outcomes, board exam failures, and high dropout rates – threaten India's educational and economic future. The NIPUN Bharat Mission has already shown that foundational skills can improve at scale with focused effort. The next step is to build on these gains and extend success to upper primary levels and to FLN+ skills, especially in math. Doing so is not just an academic priority but a social and economic one – with direct implications for enrolment, employability, and equity.

Bridging India's numeracy gap भारत की संख्यात्मकता की खाई को पाटना

Foundational Literacy and Numeracy Challenges आधारभूत साक्षरता और संख्यात्मकता की चुनौतियाँ

- The National Education Policy 2020 rightly identifies Foundational Literacy and Numeracy (FLN) as the cornerstone of all future learning. राष्ट्रीय शिक्षा नीति 2020 सही रूप से Foundational Literacy and Numeracy (FLN) को भविष्य के सभी शिक्षण का आधारस्तंभ पहचानती है।
- The NIPUN Bharat Mission has translated this policy intent into action by focusing on learning outcomes rather than just inputs. निपुण भारत मिशन ने केवल इनपुट के बजाय learning outcomes पर ध्यान देकर इस नीति को वास्तविक रूप दिया है।



- Foundational learning outcomes — stagnant for decades — have shown measurable improvement, as confirmed by government as well as independent surveys.
दशकों से स्थिर रहे **foundation learning outcomes** में अब मापनीय सुधार दिखा है, जैसा कि सरकारी और स्वतंत्र सर्वेक्षणों ने पुष्टि की है।
- Despite these gains, **numeracy** continues to lag behind literacy.
इन प्रगति के बावजूद, **numeracy** अब भी literacy से पीछे है।
- The **ASER 2024 report shows that while 48.7% of Class 5 students can read fluently, only 30.7% can solve a basic division problem** — an **18% point gap**.
ASER 2024 रिपोर्ट दिखाती है कि जहाँ **48.7%** कक्षा 5 के छात्र धाराप्रवाह पढ़ सकते हैं, वहीं केवल **30.7%** एक सामान्य division समस्या हल कर सकते हैं — यानी **18%** का अंतर।
- **No State reports higher numeracy than literacy outcomes**.
कोई भी राज्य literacy से अधिक numeracy प्रदर्शन नहीं दिखाता।
- **This situation makes it essential to examine numeracy more closely on the path to achieving foundational learning**.
यह स्थिति foundational learning प्राप्त करने के मार्ग पर **numeracy** को और करीब से समझना आवश्यक बनाती है।

Integrated Learning एकीकृत शिक्षण

- The root of the numeracy problem lies in the **cumulative nature of mathematics**.
Numeracy की समस्या की जड़ गणित की **cumulative nature** में निहित है।
- **Unlike language learning, where partial comprehension allows some progress, math is hierarchical and builds on itself**.
भाषा सीखने के विपरीत, जहाँ आंशिक समझ भी प्रगति की अनुमति देती है, गणित **hierarchical** है और अपने पूर्व अवधारणाओं पर आधारित होता है।
- A missed concept in lower grades, such as **place value**, can make future concepts like **addition** and **decimals** inaccessible.
निचली कक्षाओं में **place value** जैसी मूल अवधारणा का छूट जाना आगे की अवधारणाओं जैसे **addition** और **decimals** को समझना कठिन बना देता है।
- As a result, once gaps form, they tend to widen over time.
इसलिए, एक बार **learning gaps** बनने पर वे समय के साथ बढ़ते जाते हैं।
- Traditional syllabus-driven teaching worsens the issue, as it advances without ensuring that students have grasped earlier concepts.
पारंपरिक **syllabus-driven** शिक्षण समस्या को बढ़ाता है क्योंकि यह पहले की अवधारणाओं के समझे जाने की पुष्टि किए बिना आगे बढ़ जाता है।
- Research and field experience from **Teaching at the Right Level (Pratham)** show that **instruction must be aligned with a child's learning level rather than the curriculum**.
Teaching at the Right Level (Pratham) के शोध और अनुभव बताते हैं कि शिक्षण को पाठ्यक्रम के बजाय बच्चे के **learning level** के अनुसार होना चाहिए।
- Without remedial interventions, grade-level teaching simply bypasses most learners, deepening existing disparities.
Remedial interventions के बिना grade-level शिक्षण ज्यादातर छात्रों को पीछे छोड़ देता है, जिससे असमानताएँ और गहरी होती हैं।
- This gap is also evident in the disconnect between school learning and **real-life application**.
यह अंतर स्कूल शिक्षण और **real-life application** के बीच disconnect में भी दिखाई देता है।
- A study by **J-PAL** shows that students who perform well on classroom math assessments often struggle in real-life market situations.
J-PAL के अध्ययन से पता चलता है कि कक्षा के गणित आकलनों में अच्छा प्रदर्शन करने वाले छात्र अक्सर वास्तविक बाजार स्थितियों में संघर्ष करते हैं।
- Conversely, children engaged in real-world tasks often find it difficult to transfer those skills into classroom-based math problems.
इसके विपरीत, वास्तविक दुनिया के कार्यों में लगे बच्चे उन कौशलों को कक्षा की गणित समस्याओं में स्थानांतरित करने में कठिनाई महसूस करते हैं।



- This two-way disconnect underscores the need for **integrated learning** that brings real-life problem-solving into classrooms.
यह दो-तरफ़ा disconnect **integrated learning** की आवश्यकता को रेखांकित करता है जो वास्तविक जीवन की समस्याओं को कक्षा में लाता है।
- The practical consequences of the numeracy gap are significant.
Numeracy gap के व्यावहारिक परिणाम महत्वपूर्ण हैं।
- Students who lack foundational numeracy skills struggle in both **math** and **science** — subjects with far higher failure rates in board exams.
जिन छात्रों में **foundational numeracy** की कमी होती है, वे **math** और **science** दोनों में संघर्ष करते हैं — इन विषयों में बोर्ड परीक्षाओं में असफलता दर अधिक होती है।
- Many adolescents exit school before the board exam stage not due to lack of access or interest, but because persistent learning gaps make classroom instruction incomprehensible.
कई किशोर बोर्ड परीक्षा से पहले ही स्कूल छोड़ देते हैं, न कि पहुँच या रुचि की कमी से, बल्कि लगातार **learning gaps** के कारण कक्षा शिक्षण समझ से बाहर हो जाता है।
- This is especially true in middle and secondary school.
यह विशेष रूप से मध्य और माध्यमिक विद्यालय में सत्य है।
- The dread of math is therefore real, and results in closing the doors of **higher education** for many who can't pass Class 10 board exams or drop out earlier.
इसलिए गणित का **fear** वास्तविक है और कक्षा 10 बोर्ड परीक्षा न पास कर पाने या पहले ही स्कूल छोड़ देने वालों के लिए **higher education** के द्वार बंद हो जाते हैं।

A Multi-Pronged Response बहुआयामी समाधान

- Addressing this challenge calls for a multi-pronged response that builds on **NIPUN's gains**.
इस चुनौती का समाधान **NIPUN** की उपलब्धियों पर आधारित एक **बहुआयामी समाधान** की मांग करता है।
- The most urgent step is to extend interventions up to **Class 8**, given that about **70%** of Class 5 and more than **50%** of Class 8 students are still unable to perform basic division, as per the **ASER 2024** report.
सबसे आवश्यक कदम है हस्तक्षेपों को **कक्षा 8** तक विस्तारित करना, क्योंकि **ASER 2024** के अनुसार कक्षा 5 के करीब **70%** और कक्षा 8 के **50%** से अधिक छात्र अब भी basic division नहीं कर पाते।
- Limiting foundational interventions to **Class 3** is inadequate when upper primary children continue to miss out, many having lost crucial primary years due to **COVID-19** disruptions.
जब upper primary के बच्चे लगातार पीछे छूट रहे हों, और कई ने **COVID-19** के कारण महत्वपूर्ण प्राथमिक वर्ष खो दिए हों, तब foundational interventions को केवल **कक्षा 3** तक सीमित रखना अपर्याप्त है।
- Experiences from **Dadra and Nagar Haveli and Daman and Diu**, where extending FLN interventions into middle grades significantly improved outcomes as shown in **Parakh Rashtriya Survekshan 2024**, confirm the value of such an approach.
दादरा और नगर हवेली तथा दमन और दीव के अनुभव, जहाँ **Parakh Rashtriya Survekshan 2024** में दिखाया गया कि मध्य कक्षाओं तक FLN हस्तक्षेप बढ़ाने से महत्वपूर्ण सुधार हुआ, इस दृष्टिकोण के महत्व की पुष्टि करते हैं।
- Alongside this extension, it is equally important to move beyond “foundational” skills and introduce **FLN+ skills** — fractions, decimals, percentages, ratios, and integers.
इस विस्तार के साथ, “foundational” कौशल से आगे बढ़कर **FLN+ skills** — fractions, decimals, percentages, ratios, integers — को शामिल करना भी उतना ही महत्वपूर्ण है।
- These are critical for **board exam success** and later academic progression.
ये **board exam success** और आगे की शैक्षणिक प्रगति के लिए आवश्यक हैं।
- ASER 2024's finding that nearly **70%** of Class 5 students cannot solve division suggests that an overwhelming majority also lack higher-level skills such as adding simple fractions ($2/3 + 1/2$).
ASER 2024 के अनुसार लगभग **70%** कक्षा 5 के छात्र division नहीं कर सकते, यह दर्शाता है कि अधिकांश छात्रों में higher-level skills जैसे simple fractions जोड़ना ($2/3 + 1/2$) भी नहीं आता।
- This must change through a concerted effort.
इसे सामूहिक प्रयास से बदलना होगा।



- Pedagogy, too, must evolve, especially beyond the **NIPUN hours**.
शिक्षण-पद्धति भी विकसित होनी चाहिए, विशेषकर **NIPUN hours** से आगे।
- Child-friendly, activity-based methods already used for FLN should be adapted for higher-level concepts, ensuring teaching aligns with students' actual **learning levels** rather than rigid grade-based syllabi.
FLN में उपयोग होने वाली child-friendly, activity-based पद्धतियों को higher-level concepts के लिए अनुकूलित किया जाना चाहिए, ताकि शिक्षण rigid syllabus के बजाय छात्रों के वास्तविक **learning levels** से मेल खाए।
- Finally, the classroom must connect more meaningfully with the outside world.
अंततः, कक्षा का जुड़ाव बाहरी दुनिया से अधिक सार्थक होना चाहिए।
- By embedding literacy and numeracy in **real-life contexts** and encouraging everyday problem-solving, schools can make learning more relevant and enduring.
real-life contexts में literacy और numeracy को शामिल करके और रोज़मर्रा की problem-solving को बढ़ावा देकर स्कूल सीखने को अधिक प्रासंगिक और टिकाऊ बना सकते हैं।
- In conclusion, India's numeracy gap is both **widespread and deep**, intensifying as children progress through school.
निष्कर्षतः, भारत का numeracy gap **व्यापक और गहरा** है, और जैसे-जैसे बच्चे आगे बढ़ते हैं यह बढ़ता जाता है।
- Its causes lie in the cumulative nature of mathematics and instructional approaches that fail to meet students where they are.
इसके कारण गणित की cumulative nature और instructional approaches में हैं जो छात्रों के learning level को नहीं पकड़ पाते।
- The consequences — poor learning outcomes, board exam failures, and high dropout rates — threaten India's **educational and economic future**.
इसके परिणाम — खराब learning outcomes, बोर्ड परीक्षा में असफलता, और उच्च dropout rates — भारत के **शैक्षणिक और आर्थिक भविष्य** को खतरे में डालते हैं।
- The **NIPUN Bharat Mission** has already shown that foundational skills can improve at scale with focused effort.
निपुण भारत मिशन यह दिखा चुका है कि केंद्रित प्रयास से foundational skills बड़े स्तर पर सुधर सकती हैं।
- The next step is to build on these gains and extend success to upper primary levels and to **FLN+ skills**, especially in math.
अगला कदम है इन उपलब्धियों को बढ़ाना और upper primary स्तर तथा **FLN+ skills**, विशेषकर गणित में, सुधार को विस्तारित करना।
- Doing so is not just an academic priority but a **social and economic** one — with direct implications for **enrolment, employability, and equity**.
ऐसा करना केवल शैक्षणिक प्राथमिकता नहीं बल्कि एक **सामाजिक और आर्थिक** आवश्यकता है — जिसका सीधा प्रभाव **enrolment, employability और equity** पर पड़ता है।



The amplitude of gubernatorial discretion

ISS II: Polity, Executive

MOB

“But the Queen has no such veto. She must sign her own death-warrant if the two Houses unanimously send it up to her. It is a fiction of the past to ascribe to her legislative power (*The English Constitution*, Walter Bagehot, 1865).

The Supreme Court of India has given its opinion on 11 out of the 14 questions on which the President of India had sought its advice under Article 143 of the Constitution. The issue behind these questions is the role to be played by the Governor of a State while deciding on the Bills passed by the legislative Assemblies as in the provisions of Article 200 of the Constitution.

The mode of appointment and exercise of discretionary powers by the Governor have engaged the attention of the political executive, at the Union and State levels, and constitutional experts. After seven-and-a-half decades, it is time to analyse how the discharge of gubernatorial responsibilities has given rise to conflicts and litigation.

The focus points

The two major constitutional questions which came up before the Court in the Tamil Nadu case and the subsequent Presidential reference were, first, the existence of discretionary power for the Governor while assenting to, withholding assent from and in reserving a Bill for the consideration of the President, and, second, the time limit within which a Governor or the President has to act on a Bill passed by the legislature.

In the Court's opinion, the Governor has discretion in the three courses of action available when a Bill is presented and no time-line can be prescribed. However, the Court has a limited power of judicial review in glaring cases of inaction when the delay is prolonged, unexplained and indefinite.

Here, it is pertinent to note that when a Bill which has been withheld and sent to legislature, the Governor has to give assent as soon as possible, after it is resubmitted.

In the Government of India Act, 1935, both the Governor-General and the Governor had discretion (Sections 32 and 75, respectively) in assenting, withholding and returning Bills. In the draft Article 175, discretion was conferred on the Governor for returning a Bill with a message to a unicameral legislature. The words 'discretion' and the 'single house' in the draft Article were removed after debates in the Constituent Assembly.

The Court was of the opinion that prior to the insertion of the Tenth Schedule in 1985 in the



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The advisory by the top court has widened the scope of gubernatorial discretion and made it non-justiciable

Constitution, it was a realistic possibility that Bills could be passed without the support of the Council of Ministers. The Court implies, that after the anti-defection law, members of the party cannot act against the party whip.

Hence, the Court has taken the view that a scenario where the Council of Ministers would tender aid and advice to the effect that the Governor must return a Bill for reconsideration or reserve it for the consideration of the President is not conceivable.

This view, however, does not take into consideration a situation where a coalition government of two parties, A and B, get a Bill passed in the Assembly.

When the Bill goes for assent, there is a political change and party B forms a coalition government with party C. As a part of the new political adjustment, party B agrees not to press the Bill. The new Ministry will naturally advise the Governor to send back the Bill to the legislature. Similar scenarios have been mentioned by the constitutional advisor, B.N. Rau in his note to the Constituent Assembly. These make it abundantly clear that there is no need to assume that there is implied discretion in Article 200.

On aid and advice

Another situation mentioned in the opinion of the Court for assuming that there is implied discretion for the Governor in Article 200 for protecting and defending the Constitution is that "if there is no discretion, then even if advice is tendered contrary to the written text of the Constitution, the Governor will be bound by such advice".

Three questions arise here. First, given that the members of the Council of Ministers take oath to owe allegiance to the Constitution, why will they tender such an advice? Second, if such an unconstitutional advice is tendered to the Governor, is she/he impeded from sending a report to the Union under Article 356, for which there is no need for the aid and advice of the Council of Ministers? Third, does the President have any discretionary power, if such advice is tendered by the Union cabinet?

The Sarkaria Commission report stated that the discretion is available only under the second proviso to Article 200 and that it is quite narrow. The present advisory, on the other hand, has widened the scope of gubernatorial discretion and made it non-justiciable. If the power of assent, withholding and sending messages (the advisory states that there cannot be withholding simpliciter) fall in the realm of discretion and are

not subject to judicial review, the consequence will be a form of gubernatorial governance in the States.

The Court has adjudicated that the Governor is not an employee of the Union (*Hargovind Pant vs Raghukul Tilak Dr. And Others* (1979 AIR 1109)). However, none of the modes of appointment of the Governors, recommended by the Sarkaria, Venkatachaliah and Punchhi Commissions have been seriously considered.

Sorabjee's observation

Soli Sorabjee, in 1985, made a sharply critical observation that an unhealthy practice has grown from offering the post of Governor as a consolation prize for 'burnt-out' politicians or as a stepping stone for those still burning with political ambition. Given this backdrop, there is a likelihood of friction when the Union and the States are ruled by different political parties. It is to be noted that those who are now critical of the role of the Governors, had earlier ignored the well-meaning recommendations on the mode of appointment of Governors by three commissions on Centre-State relations.

Having judicially determined time lines for deciding on Bills passed by the legislature arose when States approached the Court citing long delays at the level of Governors. Citing instances of delay in the cases reserved for consideration of the President, former Chief Minister of Karnataka Ramakrishna Hegde has said: "The President had yet to give assent to as many as 74 Bills referred to him by different State Governors. Of these, two had been pending for seven years, three for six years, two for five years, seven for three years and 58 for the past one year... after making the Karnataka government wait for six years, the Home Ministry wrote to the State Government that its Educational Bill, 1983, was 'under examination'" (*Mainstream*, June 8, 1991).

The three commissions had also recommended timelines. In a polity, where smooth working relations are to be ensured between the Union and the States, why not think of a consensus and amend Article 200 introducing time lines? The ruling party of yesteryears is in the opposition today and it can be vice-versa.

The advisory opinion of the learned judges has upturned the position in the judgment of the Tamil Nadu case. Even though the judgment does not merge in the opinion, the latter has substantial persuasive value. Will the future be happier if the non-justiciable discretion without specific time lines is available for exercise of gubernatorial functions under Article 200?

The amplitude of gubernatorial discretion

राज्यपालीय विवेकाधिकार की व्यापकता

Governor's Discretion and Constitutional Interpretation

राज्यपाल का विवेक और संवैधानिक व्याख्या

- But the Queen has no such veto. She must sign her own death-warrant if the two Houses unanimously send it up to her. It is a fiction of the past to ascribe to her legislative power (**The English Constitution, Walter Bagehot, 1865**).

लेकिन रानी के पास ऐसा कोई veto नहीं है। यदि दोनों सदन सर्वसम्मति से कोई विधेयक भेजें तो उसे अपने ही death-warrant पर हस्ताक्षर करने होंगे। उसे विधायी शक्ति प्रदान करना अतीत की एक कल्पना है (**The English Constitution, Walter Bagehot, 1865**).

- The **Supreme Court of India** has given its opinion on **11 out of 14 questions** on which the **President of India** had sought advice under **Article 143** of the Constitution.
भारत के सुप्रीम कोर्ट ने संविधान के **Article 143** के तहत राष्ट्रपति द्वारा पूछे गए **14 में से 11 प्रश्नों** पर अपनी राय दी है।
- The issue behind these questions is the role to be played by the **Governor of a State** while deciding on Bills passed by legislative Assemblies as in the provisions of **Article 200** of the Constitution.



इन प्रश्नों के पीछे मुद्दा यह है कि **Article 200** के अनुसार विधानसभा द्वारा पारित विधेयकों पर निर्णय करते समय **राज्यपाल** की क्या भूमिका होगी।

- The mode of appointment and exercise of **discretionary powers** by the Governor have engaged the attention of the political executive, at the Union and State levels, and constitutional experts.
राज्यपाल की नियुक्ति की प्रक्रिया और उनके **विवेकाधिकार (discretionary powers)** के प्रयोग ने केंद्र और राज्यों की राजनीतिक कार्यपालिका तथा संवैधानिक विशेषज्ञों का ध्यान आकर्षित किया है।
- After **seven-and-a-half decades**, it is time to analyse how the discharge of gubernatorial responsibilities has given rise to conflicts and litigation.
साढ़े सात दशकों के बाद, यह विश्लेषण का समय है कि राज्यपाल की जिम्मेदारियों के निर्वहन ने कैसे संघर्ष और मुकदमों को जन्म दिया।

The focus points

मुख्य केंद्र बिंदु

- The two major constitutional questions which came up before the Court in the **Tamil Nadu case** and the subsequent **Presidential reference** were, first, the existence of **discretionary power** for the Governor while assenting to, withholding assent from and reserving a Bill for the President, and, second, the **time limit** within which a Governor or President must act.
तमिलनाडु मामले और बाद के **राष्ट्रपति संदर्भ** में दो प्रमुख संवैधानिक प्रश्न थे— पहला, राज्यपाल के पास विधेयक पर स्वीकृति, अस्वीकृति या राष्ट्रपति के लिए आरक्षण करने का **विवेकाधिकार** है या नहीं; दूसरा, राज्यपाल और राष्ट्रपति के लिए **समय-सीमा** क्या है।
- In the Court's opinion, the Governor has **discretion** in the three courses of action available when a Bill is presented and **no time-line** can be prescribed.
कोर्ट की राय में, राज्यपाल के पास इन तीन विकल्पों पर **विवेकाधिकार** है और कोई **समय-सीमा** निर्धारित नहीं की जा सकती।
- However, the Court has a limited power of **judicial review** in glaring cases of inaction when the delay is prolonged, unexplained and indefinite.
हालाँकि, लंबे, अस्पष्ट और अनिश्चित विलंब के मामलों में कोर्ट के पास सीमित **judicial review** की शक्ति है।
- Here, it is pertinent to note that when a Bill which has been withheld and sent to legislature, the Governor has to give assent **as soon as possible** after it is resubmitted.
यहाँ ध्यान देने योग्य है कि यदि कोई विधेयक वापस भेजा जाए और पुनः प्रस्तुत किया जाए, तो राज्यपाल को **as soon as possible** उस पर स्वीकृति देनी होगी।
- In the **Government of India Act, 1935**, both the **Governor-General** and the **Governor** had **discretion** (Sections 32 and 75) in assenting, withholding and returning Bills.
Government of India Act, 1935 में **Governor-General** और **Governor** दोनों के पास विधेयकों पर स्वीकृति, अस्वीकृति और वापसी को लेकर **विवेकाधिकार** था (Sections 32 और 75).
- In the draft **Article 175**, discretion was conferred on the Governor for returning a Bill with a message to a unicameral legislature.
ड्राफ्ट **Article 175** में एकसदनी विधानमंडल को संदेश के साथ विधेयक लौटाने का विवेक राज्यपाल को दिया गया था।
- The words '**discretion**' and '**single house**' in the draft Article were removed after debates in the **Constituent Assembly**.
ड्राफ्ट अनुच्छेद से '**discretion**' और '**single house**' शब्द **संविधान सभा** की बहसों के बाद हटा दिए गए।
- The Court was of the opinion that prior to the insertion of the **Tenth Schedule (1985)**, it was a realistic possibility that Bills could be passed without the support of the Council of Ministers.
कोर्ट का मत था कि **दसवीं अनुसूची (1985)** से पहले, मंत्रिपरिषद के समर्थन के बिना विधेयक के पारित होने की संभावना वास्तविक थी।
- The Court implies that after the **anti-defection law**, members cannot act against the **party whip**.
कोर्ट का संकेत है कि **anti-defection law** के बाद सदस्य **party whip** के विरुद्ध कार्य नहीं कर सकते।
- Hence, the Court has taken the view that a scenario where the Council of Ministers would advise the Governor to return a Bill or reserve it for the President is **not conceivable**.
इसलिए, कोर्ट ने यह दृष्टिकोण लिया कि मंत्रिपरिषद द्वारा राज्यपाल को विधेयक वापस भेजने या राष्ट्रपति के लिए आरक्षित करने की सलाह देना **अकल्पनीय** है।



- This view, however, does not consider a situation when a **coalition government** of two parties, **A and B**, gets a Bill passed.
यह दृष्टिकोण उस स्थिति पर विचार नहीं करता जब दो दलों **A और B** की गठबंधन सरकार कोई विधेयक पारित कराती है।
- When the Bill goes for assent, there is a political change and party **B** forms a coalition government with party **C**, and party **B** agrees not to press the Bill.
जब विधेयक स्वीकृति के लिए जाता है, तब राजनीतिक परिवर्तन होता है और दल **B**, दल **C** के साथ गठबंधन बनाता है और विधेयक को आगे न बढ़ाने पर सहमत होता है।
- The new Ministry will naturally advise the Governor to send back the Bill to the legislature.
नई मंत्रिपरिषद स्वाभाविक रूप से राज्यपाल को विधेयक वापस भेजने की सलाह देगी।
- Similar scenarios have been mentioned by **B.N. Rau**, constitutional advisor, in his note to the **Constituent Assembly**.
ऐसे ही परिदृश्यों का उल्लेख संवैधानिक सलाहकार **बी.एन. राव** ने संविधान सभा को अपने नोट में किया था।
- These make it clear that there is **no need to assume** that there is implied discretion in **Article 200**.
ये स्पष्ट करते हैं कि **Article 200** में निहित विवेक मानने की कोई आवश्यकता नहीं है।

On Aid and Advice in Article 200 अनुच्छेद 200 में सहायता और सलाह पर

- Another situation mentioned in the opinion of the Court for assuming that there is implied discretion for the Governor in Article 200 for protecting and defending the Constitution is that **"if there is no discretion, then even if advice is tendered contrary to the written text of the Constitution, the Governor will be bound by such advice"**.
कोर्ट की राय में अनुच्छेद 200 में राज्यपाल के लिए निहित विवेक मानने का एक और आधार यह बताया गया है कि "यदि विवेक न हो, तो संविधान के लिखित पाठ के विपरीत सलाह दिए जाने पर भी राज्यपाल उस सलाह से बाध्य होंगे"।
- Three questions arise here. First, given that the members of the **Council of Ministers take oath to owe allegiance to the Constitution**, why will they tender such an advice?
यहाँ तीन प्रश्न उठते हैं। पहला, जब मंत्रिपरिषद के सदस्य संविधान के प्रति निष्ठा की शपथ लेते हैं, तो वे ऐसी सलाह क्यों देंगे?
- Second, if such an unconstitutional advice is tendered to the Governor, is she/he impeded from sending a report to the **Union under Article 356**, for which there is no need for the aid and advice of the Council of Ministers?
दूसरा, यदि ऐसी असंवैधानिक सलाह राज्यपाल को दी जाती है, तो क्या राज्यपाल अनुच्छेद 356 के तहत केंद्र को रिपोर्ट भेजने से रोके जाते हैं, जिसके लिए मंत्रिपरिषद की सहायता और सलाह की आवश्यकता नहीं है?
- Third, does the President have any **discretionary power**, if such advice is tendered by the Union cabinet?
तीसरा, यदि ऐसी सलाह केंद्रीय मंत्रिमंडल द्वारा दी जाए, तो क्या राष्ट्रपति के पास कोई **discretionary power** है?
- The **Sarkaria Commission** report stated that the discretion is available only under the **second proviso to Article 200** and that it is quite narrow.
सरकारिया आयोग की रिपोर्ट ने कहा था कि विवेकाधिकार केवल अनुच्छेद 200 के दूसरे प्रावधान में उपलब्ध है और यह बहुत सीमित है।
- The present advisory, on the other hand, has widened the scope of gubernatorial discretion and made it **non-justiciable**.
वर्तमान सलाह ने इसके विपरीत राज्यपाल के विवेकाधिकार के दायरे को बढ़ाया है और इसे **न्यायिक समीक्षा से बाहर (non-justiciable)** बना दिया है।
- If the power of assent, withholding and sending messages fall in the realm of discretion and are not subject to judicial review, the consequence will be a form of **gubernatorial governance** in the States.
यदि स्वीकृति, अस्वीकृति और संदेश भेजने की शक्ति विवेक के अंतर्गत आती है और न्यायिक समीक्षा के अधीन नहीं है, तो इसका परिणाम राज्यों में **gubernatorial governance** के रूप में होगा।
- The **Court has adumbrated that the Governor is not an employee of the Union (Hargovind Pant vs Raghukul Tilak, 1979 AIR 1109)**.



कोर्ट ने संकेत किया है कि राज्यपाल केंद्र का कर्मचारी नहीं है (Hargovind Pant बनाम Raghukul Tilak, 1979 AIR 1109).

- However, none of the modes of appointment of Governors recommended by the **Sarkaria, Venkatachaliah and Punchhi Commissions** have been seriously considered.
हालाँकि, **सरकारिया, वेंकटचलैया और पंची आयोगों** द्वारा सुझाए गए राज्यपालों की नियुक्ति के तरीकों पर गंभीरता से विचार नहीं किया गया है।

Sorabjee's Observation सोराबजी की टिप्पणी

- **Soli Sorabjee, in 1985, made a sharply critical observation that an unhealthy practice has grown from offering the post of Governor as a consolation prize for 'burnt-out' politicians or as a stepping stone for those still burning with political ambition.**
सोली सोराबजी, 1985 में, यह तीखी टिप्पणी कर चुके हैं कि राज्यपाल का पद 'burnt-out' राजनेताओं के लिए सांत्वना पुरस्कार या महत्वाकांक्षी नेताओं के लिए सीढ़ी बन गया है।
- Given this backdrop, there is a likelihood of friction when the Union and the States are ruled by different political parties.
इस पृष्ठभूमि में, जब केंद्र और राज्य विभिन्न दलों द्वारा शासित हों, तो तनाव की संभावना रहती है।
- It is to be noted that those who are now critical of the role of the Governors, had earlier ignored well-meaning recommendations on their appointment by the three Centre-State commissions.
ध्यान देने योग्य है कि जो आज राज्यपालों की भूमिका की आलोचना कर रहे हैं, उन्होंने पहले तीन आयोगों की नियुक्ति संबंधी अच्छी सिफारिशों को नजरअंदाज किया था।
- Having judicially determined time lines for deciding on Bills passed by the legislature arose when States approached the Court citing long delays at the level of Governors.
विधायिका द्वारा पारित विधेयकों पर निर्णय के लिए **न्यायिक समय-सीमा** निर्धारित करने की आवश्यकता तब आई जब राज्यों ने राज्यपालों द्वारा लंबे विलंब की शिकायत करते हुए अदालत का रुख किया।
- Citing instances of delay in cases reserved for the President, former Karnataka Chief Minister **Ramakrishna Hegde** said: "The President had yet to give assent to **74 Bills**, of which **2** had been pending for **7 years**, **3** for **6 years**, **2** for **5 years**, **7** for **3 years**, and **58** for the past **one year...**" (Mainstream, June 8, 1991).
राष्ट्रपति के लिए आरक्षित मामलों में विलंब का हवाला देते हुए कर्नाटक के पूर्व मुख्यमंत्री **रामकृष्ण हेगड़े** ने कहा था: "राष्ट्रपति के पास **74 विधेयक** लंबित थे, जिनमें **2-7 वर्ष**, **3-6 वर्ष**, **2-5 वर्ष**, **7-3 वर्ष**, और **58-1 वर्ष** से लंबित थे..." (8 जून 1991).
- The three commissions had also recommended **timelines**.
तीनों आयोगों ने भी **timelines** की सिफारिश की थी।
- In a polity where smooth working relations must be ensured between the Union and the States, why not think of a **consensus** and amend **Article 200** introducing time lines?
ऐसी व्यवस्था में जहाँ केंद्र और राज्यों के बीच सुचारू संबंध आवश्यक हैं, तो क्यों न **consensus** बनाकर **अनुच्छेद 200** में **समय-सीमा** जोड़ने हेतु संशोधन किया जाए?
- The ruling party of yesteryears is in the opposition today and vice-versa.
जो दल कल सत्ता में था वह आज विपक्ष में है और यह उलट भी सकता है।
- The advisory opinion of the learned judges has upturned the position in the judgment of the **Tamil Nadu case**.
विद्वान न्यायाधीशों की यह सलाह **तमिलनाडु मामले** के निर्णय की स्थिति को उलट देती है।
- Even though the judgment does not merge in the opinion, the latter has substantial **persuasive value**.
हालाँकि निर्णय इस सलाह में विलय नहीं होता, फिर भी इस सलाह का महत्वपूर्ण **persuasive value** है।
- Will the future be happier if the **non-justiciable discretion** without **specific timelines** is available for the exercise of gubernatorial functions under **Article 200**?
क्या भविष्य बेहतर होगा यदि **अनुच्छेद 200** के तहत राज्यपाल के लिए **non-justiciable discretion** बिना **specific timelines** के उपलब्ध रहे?



GS II: IR: Global Groupings

Missing 'Ubuntu'

The U.S. boycott of the G-20 summit in Johannesburg was impolitic

The G-20 leaders' summit in Johannesburg, the first ever held in an African country, was unique in many positive, and some not-so-positive ways. The summit has an added voice as the African Union was made a member during India's G20 Presidency in 2023. As a result, the deliberations and the declaration seemed imbued by the spirit of the "Global South", as they listed the multiple challenges the world faces including conflicts, deepening inequality and increasing economic uncertainty. In particular, the nations gathered called for a "just, comprehensive, and lasting peace" in "Sudan, the Democratic Republic of Congo, the Occupied Palestinian Territory [and] Ukraine", invoking the UN charter. Prime Minister Narendra Modi spoke at all three sessions of the G-20, suggesting six initiatives that India could lead in order to address some of those issues, particularly on the need to "reconsider" the parameters of global development. These initiatives included a Traditional Knowledge Repository, a G20-Africa Skills Multiplier Initiative (where India proposed to train a million people across Africa), a Global Healthcare Response Team, an Initiative on Countering the Drug-Terror Nexus, an Open Satellite Data Partnership" to share agriculture, fishing and disaster-related information, and a "G20 Critical Minerals Circularity initiative". The government asserted that it had a role in drafting the declaration, but would have been disappointed by the brief condemnation of terrorism when compared to the 2023 New Delhi declaration, given the Delhi blast and the Pahalgam attack.

The leaders present spoke volubly about the need for bolstering the G-20's role in managing global challenges, but were silent on the absence of the most important dignitary – U.S. President Donald Trump did not just skip the Summit, but the U.S. government also boycotted it, sending only a diplomat as an observer. This is the first time that the U.S., that has cited tensions with South Africa over "alleged discrimination" against "White minority farmers", has walked away from the summit of the biggest economies. Aside from the irony of a "boycott" against South Africa, which suffered apartheid under the Afrikaner-led regime, the U.S.'s decision also raises questions over its commitment to the G-20 even as it takes over its presidency for 2026. The absence of the leader of the largest economy and the lack of universal criticism of the decision run counter to the hope and hype of the G-20 finally representing a more democratic world order over the last few years. The spirit of 'Ubuntu' or "I am because we are", referred to in this year's declaration, must be heeded by the very powers that would seek to side-line the grouping today.

Missing 'Ubuntu' लापता 'उबंटू'

The U.S. boycott of the G-20 summit in Johannesburg was impolitic
जोहान्सबर्ग में जी-20 शिखर सम्मेलन के अमेरिकी बहिष्कार का निर्णय अविवेकपूर्ण था

G-20 Leaders' Summit in Johannesburg जोहान्सबर्ग में G-20 नेताओं का शिखर सम्मेलन

The G-20 leaders' summit in Johannesburg, the first ever held in an African country, was unique in many positive, and some not-so-positive ways. जोहान्सबर्ग में G-20 नेताओं का शिखर सम्मेलन, जो किसी अफ्रीकी देश में आयोजित होने वाला पहला था, कई सकारात्मक और कुछ कम सकारात्मक तरीकों से विशिष्ट रहा।
The summit has an added voice as the African Union was made a member during India's G20 Presidency 2023.

इस शिखर सम्मेलन में एक महत्वपूर्ण आवाज इसलिए भी जुड़ी क्योंकि अफ्रीकी संघ को भारत की G20 अध्यक्षता 2023 के दौरान सदस्य बनाया गया।

As a result, the deliberations and the declaration seemed imbued by the spirit of the Global South, as they listed the multiple challenges the world faces including conflicts, deepening inequality and increasing economic uncertainty.

इसके परिणामस्वरूप, चर्चाएँ और घोषणा Global South की भावना से परिपूर्ण दिखीं, क्योंकि उन्होंने विश्व के सामने उपस्थित कई चुनौतियों — संघर्ष, बढ़ती असमानता और बढ़ती आर्थिक अनिश्चितता — को सूचीबद्ध किया।

In particular, the nations gathered called for a "just, comprehensive, and lasting peace" in Sudan, the Democratic Republic of Congo, the Occupied Palestinian Territory, and Ukraine, invoking the UN Charter.

विशेष रूप से, देशों ने सूडान, डेमोक्रेटिक रिपब्लिक ऑफ कांगो, अधिकृत फिलिस्तीनी क्षेत्र, और यूक्रेन में "न्यायसंगत, व्यापक और स्थायी शांति" की अपील की, और UN Charter का हवाला दिया।

Prime Minister Narendra Modi spoke at all three sessions of the G-20, suggesting six initiatives that India could lead to address some of those issues, particularly the need to "reconsider" the parameters of global development. प्रधानमंत्री नरेंद्र मोदी ने G-20 के सभी तीन सत्रों में भाग लेते हुए छह पहलों का सुझाव दिया, जिन्हें भारत उन मुद्दों के समाधान के लिए आगे बढ़ा सकता है, विशेषकर वैश्विक विकास के मानकों को "पुनर्विचार" करने की आवश्यकता पर।

These initiatives included a Traditional Knowledge Repository, a G20-Africa Skills Multiplier Initiative (where India proposed to train one million people across Africa), a Global Healthcare Response Team, an Initiative on

Countering the Drug-Terror Nexus, an Open Satellite Data Partnership to share



agriculture, fishing and disaster-related information, and a **G-20 Critical Minerals Circularity Initiative**.

इन पहलों में **Traditional Knowledge Repository, G20-Africa Skills Multiplier Initiative** (जहाँ भारत ने अफ्रीका में **one million** लोगों को प्रशिक्षित करने का प्रस्ताव रखा), **Global Healthcare Response Team, Drug-Terror Nexus** का मुकाबला करने की पहल, कृषि-मत्स्य-आपदा संबंधी सूचना साझा करने के लिए **Open Satellite Data Partnership**, और **G-20 Critical Minerals Circularity Initiative** शामिल थे।

- The government asserted that it had a role in drafting the declaration, but would have been disappointed by the **brief condemnation of terrorism compared to the 2023 New Delhi declaration, given the Delhi blast and the Pahalgam attack**.
सरकार ने दावा किया कि घोषणा-पत्र के मसौदे में उसकी भूमिका थी, लेकिन **2023 नई दिल्ली घोषणा** की तुलना में **आतंकवाद** की संक्षिप्त निंदा को देखते हुए वह निराश हुई होगी, विशेषकर **दिल्ली ब्लास्ट** और **पहलगाम हमले** के संदर्भ में।
- The leaders present spoke volubly about the need for bolstering the G-20's role in managing global challenges, but were silent on the absence of the most important dignitary — **U.S. President Donald Trump**, who not only skipped the Summit but the **U.S. government boycotted it, sending only a diplomat as an observer**.
उपस्थित नेताओं ने वैश्विक चुनौतियों से निपटने में G-20 की भूमिका को मजबूत करने की आवश्यकता पर जोर दिया, लेकिन सबसे महत्वपूर्ण गणमान्य व्यक्ति — **अमेरिकी राष्ट्रपति डोनाल्ड ट्रम्प** — की अनुपस्थिति पर चुप रहे, जिन्होंने न केवल सम्मेलन को छोड़ा, बल्कि **अमेरिकी सरकार ने बहिष्कार** करते हुए केवल एक राजनयिक को पर्यवेक्षक के रूप में भेजा।
- This is the **first time** that the U.S., citing tensions with South Africa over “alleged discrimination” against “White minority farmers”, has walked away from the summit of the biggest economies.
यह **पहली बार** है जब अमेरिका ने “White minority farmers” के खिलाफ “alleged discrimination” को लेकर दक्षिण अफ्रीका से तनाव का हवाला देते हुए दुनिया की सबसे बड़ी अर्थव्यवस्थाओं के इस शिखर सम्मेलन से दूरी बनाई है।
- Aside from the irony of a “boycott” against **South Africa**, which suffered **apartheid** under the Afrikaner-led regime, the U.S.'s decision also **raises questions over its commitment to the G-20 even as it takes over its 2026 presidency**.
दक्षिण अफ्रीका जैसे देश के खिलाफ “बहिष्कार” की विडंबना के अलावा, जिसने अफ्रीकानेर शासन के तहत **apartheid** झेला, अमेरिका का यह निर्णय उसके **2026 की अध्यक्षता** ग्रहण करने के बावजूद G-20 के प्रति उसकी प्रतिबद्धता पर सवाल उठाता है।
- The absence of the leader of the **largest economy** and the lack of universal criticism of the decision run counter to the hope and hype of the G-20 finally representing a more democratic world order in recent years.
सबसे बड़ी अर्थव्यवस्था के नेता की अनुपस्थिति और इस निर्णय की सार्वभौमिक आलोचना का अभाव, हाल के वर्षों में G-20 द्वारा अधिक लोकतांत्रिक विश्व व्यवस्था का प्रतिनिधित्व करने की आशा और अपेक्षा के विपरीत है।
- The **spirit of 'Ubuntu' or "I am because we are"**, referred to in this year's declaration, must be heeded by the very powers that would seek to side-line the grouping today.
इस वर्ष की घोषणा में संदर्भित **'Ubuntu'** या “I am because we are” की भावना को आज इस समूह को हाशिए पर रखने वाली शक्तियों द्वारा गंभीरता से लिया जाना चाहिए।



Widely quoted WHO norm of 1 doctor per 1,000 people is not official

The benchmark was repeatedly used by the government to compare doctor availability in India over the last decade

GS II: IR: International Organization

DATA POINT

Devvanshi Bihani

The Indian government often cites the World Health Organization (WHO)'s "benchmark" of one doctor for every 1,000 people. However, this is not a standard officially prescribed by the WHO.

Parliament Question and Answer records show that until at least 2010, the government maintained that the WHO had not prescribed any specific standard for the doctor-population ratio. But answers from 2015 and as recently as 2024 show otherwise. Replies in both these years cite the 1:1,000 ratio.

In both replies, the government used this benchmark to compare doctor availability in India. Since relying solely on registered allopathic doctors pushed the doctor-population ratio above the 1:1,000 benchmark, the government opted to include AYUSH practitioners as well, lowering the final ratio. Notably, while calculating the ratio for allopathic doctors, the government used only 80% of them, as only this proportion can be considered "available". However, when it came to AYUSH doctors, they did not apply the availability factor.

Chart 1 shows these doctor-population ratio calculations sourced from various Lok Sabha and Rajya Sabha replies.

Setting these discrepancies aside, the ratio itself is questionable. The WHO, in a written response to *The Hindu*, clarified that it "does not provide recommendations for health worker population ratios at country level". The agency does not make such recommendations because ratios should be determined based on a country's health labour market dynamics and individual needs, it said.

Many experts have confirmed this. "There has never been any norm by the WHO for the doctor-population ratio," said public health expert Dr. Chandrakant La-

hariya, a former staff member of the WHO. The number, he explained, was initially referenced as a WHO-recommended norm in some academic papers without attribution to any source within the WHO. Subsequently, it was cross-cited without verification and used by Parliament in its responses too.

Dr. Kiran Kumbhar, a public health expert and a historian of medicine and healthcare in India, said that there is "absolutely no indication anywhere in the WHO's documents about this recommendation". According to Dr. Kumbhar's article in *The India Forum*, the earliest official reference to the 1:1,000 figure appears in the Medical Council of India's "Vision 2015" report, released in 2011. The document stated, based on expert consultations, that the targeted doctor population ratio would be 1:1,000 and projected that India could reach this by 2031.

While the WHO did not refer to the 1:1,000 ratio in its response, the global body stated that there are some global benchmarks used to monitor global health worker needs, such as the Sustainable Development Goals (SDG) composite index threshold, which is the most recent one. "It consists of the estimated number of skilled health workers needed to reach the minimum proportion of achievement of high coverage, defined as 80% or above for 12 selected health indicators linked to the SDGs," the WHO explained. The latest figure for that benchmark is 4.45 doctors, nurses, and midwives per 1,000 population, it said.

Health systems researcher Siddhesh Zadey, co-founder of the Association for Socially Applicable Research India, explained the origins of this composite figure. "First, in 2006, they said the minimum number should be 2.25 per 1,000 and then revised it to 4.45 later," he said. Mr. Zadey explained that many misrepresented the composite figure, assuming that within it, a specific portion would be doctors and the rest nurses and

midwives. "However, the WHO was clear that the combined group had to be 2.25; they never stated that within that, there is a specific distribution," he said.

Mr. Zadey argued that separate figures for doctors are often cited to justify the need for more medical colleges. "In the last 10 years, we have seen that this number has become political. It is being weaponised by the AYUSH side of health workforce, which is pitching that the target can be reached if they are included," he said.

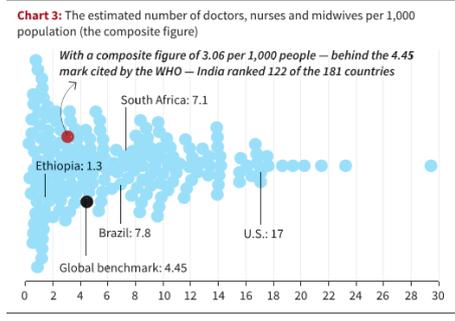
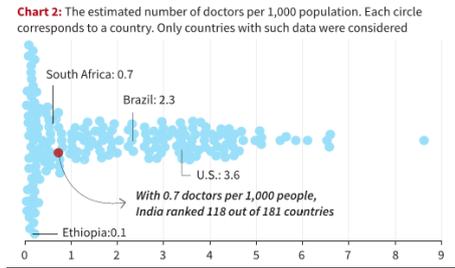
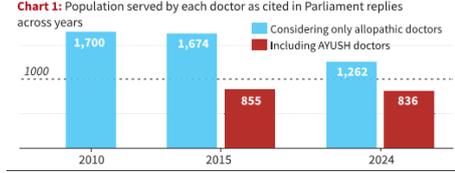
Dr. Lahariya argued that while composite figures are useful in assessing the overall performance, these have limited relevance because there is inequitable distribution. "Within a country, there can be States that have achieved varying ratios per thousand population," he said.

The WHO response stated that the latest estimates for the composite and individual figures can be accessed from the National Health Workforce Accounts Data Portal. Chart 2 plots the estimated number of doctors per 1,000 population and Chart 3 plots the estimated number of doctors, nurses and midwives per 1,000 population (the composite figure) using the latest data for countries where they are available.

With 0.7 doctors per 1,000 people, India ranked 118 out of 181 countries in Chart 2. With a composite figure of 3.06 per 1,000 people – behind the 4.45 mark cited by the WHO – India ranked 122 of the 181 countries in Chart 3.

Dr. Kumbhar argued that India has always had a sufficient number of doctors; very few public health experts had ever claimed there was a paucity. It is only recently, after the 1:1,000 ratio came into the picture, that questions are being raised.

The real crisis is not the average number, Mr. Zadey said. "We know that we have a huge rural-urban disparity. In rural areas, we are nowhere close to the ideal composite threshold."



Widely quoted WHO norm of 1 doctor per 1,000 people is not official

प्रायः उद्धृत WHO का 1 डॉक्टर प्रति 1,000 जनसंख्या का मानक आधिकारिक नहीं है

- The Indian government often cites the World Health Organization (WHO)'s "benchmark" of one doctor for every 1,000 people.
भारतीय सरकार अक्सर WHO के "benchmark" 1 डॉक्टर प्रति 1,000 लोग का हवाला देती है।
- However, this is not a standard officially prescribed by the WHO.
हालाँकि, यह WHO द्वारा आधिकारिक रूप से निर्धारित मानक नहीं है।
- Parliament Question and Answer records show that until at least 2010, the government maintained that the WHO had not prescribed any specific standard for the doctor-population ratio.
संसद के प्रश्नोत्तर रिकॉर्ड दिखाते हैं कि कम से कम 2010 तक सरकार कहती थी कि WHO ने डॉक्टर-जनसंख्या अनुपात के लिए कोई मानक निर्धारित नहीं किया है।
- But answers from 2015 and as recently as 2024 show otherwise.
लेकिन 2015 और 2024 के जवाब इसके विपरीत दिखाते हैं।
- Replies in both these years cite the 1:1,000 ratio.
इन दोनों वर्षों के जवाब 1:1,000 अनुपात का उल्लेख करते हैं।



- In both replies, the government used this benchmark to compare doctor availability in India. दोनों जवाबों में सरकार ने भारत में डॉक्टरों की उपलब्धता की तुलना के लिए इस benchmark का उपयोग किया।
- Since relying solely on registered **allopathic doctors** pushed the doctor–population ratio above the 1:1,000 benchmark, the government opted to include **AYUSH practitioners** as well, lowering the final ratio.
क्योंकि केवल **Allopathic doctors** को शामिल करने पर अनुपात 1:1,000 से ऊपर चला गया, सरकार ने **AYUSH practitioners** को भी शामिल किया, जिससे अंतिम अनुपात कम हो गया।
- Notably, while calculating the ratio for allopathic doctors, the government used only **80%** of them as “available”.
ध्यान देने योग्य बात है कि allopathic doctors के लिए सरकार ने केवल **80%** को “available” माना।
- However, for AYUSH doctors, they **did not apply the availability factor**.
लेकिन AYUSH doctors के लिए **availability factor लागू नहीं** किया गया।
- Chart 1 shows these doctor–population ratio calculations sourced from various Lok Sabha and Rajya Sabha replies.
चार्ट 1 इन doctor–population अनुपात गणनाओं को लोकसभा और राज्यसभा के विभिन्न उत्तरों से दिखाता है।
- Setting these discrepancies aside, the ratio itself is questionable.
इन विसंगतियों से परे, यह अनुपात स्वयं **संदिग्ध** है।
- The WHO, in a written response to The Hindu, clarified that it **“does not provide recommendations for health worker population ratios at country level.”**
WHO ने The Hindu को लिखित जवाब में स्पष्ट किया कि वह **देश-स्तर पर health worker population ratios की कोई अनुशंसा नहीं** देता।
- The agency said ratios should be determined based on a country’s **health labour market dynamics** and **individual needs**.
एजेंसी ने कहा कि अनुपात किसी देश के **health labour market dynamics** और **individual needs** के आधार पर निर्धारित होने चाहिए।
- Many experts have confirmed this.
कई विशेषज्ञों ने इसकी पुष्टि की है।
- “There has **never** been any norm by the WHO for the doctor–population ratio,” said public health expert **Dr. Chandrakant Lahariya**, a former WHO staff member.
डॉ. चंद्रकांत लहरिया ने कहा कि WHO द्वारा डॉक्टर–जनसंख्या अनुपात के लिए **कभी कोई मानक नहीं** रहा।
- The number was initially cited in some academic papers **without attribution**, and later cross-cited repeatedly without verification.
यह संख्या प्रारंभ में कुछ शोधपत्रों में **बिना स्रोत** के उद्धृत हुई और बाद में बिना सत्यापन के बार-बार उपयोग की गई।
- It was then used by Parliament in its responses too.
इसके बाद इसे संसद के उत्तरों में भी उपयोग किया गया।
- **Dr. Kiran Kumbhar**, a public health expert and historian of medicine, said there is **“absolutely no indication”** in any WHO document about such a recommendation.
डॉ. किरण कुम्भार ने कहा कि WHO के किसी भी दस्तावेज़ में इस प्रकार की अनुशंसा का **“बिल्कुल कोई संकेत”** नहीं है।
- According to Dr. Kumbhar’s article in The India Forum, the earliest official reference to the **1:1,000 figure appears in the Medical Council of India (MCI)’s ‘Vision 2015’ report released in 2011.**
डॉ. कुम्भार के अनुसार, **1:1,000** का पहला आधिकारिक संदर्भ **Medical Council of India (MCI)** की **‘Vision 2015’ (2011)** रिपोर्ट में है।
- The document stated, based on expert consultations, that the targeted doctor–population ratio would be **1:1,000**, and projected that India could reach this by **2031**.
दस्तावेज़ ने विशेषज्ञों की परामर्श प्रक्रिया के आधार पर कहा कि लक्षित अनुपात **1:1,000** होगा और अनुमान लगाया कि भारत **2031** तक इसे प्राप्त कर सकता है।

Global Benchmarks and WHO Clarifications वैश्विक मानक और WHO के स्पष्टीकरण



- While the WHO did not refer to the **1:1,000 ratio** in its response, the global body stated that there are some **global benchmarks** used to monitor global health worker needs, such as the **Sustainable Development Goals (SDG) composite index threshold**, which is the most recent one.
हालाँकि WHO ने अपने जवाब में **1:1,000 अनुपात** का उल्लेख नहीं किया, लेकिन उसने कहा कि वैश्विक स्वास्थ्य कर्मियों की आवश्यकता मापने के लिए कुछ **वैश्विक मानक** हैं, जैसे **SDG composite index threshold**, जो हाल का मानक है।
- “It consists of the estimated number of skilled health workers needed to reach the minimum proportion of high coverage, defined as **80% or above for 12 selected health indicators** linked to the SDGs,” the WHO explained.
WHO ने बताया कि यह **12 चयनित स्वास्थ्य संकेतकों** में **80% या उससे अधिक कवरेज** प्राप्त करने के लिए आवश्यक skilled health workers की अनुमानित संख्या पर आधारित है।
- The latest figure for that benchmark is **4.45 doctors, nurses, and midwives per 1,000 population**, it said.
इस मानक का नवीनतम आंकड़ा **4.45 डॉक्टर, नर्स और मिडवाइफ़ प्रति 1,000 जनसंख्या** है।
- Health systems researcher **Siddhesh Zadey**, co-founder of ASAR India, explained the origins of this composite figure.
स्वास्थ्य प्रणाली शोधकर्ता **सिद्धेश जडेय** ने इस composite आंकड़े की उत्पत्ति समझाई।
- “First, in **2006**, they said the minimum number should be **2.25 per 1,000**, and then revised it to **4.45** later,” he said.
उन्होंने कहा कि पहले **2006** में न्यूनतम संख्या **2.25 प्रति 1,000** कही गई थी, जिसे बाद में **4.45** किया गया।
- Mr. Zadey explained that many misrepresented the composite figure, assuming that within it, a specific portion would be doctors and the rest nurses and midwives.
उन्होंने कहा कि कई लोगों ने इस composite आंकड़े को गलत तरीके से प्रस्तुत किया, मानते हुए कि इसमें डॉक्टरों का एक निश्चित हिस्सा शामिल है।
- “However, the WHO was clear that the combined group had to be **2.25**, they never stated any internal distribution,” he said.
उन्होंने स्पष्ट किया कि WHO ने केवल संयुक्त समूह **2.25** बताया था, इसके भीतर कोई वितरण नहीं बताया था।
- Mr. Zadey argued that separate figures for doctors are often cited to justify the need for more **medical colleges**.
उन्होंने कहा कि डॉक्टरों के लिए अलग आंकड़े अक्सर अधिक **medical colleges** की आवश्यकता उचित ठहराने के लिए उपयोग किए जाते हैं।
- “In the last **10 years**, this number has become political... weaponised by the **AYUSH** side to claim targets can be met if they are included,” he said.
उन्होंने कहा कि पिछले **10 वर्षों** में यह मुद्दा राजनीतिक हो गया है... और **AYUSH** क्षेत्र इसे अपने शामिल होने के पक्ष में हथियार की तरह उपयोग कर रहा है।
- Dr. Lahariya argued that while composite figures are useful in assessing performance, they have **limited relevance** due to unequal distribution.
डॉ. लहरिया ने कहा कि composite आंकड़े उपयोगी हैं, लेकिन असमान वितरण के कारण उनकी **सीमित उपयोगिता** है।
- “Within a country, different States can have varying ratios,” he said.
उन्होंने कहा कि एक देश के भीतर भी विभिन्न राज्यों में अनुपात अलग-अलग हो सकता है।
- The WHO response stated that the latest estimates for the composite and individual figures can be accessed from the **National Health Workforce Accounts Data Portal**.
WHO के जवाब में कहा गया कि नवीनतम composite व individual आंकड़े **National Health Workforce Accounts Data Portal** पर उपलब्ध हैं।
- Chart 2 plots the estimated number of **doctors per 1,000 population**, and Chart 3 plots estimated **doctors, nurses, and midwives per 1,000 population**.
चार्ट 2 प्रति **1,000 जनसंख्या पर डॉक्टरों** की संख्या दिखाता है, और चार्ट 3 प्रति **1,000 जनसंख्या पर डॉक्टर-नर्स-मिडवाइफ़** (composite आंकड़ा) दिखाता है।
- With **0.7 doctors per 1,000 people**, India ranked **118 out of 181 countries** in Chart 2.
प्रति **1,000 पर 0.7 डॉक्टर** के साथ, भारत चार्ट 2 में **181 में से 118वां** रहा।
- With a composite figure of **3.06 per 1,000 people**, behind the **4.45 benchmark**, India ranked **122 out of 181** in Chart 3.



Composite आंकड़ा 3.06 प्रति 1,000 (मानक 4.45 से कम) होने पर भारत चार्ट 3 में 181 में से 122वां रहा।

- Dr. Kumbhar argued that India has always had a **sufficient number of doctors**, and few experts ever claimed a shortage.
डॉ. कुम्भार ने कहा कि भारत में डॉक्टरों की **पर्याप्त संख्या** हमेशा रही है और बहुत कम विशेषज्ञों ने कमी बताई है।
- It is only after the **1:1,000 ratio** came into discourse that shortages began being discussed.
1:1,000 अनुपात चर्चा में आने के बाद ही कमी की बात शुरू हुई।
- The real crisis is not the **average number**, Mr. Zadey said.
जडेय ने कहा कि वास्तविक संकट **औसत संख्या** नहीं है।
- “We know there is a huge **rural-urban disparity**. In rural areas, we are nowhere close to the ideal composite threshold.”
उन्होंने कहा कि **ग्रामीण-शहरी असमानता** बहुत बड़ी है और ग्रामीण क्षेत्रों में हम आदर्श composite स्तर से बहुत दूर हैं।

GS Paper III: Economy, S&T, Environment, DM, & IS

TOPICS COVERED

25_11_2025

Economy	
1.	Labour and honour श्रम और सम्मान
2.	Norway's tax levy on wealth trades millionaires for principle of equality नॉर्वे का संपत्ति कर समानता के सिद्धांत के लिए करोड़पतियों को खोता है
3.	Grahaa gets nod for nano satellite launch ग्राहा को नैनो सैटेलाइट लॉन्च की मंजूरी मिली
4.	NBFC AUM to grow at 19%, cross ₹50 lakh crore next fiscal: Crisil Ratings एनबीएफसी एयूएम 19% की वृद्धि के साथ अगले वित्त वर्ष में ₹50 लाख करोड़ पार करेगा: क्रिसिल रेटिंग्स
S&T	
5.	Japanese delegation visits ISRO to review status of Chandrayaan-5/LuPEX mission जापानी प्रतिनिधिमंडल ने चंद्रयान-5/लूपेक्स मिशन की स्थिति की समीक्षा के लिए इसरो का दौरा किया



6.	Gavi, UNICEF ink deal to provide easy access to malaria vaccine मलेरिया वैक्सीन तक आसान पहुंच सुनिश्चित करने के लिए गावी, यूनिसेफ ने समझौता किया
7.	QUIZ
8.	How are passengers able to access the Internet on aeroplanes? यात्री हवाई जहाजों में इंटरनेट का उपयोग कैसे कर पाते हैं?
9.	Grahaa gets nod for nano satellite launch ग्राहा को नैनो सैटेलाइट लॉन्च की मंजूरी मिली
	Environment
10.	Goa government does a U-turn on 'permanent' tiger presence in State गोवा सरकार ने राज्य में बाघों की 'स्थायी' उपस्थिति पर यू-टर्न लिया
11.	Where does road dust settle in India's efforts to clean its air? भारत के वायु प्रदूषण को नियंत्रित करने के प्रयासों में सड़क धूल कहाँ स्थान पाती है?
12.	Moss spores survive space exposure, testing life's bounds मॉस स्पॉर्स अंतरिक्ष के संपर्क में जीवित रहते हैं, जीवन की सीमाओं की परीक्षा करते हुए
13.	Rivers of salt: life on Bangladesh's climate frontline नमक की नदियाँ: बांग्लादेश की जलवायु सीमारेखा पर जीवन
14.	Southeast Asia's rivers, people at risk from toxic mines: study दक्षिण-पूर्व एशिया की नदियाँ और लोग जहरीली खदानों से जोखिम में: अध्ययन
	DM
15.	Navy gets 'silent hunter', 80% home-grown Mahe नेवी को मिला 'साइलेंट हंटर', 80% स्वदेशी 'माहे'

Economy

25/11/2025



GS III: Economy

Labour and honour

Smooth execution of the Labour Codes is linked to tripartite consultations

The Centre's announcement to implement the four Labour Codes – they concern wages, industrial relations, social security and occupational safety, health and working conditions – has been heralded by the business and investment community as the biggest reform in a long time. Passed by Parliament between 2019 and 2020, the implementation of these Codes was delayed for multiple reasons. The Codes replace 29 laws that regulated employer-employee relations, and significantly reduce the compliance requirements for a company every year. The Centre has maintained that it will handhold the States to draft and adopt the Rules in accordance with the Codes – most States and Union Territories have published the draft Rules for the Codes. Free market advocates have always considered India's labour laws to be a hindrance to its growth potential. Under the Codes, worker-employer relations, social security mechanism and wage and aspects of emoluments will witness huge changes. India needs to generate employment for its growing youth population as it is estimated that 12 million people attain working age every year. This is a trend that will hold for several years. The Economic Survey of 2023-24 noted that there needs to be an average of nearly 78.5 lakh jobs created annually until 2030 in the non-farm sector to engage the rising workforce.

Despite the long delay in the implementation of the Codes, the concerns raised by labour unions have not been addressed in full. Labour representatives allege that the government ignored the pro-worker recommendations of the Second National Commission on Labour, (submitted in 2002) and, instead, accommodated all “pro employer” recommendations and made them a part of the Codes. Those issues are now redundant, but the nature of work is undergoing rapid transformation. Considering the uncertainties due to wars, trade disruptions and climatic challenges, enhancing both agriculture and industrial productivity is necessary and ensuring a healthy worker-employer relationship is key to this. With gig and platform works and artificial intelligence disrupting conservative definitions of work, wage and social security, the Government should take the steps needed to reform the labour sector wisely. The Indian Labour Conference (ILC), which has met 46 times between 1940 and 2015, has not been convened since then. Prime Minister Narendra Modi had promised that labour laws would be changed only after wider tripartite consultations. So, it becomes imperative that the Government conducts the 47th session of the ILC on the Labour Codes to ensure their smooth implementation. In the process, States should also be consulted along with employers and employees.

population as it is estimated that 12 million people attain working age every year.

भारत को अपनी बढ़ती युवा आबादी के लिए रोजगार उत्पन्न करने की आवश्यकता है क्योंकि अनुमान है कि हर वर्ष 12 मिलियन लोग कार्यशील आयु में प्रवेश करते हैं।

Labour and honour

श्रम और सम्मान

• Smooth execution of the Labour Codes is linked to tripartite consultations

श्रम संहिताओं के सुगम कार्यान्वयन का संबंध त्रिपक्षीय परामर्श से जुड़ा हुआ है

Implementation of Labour Codes

लेबर कोड्स का कार्यान्वयन

• The Centre's announcement to implement the four Labour Codes — they concern wages, industrial relations, social security and occupational safety, health and working conditions — has been heralded by the business and investment community as the biggest reform in a long time.

केंद्र द्वारा चार लेबर कोड्स — जो wages, industrial relations, social security और occupational safety, health and working conditions से संबंधित हैं — को लागू करने की घोषणा को व्यापार और निवेश समुदाय द्वारा लंबे समय में सबसे बड़ा सुधार माना गया है।

• Passed by Parliament between 2019 and 2020, the implementation of these Codes was delayed for multiple reasons.

2019 और 2020 के बीच संसद द्वारा पारित किए गए इन कोड्स का कार्यान्वयन कई कारणों से विलंबित हुआ।

• The Codes replace 29 laws that regulated employer-employee relations, and significantly reduce the compliance requirements for a company every year.

ये कोड्स 29 कानूनों को प्रतिस्थापित करते हैं जो नियोजक-कर्मचारी संबंधों को विनियमित करते थे, और हर वर्ष कंपनियों की अनुपालन आवश्यकताओं को काफी हद तक कम करते हैं।

• The Centre has maintained that it will handhold the States to draft and adopt the Rules in accordance with the Codes — most States and Union Territories have published the draft Rules for the Codes.

केंद्र ने कहा है कि वह राज्यों को कोड्स के अनुरूप draft rules बनाने और अपनाने में मदद करेगा — अधिकांश राज्यों और केंद्रशासित प्रदेशों ने draft Rules प्रकाशित कर दिए हैं।

• Free market advocates have always considered India's labour laws to be a hindrance to its growth potential.

फ्री मार्केट समर्थक हमेशा से भारत के लेबर कानूनों को उसकी विकास क्षमता में बाधा मानते रहे हैं।

• Under the Codes, worker-employer relations, social security mechanism and wage and aspects of emoluments will witness huge changes.

कोड्स के तहत श्रमिक-नियोजक संबंध, सामाजिक सुरक्षा तंत्र, वेतन और पारिश्रमिक के पहलुओं में बड़े परिवर्तन होंगे।

• India needs to generate employment for its growing youth



- This is a trend that will hold for several years.
यह प्रवृत्ति आने वाले कई वर्षों तक जारी रहेगी।
- The **Economic Survey 2023-24** noted that there needs to be an average of nearly **78.5 lakh jobs annually until 2030** in the non-farm sector to engage the rising workforce.
आर्थिक सर्वेक्षण 2023-24 ने उल्लेख किया कि बढ़ती कार्यबल को समायोजित करने के लिए गैर-कृषि क्षेत्र में **2030** तक प्रति वर्ष लगभग **78.5 लाख नौकरियों** की आवश्यकता होगी।
- Despite the long delay in the implementation of the Codes, the concerns raised by labour unions have not been addressed in full.
कोड्स के कार्यान्वयन में लंबे विलंब के बावजूद, श्रमिक यूनियनों द्वारा उठाई गई चिंताओं को पूरी तरह संबोधित नहीं किया गया है।
- Labour representatives allege that the **government ignored the pro-worker recommendations of the Second National Commission on Labour (2002)** and instead accommodated all “pro-employer” recommendations and made them part of the Codes.
श्रमिक प्रतिनिधियों का आरोप है कि सरकार ने **सेकंड नेशनल कमीशन ऑन लेबर (2002)** की श्रमिक-पक्षीय सिफारिशों की अनदेखी की और सभी “नियोक्ता-पक्षीय” सिफारिशों को कोड्स में शामिल कर लिया।
- Those issues are now redundant, but the nature of work is undergoing rapid transformation.
ये मुद्दे अब अप्रासंगिक हो चुके हैं, लेकिन कार्य का स्वरूप तेजी से बदल रहा है।
- **Considering the uncertainties due to wars, trade disruptions and climatic challenges, enhancing both agriculture and industrial productivity is necessary and ensuring a healthy worker-employer relationship is key to this.**
युद्धों, व्यापार व्यवधानों और जलवायु चुनौतियों से उत्पन्न अनिश्चितताओं को देखते हुए, कृषि और औद्योगिक उत्पादकता को बढ़ाना आवश्यक है और स्वस्थ श्रमिक-नियोक्ता संबंध सुनिश्चित करना इसका प्रमुख तत्व है।
- With **gig and platform work** and **artificial intelligence** disrupting conservative definitions of work, wage and social security, the Government should take the steps needed to reform the labour sector wisely.
गिग और प्लेटफॉर्म वर्क तथा **आर्टिफिशियल इंटेलिजेंस** द्वारा कार्य, वेतन और सामाजिक सुरक्षा की पारंपरिक परिभाषाओं को बदलने के साथ, सरकार को श्रम क्षेत्र में समझदारीपूर्ण सुधार करने चाहिए।
- The **Indian Labour Conference (ILC)**, which has met **46 times between 1940 and 2015**, has not been convened since then.
इंडियन लेबर कॉन्फ्रेंस (ILC), जिसकी बैठकें **1940 से 2015** के बीच **46 बार** हुईं, तब से अब तक नहीं बुलाई गई है।
- Prime Minister Narendra Modi had promised that labour laws would be changed only after wider **tripartite consultations**.
प्रधानमंत्री नरेंद्र मोदी ने वादा किया था कि लेबर कानूनों में बदलाव केवल व्यापक **त्रिपक्षीय परामर्श (tripartite consultations)** के बाद ही किए जाएंगे।
- So, it becomes imperative that the Government conducts the **47th session** of the ILC on the Labour Codes to ensure their smooth implementation.
इसलिए, लेबर कोड्स के सुचारू कार्यान्वयन के लिए सरकार द्वारा ILC का **47वां सत्र** आयोजित करना आवश्यक हो जाता है।
- In the process, States should also be consulted along with employers and employees.
इस प्रक्रिया में, नियोक्ताओं और कर्मचारियों के साथ-साथ राज्यों से भी परामर्श किया जाना चाहिए।



NBFC AUM to grow at 19%, cross ₹50 lakh crore next fiscal: Crisil Ratings

GS III: Economy: Banking

The Hindu Bureau
MUMBAI

The **assets under management (AUM) of non-banking financial companies (NBFCs)** would grow at 18-19% this fiscal and the next, driven by whetted consumption demand, and cross the ₹50 lakh crore mark by March 2027, according to Crisil Ratings.

Krishnan Sitaraman, Chief Ratings Officer, Crisil Ratings said, "Vehicle finance and home loans will see steady growth amid intensifying competition. However, exercising due caution on heightened customer leverage, NBFCs will

In home loans, growth is estimated at 12-13% over the two fiscals, down from 14% last fiscal

adopt risk-calibrated growth especially in the micro, medium and small enterprises (MSME) and unsecured loan segments."

Vehicle finance (22% of NBFC AUM) growth would remain steady at 16-17% over this fiscal and the next.

The GST cuts have given a fillip to unit sales across vehicle categories, particularly cars, and this momentum is likely to continue.

Additionally, increasing preference for premium vehicles among buyers and focus on used-vehicle financing will support AUM growth in the segment even though competition with banks remains strong in new vehicles, Crisil said.

In home loans (22% of NBFC AUM), growth is estimated at 12-13% over the two fiscals, down from 14% last fiscal.

While the long-term demand for end-user housing remains strong, growth will be marginally slower due to intense competition especially from public sector banks, in the prime home loan market.

NBFC AUM to grow at 19%, cross ₹50 lakh crore next fiscal: Crisil Ratings एनबीएफसी एयूएम 19% की वृद्धि के साथ अगले वित्त वर्ष में ₹50 लाख करोड़ पार करेगा: क्रिसिल रेटिंग्स

- The **assets under management (AUM) of non-banking financial companies (NBFCs)** would grow at **18-19%** this fiscal and the next, driven by whetted **consumption demand**, and cross the **₹50 lakh crore** mark by **March 2027**, according to Crisil Ratings.

गैर-बैंकिंग वित्तीय कंपनियों (NBFCs) के एयूएम (AUM) में इस वित्त वर्ष और अगले में 18-19% की वृद्धि होगी, जो बढ़ी हुई खपत मांग से प्रेरित है, और मार्च 2027 तक यह ₹50 लाख करोड़ का स्तर पार कर जाएगा, यह क्रिसिल रेटिंग्स का अनुमान है।

- Krishnan Sitaraman**, Chief Ratings Officer, Crisil Ratings said, "**Vehicle finance and home loans** will see steady growth amid intensifying competition. However, exercising due caution on heightened **customer leverage**, NBFCs will adopt **risk-calibrated growth** especially in the **MSME** and **unsecured loan** segments."

क्रिसिल रेटिंग्स के मुख्य रेटिंग अधिकारी कृष्णन सितारामन ने कहा, "वाहन वित्त और गृह ऋण बढ़ती प्रतिस्पर्धा के बीच स्थिर वृद्धि देखेंगे। हालांकि बढ़ते हुए ग्राहक लेवरेज को देखते हुए NBFCs जोखिम-संतुलित वृद्धि अपनाएंगी, खासकर MSME और असुरक्षित ऋण क्षेत्रों में।"

- Vehicle finance** (22% of NBFC AUM) growth would remain steady at **16-17%** over this fiscal and the next.

वाहन वित्त (NBFC AUM का 22%) की वृद्धि इस वित्त वर्ष और अगले में 16-17% पर स्थिर रहेगी।



- The **GST cuts** have given a fillip to unit sales across vehicle categories, particularly cars, and this momentum is likely to continue.
जीएसटी कटौती ने वाहन श्रेणियों, विशेषकर कारों की बिक्री को बढ़ावा दिया है और यह गति जारी रहने की संभावना है।
- Additionally, increasing preference for **premium vehicles** among buyers and focus on **used-vehicle financing** will support AUM growth in the segment even though competition with banks remains strong in new vehicles, Crisil said.
इसके अतिरिक्त, खरीदारों में **प्रीमियम वाहनों** की बढ़ती पसंद और **पुराने वाहनों के वित्तपोषण** पर ध्यान इस क्षेत्र में AUM वृद्धि को समर्थन देगा, भले ही नए वाहनों में बैंकों से प्रतिस्पर्धा मजबूत बनी रहे, क्रिसिल ने कहा।
- In **home loans** (22% of NBFC AUM), growth is estimated at **12-13%** over the two fiscals, down from **14%** last fiscal.
गृह ऋण (NBFC AUM का 22%) में वृद्धि अगले दो वर्षों में **12-13%** अनुमानित है, जो पिछले वर्ष के **14%** से कम है।
- While long-term demand for **end-user housing** remains strong, growth will be marginally slower due to intense competition especially from **public sector banks**, in the **prime home loan market**.
हालांकि **एंड-यूजर हाउसिंग** की दीर्घकालिक मांग मजबूत बनी हुई है, लेकिन वृद्धि में हल्की कमी आएगी क्योंकि **सार्वजनिक क्षेत्र के बैंकों** से प्रतिस्पर्धा, विशेषकर **प्राइम होम लोन बाजार** में, काफी ज्यादा है।

Grahaa gets nod for nano satellite launch

GS III: S&T

The Hindu Bureau
BENGALURU

Grahaa Space, a Bengaluru-based spacetech startup, obtained authorisation from **Indian National Space Promotion and Authorisation Centre (IN-SPACe)** to launch its maiden nano satellite mission called **Solaras S2**, as technology demonstration by the end of November.

The launch will happen from **Alcântara Space Center (CEA)** in Brazil through the **Hanbit-Nano launch vehicle** developed by Korea-based **Innospac**, according to the company.

“**Solaras S2 mission** will qualify our nano satellite bus and platform and allow us to assess the perfor-

The launch will happen from Alcântara Space Center (CEA) located in Brazil

mance. It is a focused technical step that confirms our readiness for the next phase,” said **Ramesh Kumar V**, founder and CEO, **Grahaa Space**. This progress has been possible with the support of **TIIC incubation centre at IIST Trivandrum and IN-SPACe**.

“The upcoming missions scheduled for early 2026 with **Skyroot** will qualify the communications module, gather geo spatial data from the optical payload and establish inter-satellite links.”

the next phase,” said **Ramesh Kumar V**, founder and CEO, **Grahaa Space**.

“**Solaras S2 mission** हमारे **नैनो सैटेलाइट बस और प्लेटफॉर्म** को प्रमाणित करेगा और हमें उनके प्रदर्शन

Grahaa gets nod for nano satellite launch

ग्राहा को नैनो सैटेलाइट लॉन्च की मंजूरी मिली

• **Grahaa Space**, a Bengaluru-based spacetech startup, obtained authorisation from **Indian National Space Promotion and Authorisation Centre (IN-SPACe)** to launch its maiden **nano satellite mission** called **Solaras S2**, as technology demonstration by the end of November.
बेंगलुरु स्थित **स्पेसटेक स्टार्टअप ग्राहा स्पेस** को **भारतीय राष्ट्रीय अंतरिक्ष प्रोत्साहन और अधिकृतीकरण केंद्र (IN-SPACe)** से **Solaras S2** नामक अपने प्रथम **नैनो सैटेलाइट मिशन** को नवंबर के अंत तक तकनीकी प्रदर्शन के रूप में लॉन्च करने की मंजूरी मिली।

• The launch will happen from **Alcântara Space Center (CEA)** in Brazil through the **Hanbit-Nano launch vehicle** developed by Korea-based **Innospac**, according to the company.

कंपनी के अनुसार लॉन्च **ब्राज़ील के अलकांतारा स्पेस सेंटर (CEA)** से **कोरिया स्थित Innospac** द्वारा विकसित **Hanbit-Nano लॉन्च वाहन** के माध्यम से किया जाएगा।

• “**Solaras S2 mission** will qualify our **nano satellite bus and platform** and allow us to assess the performance. It is a focused technical step that confirms our readiness for



का मूल्यांकन करने में सक्षम बनाएगा। यह एक महत्वपूर्ण तकनीकी कदम है जो हमारे अगले चरण के लिए तैयार होने की पुष्टि करता है," ग्राह्य स्पेस के संस्थापक और सीईओ **रमेश कुमार वी** ने कहा।

- This progress has been possible with the support of **TIIIC incubation centre at IIST Trivandrum and IN-SPACE.**

यह प्रगति **IIST तिरुवनंतपुरम के TIIIC इनक्यूबेशन सेंटर और IN-SPACE** के समर्थन से संभव हुई है।

- "The upcoming missions scheduled for early 2026 with **Skyroot** will qualify the **communications module**, gather **geo-spatial data** from the **optical payload** and establish **inter-satellite links.**"

"**Skyroot** के साथ 2026 की शुरुआत में निर्धारित आगामी मिशन **कम्युनिकेशन मॉड्यूल** को प्रमाणित करेंगे, **ऑप्टिकल पेलेड** के माध्यम से **भौगोलिक-स्थानिक डेटा** एकत्र करेंगे और **इंटर-सैटेलाइट लिंक** स्थापित करेंगे।"

Norway's tax levy on wealth trades millionaires for principle of equality

Norway sees wealthy exodus after tax hike; govt says equality driver; entrepreneurs say it hinders investment; model offers lessons for Italy, France, U.K. , U.S. Business magazine Capital's ranking of **Norway's 400 richest people** shows 105 now live abroad or transferred wealth to relatives who do

GS III: Economy: Equality & Inequality
NEWS ANALYSIS

Reuters
OSLO

Sitting in his lakeside villain the **Swiss city of Lucerne**, **Borger Borgenhaug** misses grandchildren and the smell of the **Nordic sea** on a clear summer night.

The carpenter turned real-estate tycoon says that is the price he pays to escape **Norway's beefed-up wealth tax** - an annual levy that has driven hundreds of millionaires abroad while underpinning one of the world's most equal societies.

"The political climate in Norway has become increasingly hostile to business owners," **Borgerhaug**, who left in 2022, told Reuters.

With a wealth tax dating back to 1892 and a culture of openness that allows citizens to view the tax returns of others, Norway has more experience than most in squeezing the rich. Its model offers lessons for countries debating similar moves, from Britain to France and Italy, or even a city like New York.

The takeaway: a **wealth tax** will scare off some millionaires, but if set broadly enough, revenues can still be worth it.

Exodus of wealthy
The tax was a defining is-



Case for equality: A 'Tax the Rich' protest in New York City, U.S. REUTERS (FILE PHOTO)

sue in Norway's election in September, which returned the Labour Party to power. The party had raised the levy and tightened exit rules during its previous term. Individuals pay 1% on net wealth between **1.76 million and 20.7 million crowns (\$174,000-\$2 million)** and, since 2022, 1.1% above that. Exactly **6,71,639 people** - about 12% of the population - paid in 2023.

Debt deductible

Main homes enjoy a 75% discount on assessed value; shares and commercial property get 20%. Assets abroad are included, but debt is deductible.

Leaving Norway triggers an exit tax of 37.8% on unrealised capital gains above 3 million crowns -



The wealth tax makes the overall personal tax system more progressive than income tax alone

ELLEN REITAN
Deputy Finance Minister, Norway

such as notional gains on shares that have gone up in value but are yet to be sold. Loopholes that allowed emigrants to defer payment in definitely were closed in 2024.

The changes turned a trickle into a stream. Data from conservative think-tank Civita shows 261 residents with assets above 10 million crowns (\$973,000) left in 2022 and 254 in

2023 - more than double the typical rate before the hike.

Business magazine Capital's ranking of Norway's 400 richest people shows 105 now live abroad or have transferred wealth to relatives who do. Some of their pictures hang on a "wall of shame" in the offices of the small, opposition Socialist Left party.

Case for equality

Supporters argue the tax acts as a redistributive backstop in a country that scrapped inheritance tax in 2014 and ranks among the world's wealthiest thanks to oil, shipping and fisheries.

Norway funnels all proceeds from its oil and gas industry into a sovereign wealth fund and caps an-

nual withdrawals at 3% of the fund's value under a self-imposed fiscal rule.

This means it needs to find other sources of revenue.

"The wealth tax makes the overall personal tax system more progressive than income tax alone," Deputy Finance Minister **Ellen Reitan** told Reuters.

Revenue from it has climbed despite the exodus and now sits at 0.6% of GDP - not a trivial sum. For context, Britain's Labour government is hunting for savings of a similar magnitude to help hit its fiscal targets. Research by Norway's statistics office shows entrepreneurs have enough liquidity to pay, and that the burden falls hugely on the richest.

Another study suggests the tax may spur investment in human capital.

Norway remains among the world's most equal countries and ranks high for ease of doing business.

"These findings suggest that the wealth tax does not straightforwardly hinder firm-level investment or employment," said **Robert Iacomo**, professor at the Norwegian University of Science and Technology (NTNU).

A poll by the Response agency for the daily Aftenposten taken just before September's election showed 39% of Norwegians wanted the wealth tax maintained or raised,

while 23% wanted to see a reduction and 28% called for abolition.

Norway's Labour government wants a grand bargain on tax reform over the next two years, inviting all parties to the table. The catch? The wealth tax stays - in some shape or form.

Critics say the model penalises domestic ownership and risks hollowing out Norway's entrepreneurial base.

"The wealth tax system makes it harder for companies to compete with the rest of the world," said **Knut-Erik Karlsen**, who made his fortune in fish oil supplements and recently moved to Switzerland.

Norway taxes capital gains, unlike Switzerland, and imposes higher levies on labour than the OECD average. Around 40% of emigrants are business owners, according to Princeton researcher **Christine Blandhol**, who estimates the latest tax changes will cut Norway's output by 1.3% over the long run. Others find the tax hampers firms' performance.

A wealth levy is especially painful for startup founders, who pay on capital long before profits arrive.

Norway has one of Europe's lowest levels of venture capital as a share of GDP - at half that of Sweden's and far behind the U.S., OECD data shows.

Heirs often leave before taking control of shares.

Norway's tax levy on wealth trades millionaires for principle of equality नाँव का संपत्ति कर समानता के सिद्धांत के लिए करोड़पतियों को खोता है

- Sitting in his lakeside villa in the Swiss city of Lucerne, **Borger Borgenhaug** misses grandchildren and the smell of the Nordic sea on a clear summer night.



स्विट्ज़रलैंड के ल्यूसर्न शहर में झील के किनारे स्थित अपने विला में बैठे बोरगर बोरगेनहॉग को अपने पोते-पोतियों और साफ़ गर्मी की रात में नॉर्डिक समुद्र की खुशबू की याद आती है।

- The carpenter turned real-estate tycoon says that is the price he pays to escape Norway's beefed-up wealth tax – an annual levy that has driven hundreds of millions abroad while underpinning one of the world's most equal societies.

बढ़े हुए नॉर्वे के **wealth tax** से बचने के लिए यह कीमत चुकानी पड़ती है, बढ़ई से रियल एस्टेट टाइकून बने बोरगेनहॉग कहते हैं — एक वार्षिक कर जिसने सैकड़ों करोड़पतियों को विदेश भेज दिया, जबकि यह दुनिया के सबसे **समान समाजों** में से एक को मजबूत करता है।

- "The political climate in Norway has become increasingly hostile to business owners," Borgenhaug, who left in 2022, told Reuters. "नॉर्वे का राजनीतिक माहौल व्यवसाय मालिकों के प्रति बढ़ती शत्रुता दिखा रहा है," 2022 में देश छोड़ने वाले बोरगेनहॉग ने रायटर को बताया।
- With a wealth tax dating back to 1892 and a culture of openness that allows citizens to view the tax returns of others, Norway has more experience than most in squeezing the rich. 1892 से लागू **wealth tax** और दूसरों के टैक्स रिटर्न देखने की **पारदर्शिता की संस्कृति** के साथ, अमीरों से कर वसूलने में नॉर्वे को दुनिया की तुलना में कहीं अधिक अनुभव है।
- Its model offers lessons for countries debating similar moves, from Britain to France and Italy, or even a city like New York. इसका मॉडल ब्रिटेन, फ्रांस, इटली जैसे देशों या न्यूयॉर्क जैसे शहरों के लिए सीख प्रदान करता है जो ऐसे कदमों पर विचार कर रहे हैं।
- The takeaway: a wealth tax will scare off some millionaires, but if set broadly enough, revenues can still be worth it. निष्कर्ष: **wealth tax** कुछ करोड़पतियों को डरा कर भगा सकता है, लेकिन यदि इसे व्यापक आधार पर लागू किया जाए, तो राजस्व अब भी लाभकारी रह सकता है।



Exodus of wealthy धनवानों का पलायन

- The tax was a defining issue in Norway's election in September, which returned the Labour Party to power. सितंबर के नॉर्वे चुनाव में यह कर एक प्रमुख मुद्दा था, जिसने लेबर पार्टी को फिर सत्ता में लौटाया।
- The party had raised the levy and tightened exit rules during its previous term. पार्टी ने अपने पिछले कार्यकाल में कर बढ़ाया और **exit rules** को कड़ा किया था।
- Individuals pay 1% on net wealth between 1.76 million and 20.7 million crowns and since 2022, 1.1% above that. व्यक्तियों को 1.76 मिलियन से 20.7 मिलियन क्रोन की **नेट संपत्ति** पर 1% और 2022 से ऊपर की राशि पर 1.1% कर देना होता है।
- Exactly 6,71,639 people – about 12% of the population – paid in 2023. 2023 में 6,71,639 लोगों — लगभग 12% जनसंख्या — ने यह कर चुकाया।

Debt deductible ऋण कटौती योग्य

- Main homes enjoy a 75% discount; shares and commercial property get 20%. मुख्य आवास पर 75% छूट और **shares व वाणिज्यिक संपत्ति** पर 20% छूट मिलती है।
- Assets abroad are included, but debt is deductible. विदेशी संपत्तियाँ शामिल की जाती हैं, लेकिन **ऋण कटौती योग्य** है।



- Leaving Norway triggers an **exit tax** of 37.8% on unrealised capital gains above 3 million crowns.
नॉर्वे छोड़ने पर 3 मिलियन क्रोन से अधिक की **अवास्तविक पूंजीगत लाभ** पर 37.8% का **exit tax** लगता है।
- Loopholes that allowed emigrants to defer payment indefinitely were closed in 2024.
प्रवासियों को भुगतान अनिश्चितकाल तक टालने की अनुमति देने वाले **छिद्र 2024 में बंद कर दिए गए**।
- The changes turned a trickle into a stream.
इन बदलावों ने थोड़े से पलायन को भारी **exodus** में बदल दिया।
- Data shows 261 residents with assets above 10 million crowns left in 2022 and 254 in 2023 — more than double the earlier rate.
2022 में 10 मिलियन क्रोन से अधिक संपत्ति वाले 261 लोग और 2023 में 254 लोग देश छोड़ गए — पहले की दर से दोगुने से अधिक।
- Business magazine Kapital's list of Norway's 400 richest shows 105 now abroad or have transferred wealth to relatives abroad.
कैपिटल पत्रिका की नॉर्वे के 400 सबसे अमीरों की सूची में 105 लोग अब विदेश में हैं या अपनी संपत्ति विदेश में रिश्तेदारों को स्थानांतरित कर चुके हैं।

Case for equality समानता के लिए तर्क

- Supporters argue the tax is a redistributive backstop in a country without inheritance tax since 2014.
समर्थकों का कहना है कि यह कर 2014 से **inheritance tax** न होने वाले देश में पुनर्वितरण का महत्वपूर्ण उपाय है।
- Revenue has climbed despite the exodus and now stands at 0.6% of GDP.
पलायन के बावजूद राजस्व बढ़ा है और अब यह GDP का **0.6%** है।
- Research shows entrepreneurs have liquidity to pay and burden falls heavily on the richest.
अध्ययन दिखाते हैं कि उद्यमियों के पास भुगतान की तरलता है और बोझ सबसे अधिक **अमीर वर्ग** पर पड़ता है।
- Norway remains highly equal and ranks high for ease of doing business.
नॉर्वे अब भी अत्यधिक **समान** है और व्यापार सुगमता में शीर्ष पर है।
- Polls show 39% want the tax maintained or raised; 28% want abolition.
एक सर्वेक्षण में 39% ने कर को बनाए रखने या बढ़ाने का समर्थन किया; 28% इसे समाप्त करना चाहते हैं।

Criticism आलोचना

- Critics say the model penalises domestic ownership and weakens entrepreneurship.
आलोचकों का कहना है कि यह मॉडल **घरेलू स्वामित्व** को दंडित करता है और उद्यमिता को कमजोर करता है।
- Start-up founders suffer as they must pay on capital long before profits.
स्टार्टअप संस्थापक नुकसान में रहते हैं क्योंकि उन्हें लाभ से पहले ही पूंजी पर कर देना पड़ता है।
- Norway has one of Europe's lowest levels of **venture capital** as a share of GDP.
नॉर्वे में GDP के अनुपात में **वेंचर कैपिटल** का स्तर यूरोप में सबसे कम है।
- Heirs often leave before taking control of shares.
अक्सर उत्तराधिकारी शेयरों का नियंत्रण लेने से पहले ही देश छोड़ देते हैं।



Japanese delegation visits ISRO to review status of Chandrayaan-5/LuPEX mission

GS III: S&T

The Hindu Bureau
BENGALURU

A Japanese delegation recently held discussions with the senior leadership of the Indian Space Research Organisation (ISRO) and visited the facilities of the space agency to review the status of the Chandrayaan-5/LuPEX mission and explore future opportunities.

The Vice-Chair of Japan's Cabinet Committee on National Space Policy Saku Tsuneta called on ISRO Chairman V. Narayanan on November 21 to discuss the status of the Chandrayaan-5/ LuPEX, which is a Joint Lunar Polar Exploration mission between



Progress check: The Japanese delegation with ISRO Chairman V. Narayanan at the headquarters in Bengaluru. SPECIAL ARRANGEMENT

the ISRO and the Japan Aerospace Exploration Agency (JAXA).

The Chandrayaan-5 LuPEX mission is the fifth mission in the Chandrayaan series of lunar missions to study the lunar

volatile materials, including lunar water, in the vicinity of a Permanently Shadowed Region in the lunar South pole.

According to the ISRO, the mission will be launched by JAXA onboard

its H3-24L launch vehicle, carrying the ISRO-made lunar lander, which will carry the MHI, Japan-made lunar rover.

The ISRO is also responsible for developing a few scientific instruments for the mission.

The LUPEX will be a precursor to the ISRO's lunar sample return mission and for sending the first Indian to the moon by 2040.

The Japanese delegation also explored potential opportunities to work together in the field of robotic arm for space stations, launching of scientific satellites, and in supporting researchers and private companies from both nations for joint activities.

Japanese delegation visits ISRO to review status of Chandrayaan-5/LuPEX mission

जापानी प्रतिनिधिमंडल ने चंद्रयान-5/लूपेक्स मिशन की स्थिति की समीक्षा के लिए इसरो का दौरा किया

- A Japanese delegation recently held discussions with the senior leadership of the **Indian Space Research Organisation (ISRO)** and visited the facilities of the space agency to review the **status of the Chandrayaan-5/LuPEX mission** and explore future opportunities. एक जापानी प्रतिनिधिमंडल ने हाल ही में **भारतीय अंतरिक्ष अनुसंधान संगठन (ISRO)** के वरिष्ठ नेतृत्व के साथ बातचीत की और **चंद्रयान-5/लूपेक्स मिशन** की स्थिति की समीक्षा करने तथा भविष्य के अवसरों का पता लगाने के लिए इसकी सुविधाओं का दौरा किया।
- The **Vice-Chair of Japan's Cabinet Committee on National Space Policy Saku Tsuneta** called on ISRO Chairman V. Narayanan on November 21 to discuss the status of the **Chandrayaan-5/LuPEX, which is a Joint Lunar Polar Exploration mission between ISRO and JAXA.** जापान की राष्ट्रीय अंतरिक्ष नीति पर कैबिनेट समिति के उपाध्यक्ष साकू त्सुनेता ने 21 नवंबर को इसरो अध्यक्ष वी. नारायणन से मुलाकात की, ताकि **चंद्रयान-5/लूपेक्स** की स्थिति पर चर्चा की जा सके, जो **इसरो और जाक्सा (JAXA)** के बीच एक **संयुक्त चंद्र ध्रुवीय अन्वेषण मिशन** है।
- The **Chandrayaan-5 LuPEX mission** is the fifth mission in the **Chandrayaan series** to study lunar volatile materials, including **lunar water**, in the vicinity of a **Permanently Shadowed Region in the lunar South Pole.** चंद्रयान-5 लूपेक्स मिशन चंद्रयान श्रृंखला का पाँचवाँ मिशन है, जिसका उद्देश्य **चंद्र दक्षिण ध्रुव** के स्थायी रूप से छायादार क्षेत्र के पास **चंद्र जल** सहित चंद्रमा के वाष्पशील पदार्थों का अध्ययन करना है।



TELEGRAM CHANNEL: <https://t.me/patrioticIAS>

YOUTUBE CHANNEL: <https://www.youtube.com/@PatrioticIAS>

CONTACT: 9971932488



- According to ISRO, the mission will be launched by **JAXA** onboard its **H3-24L launch vehicle**, carrying the **ISRO-made lunar lander**, which will carry the **Japan-made MHI lunar rover**.
इसरो के अनुसार, मिशन को **जाक्सा (JAXA)** के **H3-24L प्रक्षेपण यान** से लॉन्च किया जाएगा, जिसमें **इसरो द्वारा निर्मित चंद्र लैंडर** होगा, जो **जापान में निर्मित MHI चंद्र रोवर** को ले जाएगा।
- The **ISRO is also responsible for developing a few scientific instruments** for the mission.
इसरो इस मिशन के लिए कुछ **वैज्ञानिक उपकरणों** के विकास के लिए भी जिम्मेदार है।
- The **LUPEX will be a precursor to ISRO's lunar sample return mission and to sending the first Indian to the Moon by 2040**.
लूपेक्स (LUPEX) इसरो के **चंद्र नमूना वापसी मिशन** और **2040 तक पहले भारतीय को चंद्रमा पर भेजने** के प्रयासों का अग्रदूत होगा।
- The Japanese delegation also explored potential opportunities to work together in the field of **robotic arms for space stations, launching scientific satellites**, and supporting **researchers and private companies** from both nations for joint activities.
जापानी प्रतिनिधिमंडल ने **अंतरिक्ष स्टेशनों के लिए रोबोटिक आर्म, वैज्ञानिक उपग्रहों के प्रक्षेपण**, तथा दोनों देशों के **शोधकर्ताओं और निजी कंपनियों** को संयुक्त गतिविधियों के लिए समर्थन देने जैसे क्षेत्रों में सहयोग के संभावित अवसरों का भी पता लगाया।

PATRIOTIC IAS



Gavi, UNICEF ink deal to provide easy access to malaria vaccine

GS III: S&T

Bindu Shajan Perappadan
NEW DELHI

Gavi, the Vaccine Alliance and United Nations Children's Fund (UNICEF) have announced a new agreement that it said will make the R21/Matrix-M malaria vaccines significantly more accessible and affordable, paving the way for protecting more children.

The deal, executed by UNICEF, is expected to generate up to \$90 million in savings for Gavi and countries, equivalent to more than 30 million additional doses – enabling full vaccination of nearly seven million more children against malaria over the next five years. It is financed by Gavi through an advance payment, enabled by the innovative International Finance Facility for Immunisation (IFFIm) mechanism.

The lower price of the vaccine – at \$2.99 per dose – is anticipated to take effect in approximately one year.

Gavi facilitates and finances the procurement, logistics, market shaping and integration of malaria vaccines into national immunisation programmes. To date, over 40 million doses of malaria vaccines



R21/Matrix-M was co-developed by the University of Oxford and Serum Institute of India. AP

have been delivered through the Gavi malaria vaccination programme and are now part of routine immunisation in 24 African countries that together represent more than 70% of the world's malaria burden.

UNICEF is the world's largest buyer of vaccines, delivering nearly three billion doses every year.

Prequalified vaccines

The WHO has prequalified two malaria vaccines to-date: R21/Matrix-M (co-developed by the University of Oxford and Serum Institute of India, leveraging Novavax's Matrix-M adjuvant technology) and RTS,S/AS01 (developed by GlaxoSmithKline (GSK), PATH and partners).

immunisation programmes.

गावी मलेरिया वैक्सीन की खरीद, लॉजिस्टिक्स, बाज़ार संरचना और राष्ट्रीय टीकाकरण कार्यक्रमों में एकीकरण को सुगम और वित्तपोषित करता है।

- To date, over **40 million doses** of malaria vaccines have been delivered through the Gavi malaria vaccination programme and are now part of routine immunisation in **24 African countries** that represent more than **70% of the world's malaria burden**.

अब तक गावी मलेरिया टीकाकरण कार्यक्रम के तहत **4 करोड़ से अधिक डोज़** वितरित की जा चुकी हैं और ये अब **24 अफ्रीकी देशों** के नियमित टीकाकरण का हिस्सा हैं, जो दुनिया के **70% से अधिक मलेरिया बोझ** का प्रतिनिधित्व करते हैं।

- UNICEF is the **world's largest buyer of vaccines**, delivering nearly **three billion doses** every year.

यूनिसेफ **दुनिया का सबसे बड़ा वैक्सीन खरीदार** है, जो हर वर्ष लगभग **3 अरब डोज़** वितरित करता है।

Gavi, UNICEF ink deal to provide easy access to malaria vaccine

मलेरिया वैक्सीन तक आसान पहुंच सुनिश्चित करने के लिए गावी, यूनिसेफ ने समझौता किया

- Gavi, the Vaccine Alliance and **United Nations Children's Fund (UNICEF)** have announced a new agreement that it said will make the **R21/Matrix-M malaria vaccines** significantly more accessible and affordable, paving the way for protecting more children.

गावी, द वैक्सीन अलायंस और **संयुक्त राष्ट्र बाल कोष (UNICEF)** ने एक नया समझौता घोषित किया है, जिसके अनुसार **R21/Matrix-M मलेरिया वैक्सीन** को काफी अधिक सुलभ और किफायती बनाया जाएगा, जिससे अधिक बच्चों की सुरक्षा का मार्ग प्रशस्त होगा।

- The deal, executed by UNICEF, is expected to generate up to **\$90 million in savings** for Gavi and countries, equivalent to more than **30 million additional doses** — enabling full vaccination of nearly **seven million more children** against malaria over the next five years.

यूनिसेफ द्वारा लागू किए गए इस समझौते से गावी और देशों के लिए लगभग **9 करोड़ डॉलर की बचत** होने की उम्मीद है, जो **3 करोड़ अतिरिक्त डोज़** के बराबर है — जिससे अगले पाँच वर्षों में लगभग **70 लाख अतिरिक्त बच्चों** को मलेरिया से पूर्ण सुरक्षा मिल सकेगी।

- It is financed by Gavi through an **advance payment**, enabled by the innovative **International Finance Facility for Immunisation (IFFIm)** mechanism.

यह गावी द्वारा **अग्रिम भुगतान** के माध्यम से वित्तपोषित है, जिसे अभिनव **अंतरराष्ट्रीय टीकाकरण वित्त सुविधा (IFFIm)** तंत्र द्वारा सक्षम बनाया गया है।

- The lower price of the vaccine — at **\$2.99 per dose** — is anticipated to take effect in approximately one year.

वैक्सीन की कम कीमत — **\$2.99 प्रति डोज़** — लगभग एक वर्ष में प्रभावी होने की उम्मीद है।

- Gavi facilitates and finances the **procurement, logistics, market shaping and integration** of malaria vaccines into national



Prequalified vaccines प्रीक्वालिफाइड वैक्सीन

- The WHO has prequalified two malaria vaccines to date: **R21/Matrix-M** (co-developed by the **University of Oxford** and **Serum Institute of India**, leveraging **Novavax's Matrix-M adjuvant technology**) and **RTS,S/AS01** (developed by **GlaxoSmithKline (GSK)**, **PATH** and partners).

डब्ल्यूएचओ ने अब तक दो मलेरिया वैक्सीन को प्रीक्वालिफाई किया है: **R21/Matrix-M** (जिसे **ऑक्सफोर्ड विश्वविद्यालय** और **सीरम इंस्टिट्यूट ऑफ इंडिया** ने संयुक्त रूप से विकसित किया है और इसमें **नोवावैक्स की Matrix-M एडजुवेंट तकनीक** का उपयोग किया गया है) तथा **RTS,S/AS01** (जिसे **ग्लैक्सोस्मिथक्लाइन (GSK)**, **PATH** और उसके साझेदारों ने विकसित किया है)।

QUESTION 5

In order to solve problems in general relativity, physicists need to first describe quantities like energy, momentum, and the properties of spacetime in a way that works in any coordinate system and any direction. Which mathematical tool, which generalises the concept of scalars and vectors to higher dimensions, is used for this purpose?

Answers to November 20 quiz:

- Bubble separation method in mineral processing
- Ans: Froth flotation
- Selective swapping of ions between solid, liquid phases - Ans: Ion exchange
- Carbon-based extraction technique in metallurgy
- Ans: Carbothermic reaction
- Liquid medium used in electrorefining methods -
Ans: Molten salts
- Mixtures with lower melting points than their constituents - Ans: Eutectics

Visual: **Diamond**

First contact: K.N. Viswanathan | Mohammad Sohail
| Tamal Biswas | Anmol Agrawal

QUIZ

Bubble Separation Method in Mineral Processing – Froth Flotation

Introduction to Froth Flotation

- Froth flotation is a **bubble separation method** used to concentrate valuable minerals by separating them from gangue (waste material).
 - It relies on differences in **surface properties**, mainly **hydrophobicity** (water-repelling) and **hydrophilicity** (water-attracting).
 - Developed commercially during **1905–1912**, it became one of the most significant separation technologies in mining.
 - Extensively used for sulphide ores such as **copper**, **lead**, **zinc**, and in **coal cleaning**.

Basic Working Principle

- Crushed ore is mixed with **water** to form a slurry.
- Collectors** are added to make the desired minerals **hydrophobic**.
- Air is blown** into the slurry to form bubbles.
- Hydrophobic minerals attach to the rising **air bubbles**.
- A **froth layer** forms at the surface carrying the mineral particles.
- Froth is **skimmed off**, giving concentrated mineral.
- Hydrophilic gangue remains in the slurry and sinks.

Key Components of a Froth Flotation System

- Flotation Cell** – Tank where slurry, reagents, and air interact.
- Air Supply System** – Produces fine bubbles essential for particle attachment.
- Reagents**
 - Collectors – Induce hydrophobicity
 - Frothers – Stabilize froth (e.g., pine oil)
 - Modifiers – Control selectivity (e.g., pH regulators like lime)
- Agitator** – Ensures mixing, dispersion of air, and reagent contact.



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Important Concepts

Hydrophobicity and Surface Chemistry

- Minerals must be hydrophobic to attach to bubbles.
- Collectors chemically bond to mineral surfaces to increase hydrophobicity.
- Sulphide minerals such as **galena**, **chalcopyrite**, and **sphalerite** naturally respond well.

Bubble–Particle Attachment

- Occurs when particles collide with bubbles and attach.
- Efficiency depends on:
 - Particle size
 - Bubble size
 - Contact angle
 - Agitation level
 - Type and amount of reagents used

Froth Formation and Stability

- Frothers ensure formation of a **stable froth layer**.
- Froth must be stable enough to carry valuable minerals but not so stable that gangue gets entrapped.
- Froth characteristics influence grade and recovery.

Types of Flotation Machines

- **Mechanical Cells** – Agitated tanks, most widely used.
- **Pneumatic Cells** – Use compressed air without mechanical agitation.
- **Column Flotation** – Tall columns, high-grade concentrates, used in coal washing and fine iron ore beneficiation.

Applications of Froth Flotation

- **Copper ore processing** – Chalcopyrite concentration
- **Lead ore processing** – Galena separation
- **Zinc ore processing** – Sphalerite beneficiation
- **Coal beneficiation** – Removal of ash-forming minerals
- **Iron ore slimes** – Used in fine particle beneficiation in various processing plants

Simple Example for Beginners

To understand the concept easily:

- If sand is mixed with water and oil is added, the sand coated with oil floats while clean sand sinks.
- This resembles flotation, where **oil-like collectors** bind to minerals to make them float.

Recent Developments and Updates

- Indian research institutions are developing **environment-friendly flotation reagents**, replacing traditional chemicals.
- New **column flotation technologies** are being implemented to improve recovery and grade of finely disseminated ores.



- Emphasis on beneficiation has increased under recent mineral policy reforms to reduce wastage and improve efficiency in mining.
- Automation, real-time sensors, and process control systems are being adopted to optimize flotation efficiency.

Advantages of Froth Flotation

- Highly efficient for **low-grade** and **complex ores**.
- Allows processing of very **fine-grained ores**.
- Produces **high-purity concentrates**.
- Cost-effective and scalable for commercial mining.

Limitations

- Less effective for certain **oxide and silicate ores** without special reagents.
- Requires precise control of **pH, reagent dosage, and bubble size**.
- Very coarse or extremely fine particles may not float effectively.

Conclusion

Froth flotation is a foundational technique in mineral processing. It uses **air bubbles, reagents, and surface chemistry** to concentrate valuable minerals. With ongoing research, automation, and improved reagents, flotation continues to evolve as an efficient method for mineral beneficiation.

Ion Exchange (Selective Swapping of Ions Between Solid and Liquid Phases)

- Ion exchange is a **reversible process** in which ions present in a **liquid phase** are exchanged with ions attached to a **solid phase** (usually a resin or natural mineral).
- It is a **highly selective** process based on electrostatic attraction between charges on the solid and ions in the solution.
- Commonly used in **water treatment, wastewater purification, chemical separation, soil science, and mineral processing**.

Basic Principles

Nature of Ion Exchangers

- Ion exchangers are **insoluble solids** that contain **fixed charged groups** bound within a polymer or mineral framework.
- These fixed charges attract **oppositely charged ions** (counter-ions) that can be exchanged.
- They may be
 - Natural (such as **zeolites** and clay minerals)
 - Synthetic (such as **polystyrene–divinylbenzene resins**)

Types of Ion Exchange

Cation Exchange

- Exchanges **positively charged ions** such as Ca^{2+} , Mg^{2+} , Na^+ , and H^+ .
- Solid contains **negatively charged functional groups** such as sulfonic or carboxylic groups.
- Example
 - **Water softening**, where Ca^{2+} and Mg^{2+} ions are replaced by Na^+ ions.



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Anion Exchange

- Exchanges **negatively charged ions** such as Cl^- , SO_4^{2-} , NO_3^- , and OH^- .
- Solid contains **positively charged groups** such as quaternary ammonium groups.
- Example
- Removal of nitrate ions from drinking water.

Mixed-Bed Exchange

- Contains **both** cation and anion exchange resins in a single bed.
- Produces **ultra-pure water** needed in laboratories, nuclear reactors, and semiconductor industri

Mechanism: How Ion Exchange Occurs

- Resin beads or mineral surfaces are preloaded with specific ions (e.g., Na^+).
- When a solution passes over the resin:
- Ions in solution with **higher affinity** for the resin **displace** the ions originally attached.
- The displaced ions enter the solution, and the incoming ions bind to the resin.
- The process continues until the **resin becomes exhausted**.
- The resin is restored through **regeneration**, often using NaCl (for cation resins) or NaOH (for anion resins).

Key Characteristics of Ion Exchange

- Highly **selective** and efficient even in dilute solutions.
- **Reversible**, allowing repeated regeneration.
- **No structural change** in the solid exchanger during the process.
- Works effectively under **ambient conditions**.
- Ideal for **water purification** and **industrial separation**.

Applications

Water Softening

- Removes hardness-causing ions (Ca^{2+} , Mg^{2+}).
- Protects boilers, pipelines, and improves detergent use.

Drinking Water Purification

- Removes excess nitrate, fluoride, sulphate, and sometimes arsenic (in special systems).

Industrial Wastewater Treatment

- Removes toxic metals such as Pb^{2+} , Cu^{2+} , Zn^{2+} , Cr^{3+} .
- Widely used in mining, electroplating, and metal-processing industries.

Soil Science

- Soil's **cation exchange capacity (CEC)** determines nutrient availability.
- Clay and humus exchange ions like K^+ , Mg^{2+} , and Ca^{2+} with plant roots.

Chemical and Pharmaceutical Separation



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- Used in chromatographic techniques for separating and purifying charged molecules.

Historical Background

- Mid-19th century – Natural zeolites were identified as capable of exchanging ions.
- Early 1900s – First artificial inorganic ion exchangers developed.
- 1930s–1940s – Fully synthetic organic resins introduced and commercialized.
- Post-1950s – Major expansion in water treatment applications.
- Recent decades – High-purity resins introduced for sensitive industries (nuclear, semiconductor, medical).

Recent Developments

- Development of **nano-engineered ion exchange materials** with enhanced selectivity.
- Introduction of **hybrid resins** (resin + metal oxide) for removing toxic ions like arsenic and chromium.
- Better **regeneration technologies** reducing waste chemicals.
- Adoption in **Zero Liquid Discharge (ZLD)** wastewater systems.
- Growing application in **post-treatment of desalinated water** to achieve potable quality.

Carbon-based Extraction Technique in Metallurgy – Carbothermic Reaction

Introduction

- A **carbothermic reaction** is a metallurgical extraction method in which **carbon** (coke, charcoal, or coal) is used as a **reducing agent** to extract metals from their oxides.
- It represents one of the **oldest and most widely used extraction techniques**, with historical roots in ancient iron-smelting practices.
- This method is primarily used for extracting **moderately reactive metals**, such as **iron, zinc, lead, tin, manganese, chromium**, and for producing **ferroalloys**.
- It remains central to global metallurgical industries because carbon is abundant, inexpensive, and highly effective at high temperatures.

Basic Principle of Carbothermic Reduction

- Metal oxides are heated with carbon at **high temperatures**, generally between **900°C and 2000°C** depending on the metal.
- Carbon reacts with oxygen present in the metal oxide, reducing it to metal and forming **carbon monoxide (CO)** or **carbon dioxide (CO₂)**.

General Chemical Reaction:

Metal oxide + Carbon → Metal + Carbon monoxide/carbon dioxide



- The reduction takes place inside high-temperature furnaces such as:
 - Blast furnace
 - Electric arc furnace
 - Cupola furnace
 - Reverberatory furnace

Why Carbon is an Effective Reducing Agent



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- Carbon has a strong tendency to combine with oxygen at high temperatures.
- At elevated temperatures, **carbon monoxide (CO)** becomes a powerful reducing agent.
- Carbon sources (especially **coke**) provide both:
 - **Chemical reduction**
 - **Thermal energy** needed for extraction
- According to thermodynamic principles, the reduction becomes favourable because the Gibbs free energy for carbon oxidation is highly negative at high temperature.

Ellingham Diagram: Thermodynamic Foundation

- The **Ellingham Diagram** plots the Gibbs free energy of formation of metal oxides versus temperature.
- The oxidation lines of carbon ($C \rightarrow CO$ and $C \rightarrow CO_2$) lie **below** the lines of many metal oxides at high temperature.
- This means carbon can **reduce many metal oxides** effectively, including Fe_2O_3 , PbO , ZnO , and SnO_2 .

Forms of Carbon Used in Metallurgy

- **Coke** – Highly porous, high-carbon fuel; used in blast furnaces.
- **Charcoal** – Historically used; still used in smaller-scale or eco-friendly smelting.
- **Coal** – Sometimes used directly, but more often converted to coke for metallurgical processes.

Examples of Metals Extracted via Carbothermic Reaction

Iron (Fe)

- Extracted from hematite (Fe_2O_3) and magnetite (Fe_3O_4) using **coke** in a **blast furnace**.
- Key reactions:
 - $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
 - $C + O_2 \rightarrow CO_2$
 - $CO_2 + C \rightarrow 2CO$ (Boudouard reaction)
- Temperature inside the furnace reaches **2000°C** near the bottom zone.

Zinc (Zn)

- Extracted from zinc oxide (ZnO) using carbon at **1000–1200°C**.
- $ZnO + C \rightarrow Zn + CO$
- Since zinc boils at $\sim 907^\circ C$, the extracted zinc leaves as vapour and is later condensed.

Lead (Pb)

- Lead oxide (PbO) is easily reduced by carbon.
- $PbO + C \rightarrow Pb + CO$
- Requires lower temperatures compared to iron.

Tin (Sn)

- $SnO_2 + C \rightarrow Sn + CO_2$
- Historically used in ancient tin-smelting furnaces.



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Manganese (Mn) and Chromium (Cr)

- Carbothermic reduction used in the manufacture of **ferromanganese** and **ferrochromium**.
- Occurs in electric arc furnaces because extremely high temperatures are needed.

Applications of Carbothermic Reduction in Modern Industries

- **Iron and steel industry** – Blast furnace ironmaking remains the largest user.
- **Ferrous alloys industry** – Production of ferromanganese, ferrochromium, ferrosilicon.
- **Zinc and lead smelting** – Especially in roasting–reduction processes.
- **Silicon carbide production** – Reduction of silica with carbon at ~2000°C.
- **Cement and refractory industries** – Use carbon for reduction of mineral components.

Advantages of Carbothermic Reduction

- Highly effective for **moderately reactive metals**.
- Carbon is **inexpensive, abundant**, and provides both heat and reduction.
- Can handle **large quantities of ore**, making it suitable for industrial-scale operations.
- Works with a variety of metal oxides and ore grades.

Limitations

- Cannot be used for metals with **very high affinity for oxygen**, such as:
 - Aluminium
 - Magnesium
 - Titanium
- These metals require **electrolytic or metallothermic reduction** processes.
- Produces **high CO₂ emissions**, making environmental control important.
- Possibility of carbon contamination in certain metals.

Recent Developments and Updates

- Development of **cleaner, low-carbon variants** of carbothermic processes.
- Use of **biocarbon** (renewable charcoal) in place of coke to reduce emissions.
- Research on **hydrogen-based iron reduction** is progressing, but carbothermic reduction remains dominant globally.
- Automation and real-time monitoring have improved furnace efficiency.
- Industrial initiatives are adopting **carbon capture and utilization (CCU)** technologies.

Simple Example for Beginners

- When rust (iron oxide) is heated with charcoal (carbon), the charcoal removes the oxygen and the metallic iron remains.
- This basic principle applies to most carbothermic reductions.

Conclusion

Carbothermic reduction is a **core metallurgical extraction technique** used for converting metal oxides into pure metals by using carbon as a reducing agent. Its scientific basis lies in thermodynamics and high-temperature chemistry, and it remains crucial for global industries due to its efficiency, reliability, and scalability.



Molten Salts as the Liquid Medium in Electrorefining

- In several electrorefining methods, especially for **high-melting, reactive, or water-sensitive metals**, the **liquid medium used is molten salts**.
- A **molten salt** is a salt (such as chlorides or fluorides) heated above its melting point until it becomes a **liquid ionic conductor**.
- Molten salts provide a stable, high-temperature environment where metal ions can dissolve and migrate between electrodes

Basic Concept of Electrorefining Using Molten Salts

- Electrorefining involves dissolving metal ions from an **impure anode** and depositing high-purity metal at the **cathode**.
- The liquid medium needs to allow smooth ion transport.
- For many metals, especially those incompatible with water, **molten salts are used instead of aqueous electrolytes**.

Why Molten Salts Are Used

Metals Too Reactive for Water

- Certain metals react vigorously with water or form oxides/hydroxides, making aqueous solutions unusable.
- Examples include titanium, zirconium, magnesium, sodium, and rare earth elements.
- Molten salts provide a **water-free ionic environment**, enabling efficient electrorefining.

High Melting Points of Target Metals

- Many strategic metals require processing temperatures between **400°C and 900°C**.
- Water decomposes long before reaching those temperatures, but molten salts remain **chemically stable**.

High Ionic Conductivity

- When molten, salts like **LiCl–KCl**, **NaCl–KCl**, and **CaCl₂ mixtures** allow **excellent movement of metal cations and anions**.
- This makes the refining process faster and more efficient.

Better Control Over Metal Purity

- Molten salts minimize contamination from water-borne impurities.
- They allow precise control over ion concentration, ensuring **high-purity metal deposition**.

Common Molten Salts Used in Electrorefining

- **LiCl–KCl eutectic mixture** – Used for refining uranium, plutonium, and spent nuclear fuel metals.
- **NaCl–KCl mixture** – Used for magnesium and rare-earth metal refining.
- **CaCl₂-based melts** – Used for titanium and zirconium purification.
- **Molten fluorides (e.g., LiF–NaF–KF)** – Used for high-temperature electrochemical processes.

Examples of Metals Refined Using Molten Salts

Titanium



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- Cannot be refined using aqueous electrolytes due to rapid oxidation.
- Molten chloride salts are used to dissolve Ti ions for high-purity extraction.

Zirconium and Hafnium

- Used in nuclear reactors; require extremely high purity.
- Molten salt electrorefining removes iron, nickel, chromium, and other impurities.

Uranium and Other Nuclear Materials

- Pyroprocessing uses molten LiCl–KCl as the electrolyte.
- Enables recycling of spent nuclear fuel safely at high temperatures.

Magnesium and Sodium

- Highly reactive metals.
- Refined using molten chloride baths to avoid reaction with water.

Rare Earth Elements

- Molten fluoride or chloride salts help separate rare-earth metals from their mixtures.

Historical Background

- **1890s** – Early molten salt experiments began for aluminium refining.
- **1940s** – Molten salts used extensively in aluminium production (Hall–Héroult process).
- **1950s–1960s** – Molten salt electrorefining adopted for titanium and zirconium metallurgy.
- **1990s onwards** – Nuclear industries adopted molten salt electrorefining for pyroprocessing of spent fuel.
- **Recent times** – Growing use in battery recycling, rare-earth refining, and strategic metal purification.

Recent Developments and Updates

- Introduction of **low-melting eutectic molten salts** to reduce energy consumption.
- Advances in **inert anode materials** to prevent contamination during high-temperature operations.
- Research on **environment-friendly molten salts** (less corrosive and less toxic).
- Increased use in **battery recycling**, particularly for lithium and nickel purification.
- Development of **semi-continuous molten salt refining systems** for faster industrial throughput.



How are passengers able to access the Internet on aeroplanes?

In-flight Internet has become a standard service on commercial flights, utilising air-to-ground and satellite systems to meet growing passenger demand for connectivity while navigating technical and regulatory challenges

CS III: S&T

Vasudevan Mukunth

Passenger Internet on aeroplanes used to be rare in the 2010s but has become almost commonplace today. On most flights, the basic idea is that the whole aeroplane is treated like a flying Wi-Fi router that connects to the rest of the Internet through a long backhaul link. This means your phone or laptop never talks directly to the ground. Instead it talks to a Wi-Fi access point inside the cabin, which then sends your data out of the aircraft via radio links.

How is the backhaul setup?

The backhaul link these days comes in two main forms: air-to-ground (ATG) and via satellite. In the ATG system, the aeroplane connects to special cellular-like towers on the ground. These towers have antennae pointing up at the sky. The plane's antennae – often mounted on the underside – maintains a radio link with whichever tower is currently in range ('radio link' just means they send and receive electromagnetic signals in the radio frequency range, 3-3,000,000,000 kHz). As the plane flies, the ATG system hands off the connection from one tower to the next, similar to how your phone switches between cell towers if you're on a call in a moving vehicle.

Obviously this arrangement works well over land, where there's a dense coverage of towers, but fails over oceans, deserts, and in polar areas – all places with fewer or no towers. This is where satellites help.

Satellite systems are more flexible because they don't care whether an

aeroplane is over land or water. In this system, the aeroplane uses a dish or phased-array antenna, usually inside a bespoke hump-shaped structure on top of the fuselage, that's pointed towards the sky. This antenna will transmit data to a satellite in orbit, which will relay the data to a ground station connected to the regular Internet.

Historically, these satellites have been in geostationary orbit, which is a circular orbit 35,786 km above sea level. This means, even at the speed of light, there's a noticeable data latency. A signal round-trip time of several hundred milliseconds is common. Newer systems use satellite constellations that are located in low-earth orbit, that is, 150-2,000 km above sea level. Since these satellites are much closer to ground stations, the latency is lower. Sometimes they also allow for higher bandwidth if the aeroplane's antennae can track fast-moving satellites and hand off between them.

How are connections provided to users?

Inside the aeroplane, the connectivity network resembles that in a small office. There's a central server or router, a satellite or ATG modem, and several Wi-Fi access points distributed through the cabin. When you connect, your device joins this local Wi-Fi network. A captive portal page appears in your browser where you either pay, log in with a frequent-flyer account or accept some terms of use. Once you're authenticated, the onboard network will start forwarding your traffic over the ATG or satellite link.

The airline or provider can shape or in many ways filter this traffic, and often does. For instance, providers may block high-bitrate video streaming or VoIP calls, force images to be compressed, and aggressively cache web pages to load faster over the constrained data link.

The in-flight bandwidth is almost always lower than home broadband connections and it's also shared among everyone on board. If a single satellite beam is serving multiple aircraft at once, they may all be competing for the same capacity. This is why performance varies so much between flights, routes, times of day, and providers. More sophisticated networks try to manage this challenge by dynamically allocating bandwidth and upgrading to higher-throughput satellites or satellite constellations. Even then the basic constraints of limited spectrum, distance, and shared use remain.

Don't signals interfere with operations?

When cabin crew ask you to switch your phone off for take-off and landing and to use 'airplane mode' the rest of the time, they're mainly trying to eliminate lots of uncontrolled radio transmitters inside the cabin. A phone whose mobile (that is, cellular) radio is on does several things that are awkward for both aviation and telecom regulators. It periodically 'shouts' loudly in radio terms, scans across multiple bands to find towers, and maintains a connection. In a cabin with a couple hundred phones, that creates a messy blast of radio noise at unpredictable times and frequencies – much like a noisy playground. In the

worst-case scenario, some of that energy could be very close to the frequencies aeroplane radios, sensors and navigation beacons use.

While contemporary aeroplanes are well-shielded and the actual risk is very low, regulators prefer a conservative approach that minimises known unknowns.

Further, a plane full of phones talking directly to towers on the ground still moves quickly and is visible to many towers at once. These quirks can confuse handover algorithms and overuse capacity in the cellular network. This is why telecommunications rules in many places explicitly forbid phones from connecting to terrestrial mobile networks at cruising altitude, and 'airplane mode' is a simple way to comply.

To its advantage, passenger Internet uses equipment that's part of the aircraft's certified systems. The Wi-Fi access points inside the cabin and the satellite or ATG radios that link the aeroplane to the outside world are all installed and tested together with the avionics. The engineers who design them also pick frequencies that are well separated from the bands that critical onboard systems use and design the antennae and cabling to minimise signal 'leaks'. They're also expected to prove (through testing) that none of these systems can fail in a way that also destabilises the aeroplane.

Taken together the in-flight Internet apparatus addresses the radio interference risks differently from how individual cellphones do, quelling regulators' anxieties while allowing you to stay online.

How are passengers able to access the Internet on aeroplanes?

यात्री हवाई जहाज़ों में इंटरनेट का उपयोग कैसे कर पाते हैं?

Passenger Internet on aeroplanes

विमानों में यात्री इंटरनेट

- Passenger Internet on aeroplanes used to be rare in the **2010s** but has become almost commonplace today.

विमानों में यात्री इंटरनेट **2010s** में दुर्लभ होता था लेकिन आज लगभग आम हो गया है।

- On most flights, the basic idea is that the whole aeroplane is treated like a flying **Wi-Fi router** that connects to the rest of the Internet through a long **backhaul link**.

अधिकांश उड़ानों में मूल विचार यह है कि पूरा विमान एक उड़ते हुए **Wi-Fi राउटर** की तरह माना जाता है, जो एक लंबे **बैकहॉल लिंक** के माध्यम से बाकी इंटरनेट से जुड़ता है।

- This means your phone or laptop never talks directly to the ground.

इसका मतलब है कि आपका फोन या लैपटॉप सीधे जमीन से बात नहीं करता।

- Instead it talks to a Wi-Fi access point inside the cabin, which then sends your data out of the aircraft via **radio links**.

इसके बजाय यह केबिन के अंदर स्थित **Wi-Fi एक्सेस पॉइंट** से जुड़ता है, जो फिर आपके डेटा को विमान से बाहर **रेडियो लिंक** के माध्यम से भेजता है।



How is the backhaul setup?

बैकहॉल सेटअप कैसे होता है?

- The backhaul link these days comes in two main forms: **air-to-ground (ATG)** and **via satellite**.
आजकल बैकहॉल लिंक दो मुख्य रूपों में आता है: **एयर-टू-ग्राउंड (ATG)** और **सैटेलाइट के माध्यम से**।
- In the ATG system, the aeroplane connects to special cellular-like towers on the ground.
ATG प्रणाली में, विमान जमीन पर स्थित विशेष सेलुलर-जैसे टावरों से जुड़ता है।
- These towers have antennae pointing up at the sky.
इन टावरों में एंटेना ऊपर आकाश की ओर इशारा करते हैं।
- The plane's antennae — often mounted on the underside — maintains a **radio link** with whichever tower is currently in range (**radio frequency range: 3–3,000,000,000 kHz**).
विमान के एंटेना — जो अक्सर नीचे की तरफ लगे होते हैं — वर्तमान में रेंज में मौजूद टावर से **रेडियो लिंक** बनाए रखते हैं (**रेडियो फ्रीक्वेंसी रेंज: 3–3,000,000,000 kHz**).
- As the plane flies, the ATG system hands off the connection from one tower to the next, similar to how your phone switches between cell towers if you're on a call in a moving vehicle.
जैसे-जैसे विमान उड़ता है, ATG सिस्टम एक टावर से दूसरे में कनेक्शन सौंपता है, बिल्कुल वैसे जैसे आपका फोन चलती गाड़ी में सेल टावर बदलता है।
- Obviously this arrangement works well over land, where there's dense tower coverage, but fails over **oceans, deserts, and polar areas**.
स्पष्ट है कि यह व्यवस्था जमीन पर घने टावर कवरेज में अच्छी तरह काम करती है, लेकिन **समुद्रों, रेगिस्तानों और ध्रुवीय क्षेत्रों** में विफल हो जाती है।
- This is where satellites help.
यहीं पर सैटेलाइट मदद करते हैं।
- Satellite systems are more flexible because they don't care whether an aeroplane is over land or water.
सैटेलाइट प्रणाली अधिक लचीली होती है क्योंकि उन्हें फर्क नहीं पड़ता कि विमान जमीन पर है या पानी पर।
- In this system, the aeroplane uses a **dish or phased-array antenna**, usually inside a hump-shaped structure on top of the fuselage, pointed towards the sky.
इस प्रणाली में, विमान एक **डिश या फेज्ड-एरे एंटेना** का उपयोग करता है, जो आमतौर पर फ्यूज़लेज के ऊपर गुंबद जैसी संरचना में लगा होता है और आकाश की ओर इशारा करता है।
- This antenna will transmit data to a satellite in orbit, which will relay the data to a ground station connected to the regular Internet.
यह एंटेना डेटा को कक्षा में स्थित सैटेलाइट तक भेजता है, जो उसे सामान्य इंटरनेट से जुड़े ग्राउंड स्टेशन तक पहुंचाता है।
- Historically, these satellites have been in **geostationary orbit (35,786 km)** which results in noticeable **latency**.
ऐतिहासिक रूप से ये सैटेलाइट **जियोस्टेशनरी ऑर्बिट (35,786 km)** में होते थे, जिससे उल्लेखनीय **लेटेंसी** पैदा होती थी।
- A signal round-trip time of several hundred milliseconds is common.
कई सौ मिलीसेकंड का सिग्नल राउंड-ट्रिप समय आम होता है।
- Newer systems use **low-earth orbit (LEO)** satellite constellations at **150–2,000 km**, reducing latency.
नई प्रणालियाँ **लो-अर्थ ऑर्बिट (LEO)** सैटेलाइट तकरीबन **150–2,000 km** पर उपयोग करती हैं, जिससे लेटेंसी कम हो जाती है।
- Sometimes they also allow for higher bandwidth if the aeroplane's antennae can track fast-moving satellites and hand off between them.
कभी-कभी वे उच्च बैंडविड्थ भी प्रदान करती हैं यदि विमान के एंटेना तेज़ी से चलते सैटेलाइट को ट्रैक कर सकें और उनके बीच हैंडऑफ कर सकें।



How are connections provided to users?

उपयोगकर्ताओं को कनेक्शन कैसे प्रदान किए जाते हैं?



- Inside the aeroplane, the connectivity network resembles that in a small office.
विमान के अंदर कनेक्टिविटी नेटवर्क एक छोटे कार्यालय जैसा दिखता है।
- There's a central server or router, a satellite or ATG modem, and several **Wi-Fi access points** distributed through the cabin.
यहाँ एक केंद्रीय सर्वर या राउटर, एक सैटेलाइट या ATG मॉडेम, और कई **Wi-Fi एक्सेस पॉइंट** होते हैं।
- When you connect, your device joins this local Wi-Fi network.
जब आप जुड़ते हैं, आपका डिवाइस इस स्थानीय Wi-Fi नेटवर्क में शामिल हो जाता है।
- A **captive portal page** appears in your browser where you either pay, log in, or accept terms of use.
आपके ब्राउज़र में एक **कैप्टिव पोर्टल पेज** दिखाई देता है जहाँ आप भुगतान करते हैं, लॉगिन करते हैं या शर्तें स्वीकार करते हैं।
- Once you're authenticated, the onboard network will start forwarding your traffic over the ATG or satellite link.
एक बार प्रमाणीकरण होने पर, ऑनबोर्ड नेटवर्क आपका ट्रैफिक ATG या सैटेलाइट लिंक पर भेजना शुरू कर देता है।
- The airline or provider can shape or filter this traffic.
एयरलाइन या प्रदाता इस ट्रैफिक को आकार दे सकता है या फ़िल्टर कर सकता है।
- For instance, providers may block **high-bitrate video streaming** or **VoIP calls**, compress images, and aggressively cache webpages.
उदाहरण के लिए, प्रदाता **हाई-बिटरेट वीडियो स्ट्रीमिंग** या **VoIP कॉल्स** को ब्लॉक कर सकते हैं, इमेज कंप्रेस कर सकते हैं और वेबपेज को आक्रामक रूप से कैश कर सकते हैं।
- The in-flight bandwidth is almost always lower than home broadband and also shared among everyone on board.
इन-फ्लाइट बैंडविड्थ लगभग हमेशा घरेलू ब्रॉडबैंड से कम होती है और बोर्ड पर सभी यात्रियों में साझा होती है।
- If a single satellite beam is serving multiple aircraft at once, they may compete for the same capacity.
यदि एक सैटेलाइट बीम एक साथ कई विमानों को सेवा दे रही है, तो वे समान क्षमता के लिए प्रतिस्पर्धा कर सकते हैं।
- This is why performance varies so much between flights, routes, times of day, and providers.
इसी कारण उड़ानों, मार्गों, दिन के समय और प्रदाताओं के बीच प्रदर्शन में बहुत अंतर होता है।
- More sophisticated networks manage this challenge by dynamically allocating bandwidth and upgrading to higher-throughput satellites.
अधिक उन्नत नेटवर्क डायनामिक रूप से बैंडविड्थ आवंटित कर और उच्च-थ्रूपुट सैटेलाइट का उपयोग कर इस चुनौती को संभालते हैं।
- Even then the basic constraints of **limited spectrum**, **distance**, and **shared use** remain.
फिर भी **सीमित स्पेक्ट्रम**, **दूरी**, और **साझा उपयोग** जैसी मूल सीमाएँ बनी रहती हैं।

Don't signals interfere with operations?

क्या सिग्नल संचालन में हस्तक्षेप नहीं करते?

- When cabin crew ask you to switch your phone off for take-off and landing and to use **'airplane mode'** the rest of the time, they're mainly trying to eliminate lots of uncontrolled radio transmitters inside the cabin.
जब केबिन कू आपसे टेक-ऑफ और लैंडिंग के लिए फोन बंद करने और बाकी समय **'एयरप्लेन मोड'** इस्तेमाल करने के लिए कहते हैं, तो वे मुख्य रूप से केबिन के अंदर कई अनियंत्रित रेडियो ट्रांसमीटरों को हटाने की कोशिश कर रहे होते हैं।
- A phone whose mobile (**cellular**) radio is on does several things that are awkward for both aviation and telecom regulators.
एक फोन जिसका **मोबाइल (सेल्युलर)** रेडियो चालू हो, कई ऐसे कार्य करता है जो विमानन और दूरसंचार नियामकों दोनों के लिए समस्यापूर्ण होते हैं।
- It periodically **'shouts' loudly** in radio terms, scans across multiple bands to find towers, and maintains a connection.
यह समय-समय पर रेडियो की भाषा में **'जोर से चिल्लाता'** है, कई बैंड स्कैन करता है ताकि टावर ढूँढ सके, और एक कनेक्शन बनाए रखता है।



- In a cabin with a couple hundred phones, that creates a messy blast of **radio noise** at unpredictable times and frequencies — much like a noisy playground.
कई सौ फोनों वाले केबिन में, यह अप्रत्याशित समय और आवृत्तियों पर **रेडियो शोर** का अव्यवस्थित विस्फोट पैदा करता है — बिल्कुल शोरगुल वाले मैदान की तरह।
- In the worst-case scenario, some of that energy could be very close to the frequencies aeroplane radios, sensors and **navigation beacons** use.
सबसे खराब स्थिति में, उस ऊर्जा का कुछ हिस्सा विमान के रेडियो, सेंसर और **नेविगेशन बीकन** द्वारा उपयोग की जाने वाली आवृत्तियों के बहुत करीब हो सकता है।
- While contemporary aeroplanes are well-shielded and the actual risk is very low, regulators prefer a conservative approach that minimises known unknowns.
हालांकि आधुनिक विमान अच्छी तरह शील्डेड होते हैं और वास्तविक जोखिम बहुत कम होता है, लेकिन नियामक उन **अज्ञात जोखिमों** को कम करने के लिए एक सतर्क दृष्टिकोण पसंद करते हैं।
- Further, a plane full of phones talking directly to towers on the ground still moves quickly and is visible to many towers at once.
इसके अलावा, जमीन पर स्थित टावरों से सीधे बात करते कई फोनों वाला विमान बहुत तेजी से चलता है और एक ही समय में कई टावरों को दिखाई देता है।
- These quirks can confuse **handover algorithms** and overuse capacity in the cellular network.
ये विशेषताएँ **हैंडओवर एल्गोरिदम** को भ्रमित कर सकती हैं और सेलुलर नेटवर्क की क्षमता का अत्यधिक उपयोग करा सकती हैं।
- This is why telecommunications rules in many places explicitly forbid phones from connecting to terrestrial mobile networks at **cruising altitude**, and 'airplane mode' is a simple way to comply.
इसी कारण कई जगह दूरसंचार नियम **कूज़िंग ऊँचाई** पर फोनों को स्थलीय मोबाइल नेटवर्क से जुड़ने से स्पष्ट रूप से रोकते हैं, और 'एयरप्लेन मोड' इसका पालन करने का सरल तरीका है।
- To its advantage, passenger Internet uses equipment that's part of the aircraft's **certified systems**.
अपने लाभ के लिए, यात्री इंटरनेट विमान की **प्रमाणित प्रणालियों** का हिस्सा होने वाले उपकरणों का उपयोग करता है।
- The Wi-Fi access points inside the cabin and the **satellite or ATG radios** that link the aeroplane to the outside world are all installed and tested together with the avionics.
केबिन के अंदर के **Wi-Fi एक्सेस पॉइंट** और विमान को बाहरी दुनिया से जोड़ने वाले **सैटेलाइट या ATG रेडियो** एवियोनिक्स के साथ स्थापित और परीक्षण किए जाते हैं।
- The engineers who design them also pick frequencies that are well separated from the bands that critical onboard systems use and design the antennae and cabling to minimise signal **'leaks'**.
जो इंजीनियर इन्हें डिजाइन करते हैं, वे ऐसी आवृत्तियाँ चुनते हैं जो महत्वपूर्ण ऑनबोर्ड सिस्टम द्वारा उपयोग किए जाने वाले बैंड से अच्छी तरह अलग हों, और एंटेना व केबलिंग को इस तरह डिजाइन करते हैं कि सिग्नल **'लीक'** न्यूनतम हों।
- They're also expected to prove (through testing) that none of these systems can fail in a way that also destabilises the aeroplane.
उनसे यह साबित करने की भी अपेक्षा की जाती है (परीक्षण के माध्यम से) कि इनमें से कोई भी प्रणाली ऐसे तरीके से विफल नहीं हो सकती जो विमान को अस्थिर कर दे।
- Taken together, the in-flight Internet apparatus addresses the **radio interference risks** differently from how individual cellphones do, quelling regulators' anxieties while allowing you to stay online.
कुल मिलाकर, इन-फ्लाइट इंटरनेट उपकरण **रेडियो इंटरफेरेंस जोखिमों** को व्यक्तिगत मोबाइल फोनों से अलग तरीके से संभालते हैं, जिससे नियामकों की चिंताएँ कम होती हैं और आप ऑनलाइन रह पाते हैं।



Grahaa gets nod for nano satellite launch

GS III: S&T

The Hindu Bureau
BENGALURU

Grahaa Space, a Bengaluru-based spacetech startup, obtained authorisation from Indian National Space Promotion and Authorisation Centre (IN-SPACE) to launch its maiden nano satellite mission called Solaras S2, as technology demonstration by the end of November.

The launch will happen from Alcântara Space Center (CEA) in Brazil through the Hanbit-Nano launch vehicle developed by Korea-based Innospace, according to the company.

“Solaras S2 mission will qualify our nano satellite bus and platform and allow us to assess the perfor-

The launch will happen from Alcântara Space Center (CEA) located in Brazil

mance. It is a focused technical step that confirms our readiness for the next phase,” said Ramesh Kumar V, founder and CEO, Grahaa Space. This progress has been possible with the support of TIIC incubation centre at IIST Trivandrum and IN-SPACE.

“The upcoming missions scheduled for early 2026 with Skyroot will qualify the communications module, gather geo spatial data from the optical payload and establish inter-satellite links.”

Ramesh Kumar V, founder and CEO, Grahaa Space.

“Solaras S2 मिशन हमारे नैनो सैटेलाइट बस और प्लेटफॉर्म को प्रमाणित करेगा और हमें उनके प्रदर्शन का मूल्यांकन करने में सक्षम बनाएगा। यह एक महत्वपूर्ण तकनीकी कदम है जो हमारे अगले चरण के लिए तैयार होने की पुष्टि करता है,” ग्राहा स्पेस के संस्थापक और सीईओ रमेश कुमार वी ने कहा।

- This progress has been possible with the support of TIIC incubation centre at IIST Trivandrum and IN-SPACE.

यह प्रगति IIST तिरुवनंतपुरम के TIIC इनक्यूबेशन सेंटर और IN-SPACE के समर्थन से संभव हुई है।

- “The upcoming missions scheduled for early 2026 with Skyroot will qualify the communications module, gather geo-spatial data from the optical payload and establish inter-satellite links.”

“Skyroot के साथ 2026 की शुरुआत में निर्धारित आगामी मिशन कम्युनिकेशन मॉड्यूल को प्रमाणित करेंगे, ऑप्टिकल पेलोड के माध्यम से भौगोलिक-स्थानिक डेटा एकत्र करेंगे और इंटर-सैटेलाइट लिंक स्थापित करेंगे।”

Grahaa gets nod for nano satellite launch ग्राहा को नैनो सैटेलाइट लॉन्च की मंजूरी मिली

- Grahaa Space, a Bengaluru-based spacetech startup, obtained authorisation from Indian National Space Promotion and Authorisation Centre (IN-SPACE) to launch its maiden nano satellite mission called Solaras S2, as technology demonstration by the end of November.

बेंगलुरु स्थित स्पेसटेक स्टार्टअप ग्राहा स्पेस को भारतीय राष्ट्रीय अंतरिक्ष प्रोत्साहन और अधिकृतीकरण केंद्र (IN-SPACE) से Solaras S2 नामक अपने प्रथम नैनो सैटेलाइट मिशन को नवंबर के अंत तक तकनीकी प्रदर्शन के रूप में लॉन्च करने की मंजूरी मिली।

- The launch will happen from Alcântara Space Center (CEA) in Brazil through the Hanbit-Nano launch vehicle developed by Korea-based Innospace, according to the company.

कंपनी के अनुसार लॉन्च ब्राज़ील के अलकांतारा स्पेस सेंटर (CEA) से कोरिया स्थित Innospace द्वारा विकसित Hanbit-Nano लॉन्च वाहन के माध्यम से किया जाएगा।

- “Solaras S2 mission will qualify our nano satellite bus and platform and allow us to assess the performance. It is a focused technical step that confirms our readiness for the next phase,” said

Environment

25/11/2025



Goa government does a U-turn on 'permanent' tiger presence in State

GS III: Environment

Jacob Koshy
NEW DELHI

The answer to whether tigers "reside" in Goa depends on who is asking the question. The Goa Government, earlier this year, argued before a Supreme Court-appointed committee that there was "...no permanent presence of tigers" in the State.

However, in a separate matter concerning a dispute involving Goa, Karnataka and Maharashtra over the sharing of water from the Mahadayi river in Goa, it stated the opposite.

"...The State of Goa states that there is evidence to show that tigers in Goa are not merely transient animals, but are a resident population, and the forests around Chorla, Mann and Kankumbi comprise a contiguous tiger landscape corridor, to the Bhimgad Wildlife Sanctuary in Karnataka to its south-east and the Anshi Dandeli Tiger Reserve to its south that has around 35 tigers." The latter appears in a 2018 report of the Mahadayi Water Disputes Tribunal. "Thus, were the flow of Mahadayi river to be impeded," Goa argued, "it would impact the prey base as well as tiger ecosystem".

The issue of tiger presence (or absence) in Goa has come to the fore following the Goa government challenging a July



The Goa government says only three tigers were found through 'camera trapping' during the NTCA survey of 2018. PTI

2023 order of the Bombay High Court that directed the State to declare the Mhadei sanctuary and other connected regions – as recommended by the National Tiger Conservation Authority (NTCA, the nodal Central body tasked with overseeing tiger conservation) – a 'tiger reserve' within three months.

The Goa government filed a special leave petition (SLP) in the Supreme Court challenging this order. Its core arguments in the SLP are that, as per the NTCA guidelines, an area of 800-1,000 sq. kms would have to be declared an inviolate space for a tiger reserve. The area already under protection in the State, in the form of parks and sanctuaries, added up to 745 sq. km. "Therefore, to declare an area larger than the already protected area an inviolate space would be an aberration."

Secondly, the area that would have to be declared a tiger reserve had a "huge population" of about 1,00,000 individuals spread across several villages. Given the paucity of alternative areas to settle them and the 'unwillingness' of this resident population, the move could translate to social unrest.

In terms of tiger presence, it argued that only three tigers were found through 'camera trapping' during the NTCA's tiger estimation survey of 2018. There was "no evidence" that these tigers were "residents" of the area; there were no cubs or young animals either.

"The protected area is only a corridor whereby the tigers transit from Maharashtra to Karnataka or vice versa, and the area of Mhadei is only a route, which is used by tigers to transit," the State argued in its petition. "Such 'transi-

tory presence' of tigers in Mhadei was due to very few deer (as prey), and thus, declaring Mhadei sanctuary as a reserve... would not serve any significant purpose," it said.

SC seeks report

The Supreme Court, this September, directed a Central Empowered Committee of the Union Environment Ministry to hear all the "stakeholders" in the matter and submit a report in "six weeks." The Committee has reportedly sought an extension to file this.

The case traces back to 2011, when the Centre and the NTCA made multiple requests to the State of Goa to notify Mhadei Wildlife Sanctuary (WLS) and certain other adjacent areas as a tiger reserve. But this did not happen.

In January 2021, four tigers were found poisoned following which the Goa Foundation, a non-profit, filed a petition for the region to be declared a tiger reserve. Doing so puts the onus on the State to improve protection measures for conservation of animals.

On September 8, 2025, after counsel for the Goa Foundation informed the top court that some proposals for resorts were being approved in the proposed tiger reserve, the court stayed all such activity till final order and judgment.

Goa government does a U-turn on 'permanent' tiger presence in State
गोवा सरकार ने राज्य में बाघों की 'स्थायी' उपस्थिति पर यू-टर्न लिया

• The answer to whether tigers "reside" in Goa depends on who is asking the question.

गोवा में बाघ "रहते" हैं या नहीं, इसका जवाब इस बात पर निर्भर करता है कि सवाल कौन पूछ रहा है।

• The Goa Government, earlier this year, argued before a **Supreme Court-appointed committee** that there was "...no permanent presence of tigers" in the State.

गोवा सरकार ने इस वर्ष की शुरुआत में सुप्रीम कोर्ट द्वारा नियुक्त समिति के सामने तर्क दिया था कि राज्य में "...बाघों की स्थायी उपस्थिति नहीं है।"

• However, in a separate matter involving a dispute between **Goa,**

Karnataka and Maharashtra over the **Mahadayi river**, it stated the opposite.

हालाँकि, गोवा, कर्नाटक और महाराष्ट्र के बीच महादायी नदी को लेकर विवाद के एक अलग मामले में उसने इसका उलटा कहा।

- "...The State of Goa states that there is evidence to show that tigers in Goa are not merely transient animals, but are a **resident population**, and the forests around **Chorla, Mann and Kankumbi** comprise a **contiguous tiger landscape corridor**..." (Mahadayi Water Disputes Tribunal, 2018).

"...गोवा राज्य बताता है कि ऐसे प्रमाण हैं जो दर्शाते हैं कि गोवा के बाघ केवल अस्थायी जानवर नहीं, बल्कि **स्थायी आबादी** हैं, और चोर्ला, मान और कंकुंबी के आसपास के जंगल एक **सतत बाघ परिदृश्य कॉरिडोर** बनाते हैं..." (महादायी जल विवाद ट्रिब्यूनल, 2018)।

- It added that this corridor connects to **Bhimgad Wildlife Sanctuary** (Karnataka) and **Anshi Dandeli Tiger Reserve**, home to about **35 tigers**.

इसमें यह भी कहा गया कि यह कॉरिडोर **भीमगढ़ वन्यजीव अभयारण्य** (कर्नाटक) और **अंशी-दांदेली टाइगर रिजर्व** से जुड़ता है, जहाँ लगभग **35 बाघ** हैं।



- “Thus, were the flow of Mahadayi river to be impeded, it would impact the prey base as well as the tiger ecosystem.”

“इस प्रकार, यदि महादायी नदी के प्रवाह में बाधा डाली गई तो यह शिकार आधार और बाघ पारिस्थितिकी तंत्र को प्रभावित करेगा।”

- The issue of tiger presence in Goa has resurfaced after the Goa government challenged a **July 2023 Bombay High Court order** directing the State to declare **Mhadei sanctuary** and surrounding regions a **tiger reserve** within three months.

गोवा में बाघों की उपस्थिति का मुद्दा फिर उभर आया है क्योंकि

गोवा सरकार ने **जुलाई 2023 के बॉम्बे हाई कोर्ट के आदेश** को चुनौती दी है, जिसमें राज्य को **म्हादेई अभयारण्य** और आसपास के क्षेत्रों को तीन महीने में **टाइगर रिजर्व** घोषित करने को कहा गया था।

- The Goa government filed an **SLP in the Supreme Court**, arguing that NTCA guidelines require **800-1,000 sq. km** of inviolate area for a tiger reserve.

गोवा सरकार ने सुप्रीम कोर्ट में **एसएलपी** दायर की, यह कहते हुए कि NTCA दिशानिर्देशों के अनुसार टाइगर रिजर्व के लिए **800-1,000 वर्ग किमी** का अभेद्य क्षेत्र आवश्यक है।

- The State said its protected areas add up to **745 sq. km**, and expanding beyond that would be an “aberration.”

राज्य ने कहा कि उसके संरक्षित क्षेत्र **745 वर्ग किमी** हैं, और उससे अधिक क्षेत्र को अभेद्य घोषित करना “विचलन” होगा।

- It further added that the proposed area has a “**huge population**” of about **1,00,000 people** across several villages, and relocation would cause “**social unrest**.”

उसने यह भी कहा कि प्रस्तावित क्षेत्र में लगभग **1,00,000 लोगों** की “**बड़ी आबादी**” है, और पुनर्वास से “**सामाजिक अशांति**” हो सकती है।

- Regarding tiger presence, it said only **three tigers** were recorded via **camera trapping** in the **2018 NTCA survey**, with no evidence of residents or cubs.

बाघों की उपस्थिति के बारे में, उसने कहा कि **2018 NTCA सर्वेक्षण** में **कैमरा ट्रैपिंग** से केवल **तीन बाघ** मिले, और स्थायी आबादी या शावकों का कोई प्रमाण नहीं था।

- “The protected area is only a **corridor** whereby the tigers transit from Maharashtra to Karnataka or vice versa...”

“संरक्षित क्षेत्र केवल एक **कॉरिडोर** है जहाँ से बाघ महाराष्ट्र से कर्नाटक या इसके विपरीत जाते हैं...”

- The State claimed that “**transitory presence**” of tigers was due to low prey density and that declaring the area a tiger reserve would not serve a “**significant purpose**.”

राज्य ने दावा किया कि बाघों की “**अस्थायी उपस्थिति**” शिकार की कमी के कारण है और क्षेत्र को टाइगर रिजर्व घोषित करने से कोई “महत्वपूर्ण उद्देश्य” पूरा नहीं होगा।



Supreme Court seeks report

सुप्रीम कोर्ट ने रिपोर्ट मांगी

- In September, the Supreme Court directed the **Central Empowered Committee** to hear all stakeholders and submit a report in **six weeks**.

सितंबर में सुप्रीम कोर्ट ने **केंद्रीय सशक्त समिति** को सभी पक्षों को सुनकर **छह सप्ताह** में रिपोर्ट देने का निर्देश दिया।

- The roots of the case go back to **2011**, when NTCA had repeatedly asked Goa to notify Mhadei WLS as a tiger reserve, but the State did not act.

यह मामला **2011** तक जाता है, जब NTCA ने बार-बार गोवा को म्हादेई WLS को टाइगर रिजर्व घोषित करने को कहा, लेकिन राज्य ने कार्रवाई नहीं की।

- In **January 2021**, four tigers were found **poisoned**, leading the **Goa Foundation** to file a petition seeking tiger reserve declaration.

जनवरी 2021 में चार बाघ **जहरीले** पाए गए, जिसके बाद **गोवा फाउंडेशन** ने टाइगर रिजर्व घोषित करने की मांग वाली याचिका दायर की।

- On **September 8, 2025**, after reports of resort proposals in the proposed reserve area, the Supreme Court **stayed all such activity** until final judgment.



8 सितंबर 2025 को, प्रस्तावित रिजर्व क्षेत्र में रिसॉर्ट निर्माण के प्रस्तावों की जानकारी मिलने पर सुप्रीम कोर्ट ने सभी ऐसी गतिविधियों पर रोक लगा दी, जब तक अंतिम आदेश नहीं आता।

Where does road dust settle in India's efforts to clean its air?

Dust pollution is mainly caused by unscientific practices during the development of roads and maintenance: the collected dust is typically discarded in landfills or on the roadsides, from where the wind easily carries it back into the cities, rendering the entire process of sweeping ineffective

ISSUE: Environment: Pollution

Charu Tyagi
Swagata Dey

Road dust mainly comprises PM₁₀ and coarse particles and forms a large share of the air we breathe. With the National Clean Air Programme (NCAP) aiming for a 40% reduction in PM₁₀ by 2025-2026, reducing road dust is an urgent priority.

This is reinforced by source apportionment studies across 17 non-attainment cities that have found road dust to be a major contributor to PM₁₀ (20-52%) as well as PM_{2.5} (8-25%) particles. IIT-Delhi researchers have also recorded that streets in 32 cities across Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, and Telangana vary widely vis-à-vis their silt loads, from 0.2 g/m² to 111.2 g/m²; Delhi averages 14.47 g/m².

Overall, cities in North India have heavier silt loads and are thus dustier than their southern counterparts.

In response, governments have already invested heavily in fighting dust. Per a 2024 report by the Centre for Science and Environment, ₹19,711 crore was allocated to 131 cities between 2019 and 2025 under the NCAP to improve air quality. By November 2023, nearly 64% of the total fund had been spent on road dust control, far more than what was spent on tackling biomass burning, vehicular pollution, and capacity-building efforts.

While this suggests that there's a prioritisation, it's essential to assess effectiveness on the ground.

Policy landscape

Efforts to control road dust have been underway for several years. In January 2018, the Union Environment Ministry issued a notification to mitigate dust at construction sites, mandating paving and blacktopping of roads leading up to such sites. In 2021, the Commission for Air Quality Management in the National Capital Region and Adjoining Areas (CAQM) recommended the establishment of 'Dust Control and Management Cells'. Following statutory directions from the CAQM, 68 Cells were set up to undertake a comprehensive set of actions, including identifying dust hotspots, paving and repairing roads and roadsides, greening central verges and roadsides, and deploying mechanised road-sweeping machines and anti-smog guns. The CAQM periodically reviews these activities. However, dust from roads and open areas remains a major driver of poor air quality in Delhi-NCR.

To strengthen its approach, the CAQM initiated a study called 'Addressing vehicular traffic-induced road dust resuspension for air quality action plans' in 2025. In the pilot phase, 24% of 82 km of assessed road length was found to be in poor condition, 42% moderate, and 34% good. The CAQM also set up a committee to develop a 'Standard Framework for Controlling Dust Pollution from Roads and Open Areas'.

Both initiatives recommended multiple activities, including paving and greening, for the NCR states as well as additional steps such as digital mapping of all roads in Delhi-NCR and conducting comprehensive road condition surveys.

As is evident, these efforts were focused on Delhi-NCR whereas similar measures and institutional mechanisms are needed across India. Indeed, the Environment (Protection) Act 1986 and



Efforts to control road dust have been underway in India for several years. Representative photo. SUBHASHISH DUTTA/UNSPLOSH

the Air (Prevention and Control of Pollution) Act 1981 make broad references to road dust management. The Construction and Demolition Waste Management Rules 2025 don't outline specific regulations addressing road dust control at the national scale, however. There are also no standard operating procedures to scientifically dispose of the dust collected by manual and mechanised sweeping to prevent resuspension.

Jurisdictional puzzle

While the NCAP, the CAQM guidelines, and city action plans prioritise control options such as paving roads and roadsides, sprinkling water, and so on, the outcomes remain uneven.

Even with 64% of the total NCAP fund spent on road repair and maintenance, 29 cities have reported an increase in PM₁₀ concentrations. Of the 68 cities where the local PM₁₀ concentration dropped, 61 were above the National Ambient Air Quality Standards, pointing to the limited effectiveness of extant interventions.

One major challenge is fragmented jurisdiction.

Under the NCAP, municipal corporations and State Pollution Control Boards are required to curb road dust. In practice, however, the responsibility is split across multiple agencies. In Delhi, 12 agencies – including the Municipal Corporation, the Delhi Development Authority, the Central Public Works Department, and the National Highways Authority of India – maintain roads. Similarly, 18 agencies are involved in Uttar Pradesh, 22 in Haryana, and 16 in Rajasthan. Without clearly demarcated roles, funds and accountability become

Even with 64% of the NCAP fund spent on maintenance, 29 cities reported an increase in PM₁₀ concentrations. Of the 68 cities where local PM₁₀ concentration dropped, 61 were above the National Ambient Air Quality Standards

diffused. Operational constraints add to the problem. Of Delhi's total road length of 19,000 km, only 8,000 km has been identified for mechanised sweeping. Around 200 mechanised road-sweeping machines (each operating at 40 km/hr) are required to clean this stretch every day. Yet the number of such machines in Delhi is only 85. This gap is much wider in other cities, underscoring the need to properly estimate road length and for machine mapping. Road dust management guidelines should also be established to define the appropriate type of cleaning and maintenance machinery based on road width, surface type, traffic conditions, debris characteristics, water availability, and seasonal variations.

Finally, to ensure agencies coordinate better, a GIS-based platform should be created to allow them to monitor and resolve complaints in real-time, thus improving accountability. Such a system can be integrated with existing applications, such as the Green Delhi App and Swachhata App, to improve coordination and response.

Practical measures

Dust pollution is mainly caused by unscientific practices during road

development and maintenance. The collected dust is typically discarded in landfills or on roadsides, wherefrom the wind easily carries it back into cities, rendering the entire sweeping process ineffective.

Dust suppressant chemicals such as calcium chloride, magnesium chloride, and natural polymer-based agents (e.g. lignosulphate and bitumen-based emulsions) are widely available. However, their effectiveness and impact on soil and road health aren't well documented. We need scientifically informed mitigation strategies, including guidelines for using dust suppressants and scientific disposal mechanisms for collection.

Addressing road and open-area dust across India will require a holistic and time-bound approach, embedded within a long-term, sustainable urban planning framework.

A comprehensive, science-based regulatory mechanism for cleaner road construction and maintenance, considering open roadsides and air quality as critical components of infrastructure development plans, is essential.

Thoughtfully designed and consistently implemented dust control strategies can significantly enhance air quality, protect public health, and help build more resilient and liveable cities.

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Where does road dust settle in India's efforts to clean its air?

भारत के वायु प्रदूषण को नियंत्रित करने के प्रयासों में सड़क धूल कहाँ स्थान पाती है?

- Dust pollution is mainly caused by **unscientific practices** during the development of roads and maintenance; the collected dust is typically discarded in **landfills** or on the roadsides, from where the **wind** easily carries it back into the cities, rendering the entire process of sweeping ineffective
धूल प्रदूषण मुख्य रूप से सड़कों के निर्माण और रखरखाव के दौरान **अवैज्ञानिक प्रथाओं** के कारण होता है; एकत्रित धूल आमतौर पर **लैंडफिल** या सड़कों के किनारे फेंक दी जाती है, जहाँ से **हवा** इसे आसानी से शहरों में वापस ले आती है, जिससे सफाई की पूरी प्रक्रिया **अप्रभावी** हो जाती है
- Road dust mainly comprises **PM10 and coarse particles** and forms a large share of the air we breathe.
रोड डस्ट मुख्यतः **PM10** और **coarse particles** से बनी होती है और हमारी साँस में आने वाली हवा का बड़ा हिस्सा बनाती है।
- With the **National Clean Air Programme (NCAP)** aiming for a **40% reduction in PM10 by 2025-2026**, reducing road dust is an urgent priority.
नेशनल क्लीन एयर प्रोग्राम (NCAP) का लक्ष्य **2025-2026** तक **PM10 में 40% की कमी** लाना है, इसलिए रोड डस्ट को कम करना एक **तत्काल प्राथमिकता** है।
- This is reinforced by source apportionment studies across **17 non-attainment cities** that have found road dust to be a major contributor to **PM10 (20-52%)** as well as **PM2.5 (8-25%) particles**.
यह बात **17 नॉन-अटेनमेंट शहरों** में की गई **सोर्स अपॉर्शनमेंट स्टडीज़** से भी मजबूत होती है, जिनमें रोड डस्ट को **PM10 (20-52%)** और **PM2.5 (8-25%)** का प्रमुख स्रोत पाया गया है।
- IIT-Delhi researchers** have also recorded that streets in **32 cities across Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, and Telangana** vary widely vis-à-vis their silt loads, from **0.2 g/m² to 111.2 g/m²**; Delhi averages **14.47 g/m²**.
IIT-Delhi के शोधकर्ताओं ने पाया कि **32 शहरों** में **सिल्ट लोड 0.2 g/m² से 111.2 g/m² तक** है; **दिल्ली का औसत 14.47 g/m²** है।
- Overall, cities in North India have heavier silt loads and are thus dustier than their southern counterparts.
कुल मिलाकर, **उत्तर भारत** के शहरों में **सिल्ट लोड अधिक** है और वे **दक्षिण भारत** की तुलना में अधिक धूलभरे हैं।
- In response, governments have already invested heavily in fighting dust. Per a **2024 report by the Centre for Science and Environment**, **₹19,711 crore** was allocated to **131 cities between 2019 and 2025** under the NCAP to improve air quality.
सरकारों ने धूल से निपटने में भारी निवेश किया है। **2024 की सेंटर फॉर साइंस एंड एनवायरनमेंट रिपोर्ट** के अनुसार, **2019-2025** के बीच **₹19,711 करोड़ 131 शहरों** को NCAP के तहत दिए गए।
- By **November 2023**, nearly **64%** of the total fund had been spent on road dust control, far more than what was spent on tackling biomass burning, vehicular pollution, and capacity-building efforts.
नवंबर 2023 तक कुल फंड का **लगभग 64%** रोड डस्ट नियंत्रण पर खर्च किया जा चुका था, जो **बायोमास बर्निंग, व्हीकल प्रदूषण, और कैपेसिटी बिल्डिंग** से कहीं अधिक था।
- While this suggests that there's a prioritisation, it's essential to assess effectiveness on the ground.
यह प्राथमिकता दिखाता है, लेकिन **ज़रूरी है कि इसकी ग्राउंड लवल प्रभावशीलता जाँची जाए।**

Policy landscape

नीति परिदृश्य

- Efforts to control road dust have been underway for several years.
रोड डस्ट नियंत्रण के प्रयास कई वर्षों से जारी हैं।
- In January 2018, the Union Environment Ministry issued a notification to mitigate dust at construction sites, mandating paving and blacktopping of roads leading up to such sites.



जनवरी 2018 में केंद्रीय पर्यावरण मंत्रालय ने निर्माण स्थलों पर धूल कम करने हेतु नोटिफिकेशन जारी किया, जिसमें इन तक जाने वाली सड़कों के पेविंग और ब्लैकटॉपिंग को अनिवार्य किया गया।

- In 2021, the Commission for Air Quality Management in the National Capital Region and Adjoining Areas (CAQM) recommended the establishment of 'Dust Control and Management Cells'.
2021 में CAQM ने डस्ट कंट्रोल एंड मैनेजमेंट सेल्स स्थापित करने की सिफारिश की।
- Following statutory directions from the CAQM, 68 Cells were set up to undertake a comprehensive set of actions, including identifying dust hotspots, paving and repairing roads and roadsides, greening central verges and roadsides, and deploying mechanised road-sweeping machines and anti-smog guns.
CAQM के नियामक निर्देशों के बाद 68 सेल्स बनाए गए जो धूल हॉटस्पॉट पहचान, सड़कों की मरम्मत-पेविंग, ग्रीनिंग, मैकेनाइज्ड स्वीपिंग मशीनें, और एंटी-स्मॉग गन्स जैसी गतिविधियाँ करते हैं।
- The CAQM periodically reviews these activities.
CAQM इन गतिविधियों की समय-समय पर समीक्षा करता है।
- However, dust from roads and open areas remains a major driver of poor air quality in Delhi-NCR.
लेकिन दिल्ली-NCR में सड़कों और खुले क्षेत्रों की धूल अभी भी प्रमुख प्रदूषण स्रोत है।
- To strengthen its approach, the CAQM initiated a study called 'Addressing vehicular traffic-induced road dust resuspension for air quality action plans' in 2025.
दृष्टिकोण को मजबूत करने के लिए 2025 में CAQM ने वाहन-जनित रोड डस्ट रीसस्पेंशन पर अध्ययन शुरू किया।
- In the pilot phase, 24% of 82 km of assessed road length was found to be in poor condition, 42% moderate, and 34% good.
पायलट चरण में 82 किमी सड़क में से 24% खराब, 42% मध्यम, और 34% अच्छी पाई गई।
- The CAQM also set up a committee to develop a 'Standard Framework for Controlling Dust Pollution from Roads and Open Areas'.
CAQM ने सड़कों और खुले क्षेत्रों से धूल नियंत्रण हेतु स्टैंडर्ड फ्रेमवर्क बनाने को समिति गठित की।
- Both initiatives recommended multiple activities, including paving and greening, for the NCR states as well as additional steps such as digital mapping of all roads in Delhi-NCR and conducting comprehensive road condition surveys.
दोनों पहलों ने पेविंग, ग्रीनिंग, और डिजिटल मैपिंग, रोड कंडीशन सर्वे जैसी अतिरिक्त गतिविधियों की सिफारिश की।
- As is evident, these efforts were focused on Delhi-NCR whereas similar measures and institutional mechanisms are needed across India.
जैसा स्पष्ट है, ये प्रयास मुख्यतः दिल्ली-NCR पर केंद्रित थे, जबकि ऐसे उपाय पूरे भारत में आवश्यक हैं।
- Indeed, the Environment (Protection) Act 1986 and the Air (Prevention and Control of Pollution) Act 1981 make broad references to road dust management.
Environment (Protection) Act 1986 और Air (Prevention and Control of Pollution) Act 1981 रोड डस्ट प्रबंधन का सामान्य उल्लेख करते हैं।
- The Construction and Demolition Waste Management Rules 2025 don't outline specific regulations addressing road dust control at the national scale, however.
Construction and Demolition Waste Management Rules 2025 राष्ट्रीय स्तर पर रोड डस्ट नियंत्रण हेतु विशिष्ट प्रावधान नहीं देते।
- There are also no standard operating procedures to scientifically dispose of the dust collected by manual and mechanised sweeping to prevent resuspension.
मैनुअल और मैकेनाइज्ड स्वीपिंग से एकत्र धूल के वैज्ञानिक निपटान के लिए कोई SOP मौजूद नहीं है, जिससे रीसस्पेंशन रोका जा सके।

Jurisdictional puzzle अधिकार क्षेत्र की पहली

- While the NCAP, the CAQM guidelines, and city action plans prioritise control options such as paving roads and roadsides, sprinkling water, and so on, the outcomes remain uneven.
जबकि NCAP, CAQM guidelines, और शहरों की एक्शन प्लान paving roads, roadsides, sprinkling water जैसे नियंत्रण विकल्पों को प्राथमिकता देते हैं, परिणाम अभी भी असमान हैं।



- **Even with 64% of the total NCAP fund spent on road repair and maintenance, 29 cities have reported an increase in PM10 concentrations.**
कुल NCAP फंड का 64% सड़क मरम्मत और मेटेनेंस पर खर्च होने के बावजूद, 29 शहरों में PM10 में वृद्धि दर्ज की गई है।
- **Of the 68 cities where the local PM10 concentration dropped, 61 were above the National Ambient Air Quality Standards, pointing to the limited effectiveness of extant interventions.**
68 शहरों में जहाँ PM10 कम हुआ, उनमें से 61 शहर अभी भी National Ambient Air Quality Standards से ऊपर थे, जिससे हस्तक्षेपों की सीमित प्रभावशीलता दिखती है।
- **One major challenge is fragmented jurisdiction.**
एक बड़ा चुनौती fragmented jurisdiction है।
- **Under the NCAP, municipal corporations and State Pollution Control Boards are required to curb road dust.**
NCAP के तहत नगर निगमों और State Pollution Control Boards को रोड डस्ट कम करने की ज़िम्मेदारी है।
- **In practice, however, the responsibility is split across multiple agencies.**
लेकिन व्यवहार में यह ज़िम्मेदारी कई एजेंसियों में बंटी हुई है।
- **In Delhi, 12 agencies — including the Municipal Corporation, the Delhi Development Authority, the Central Public Works Department, and the National Highways Authority of India — maintain roads.**
दिल्ली में 12 एजेंसियाँ — जैसे Municipal Corporation, DDA, CPWD, और NHAI — सड़कें संभालती हैं।
- **Similarly, 18 agencies are involved in Uttar Pradesh, 22 in Haryana, and 16 in Rajasthan.**
इसी तरह उत्तर प्रदेश में 18, हरियाणा में 22, और राजस्थान में 16 एजेंसियाँ शामिल हैं।
- **Without clearly demarcated roles, funds and accountability become diffused.**
भूमिकाओं के स्पष्ट निर्धारण के बिना फंड और accountability बिखर जाती है।
- **Operational constraints add to the problem.**
Operational constraints समस्या को और बढ़ाते हैं।
- **Of Delhi's total road length of 19,000 km, only 8,000 km has been identified for mechanised sweeping.**
दिल्ली की कुल 19,000 km सड़क लंबाई में से केवल 8,000 km को mechanised sweeping के लिए पहचाना गया है।
- **Around 200 mechanised road-sweeping machines (each operating at 40 km/hr) are required to clean this stretch every day.**
इस हिस्से को रोज़ साफ़ करने हेतु लगभग 200 mechanised sweeping machines (हर एक 40 km/hr) की आवश्यकता है।
- **Yet the number of such machines in Delhi is only 85.**
लेकिन दिल्ली में ऐसी मशीनें केवल 85 ही हैं।
- **This gap is much wider in other cities, underscoring the need to properly estimate road length and for machine mapping.**
यह अंतर अन्य शहरों में और भी अधिक है, जिससे road length estimation और machine mapping की आवश्यकता स्पष्ट होती है।
- **Road dust management guidelines should also be established to define the appropriate type of cleaning and maintenance machinery based on road width, surface type, traffic conditions, debris characteristics, water availability, and seasonal variations.**
रोड डस्ट प्रबंधन हेतु ऐसे guidelines होने चाहिए जो सड़क की चौड़ाई, सतह, ट्रैफिक, debris, पानी की उपलब्धता और मौसमी बदलाव के आधार पर सही मशीनरी तय करें।
- **Finally, to ensure agencies coordinate better, a GIS-based platform should be created to allow them to monitor and resolve complaints in real-time, thus improving accountability.**
एजेंसियों के बेहतर समन्वय के लिए एक GIS-based platform बनाना चाहिए ताकि वे शिकायतों की real-time monitoring और समाधान कर सकें, जिससे accountability बढ़ेगी।



- Such a system can be integrated with existing applications, such as the Green Delhi App and Swachhata App, to improve coordination and response.
ऐसी प्रणाली को Green Delhi App और Swachhata App जैसे मौजूदा ऐप्स से जोड़ा जा सकता है ताकि समन्वय और प्रतिक्रिया बेहतर हो।

Practical measures

व्यावहारिक उपाय

- Dust pollution is mainly caused by unscientific practices during road development and maintenance.
धूल प्रदूषण मुख्यतः सड़क विकास और मेंटेनेंस के दौरान unscientific practices के कारण होता है।
- The collected dust is typically discarded in landfills or on roadsides, wherefrom the wind easily carries it back into cities, rendering the entire sweeping process ineffective.
इकट्ठी धूल को अक्सर landfills या roadsides पर फेंक दिया जाता है, जहाँ से हवा उसे फिर शहरों में ले आती है, जिससे पूरा सफाई प्रक्रिया ineffective हो जाती है।
- Dust suppressant chemicals such as calcium chloride, magnesium chloride, and natural polymer-based agents (e.g. lignosulphate and bitumen-based emulsions) are widely available.
Dust suppressants जैसे calcium chloride, magnesium chloride, और natural polymer-based agents (जैसे lignosulphate, bitumen emulsions) आसानी से उपलब्ध हैं।
- However, their effectiveness and impact on soil and road health aren't well documented.
लेकिन इनकी प्रभावशीलता और soil/road health पर प्रभाव अच्छी तरह दर्ज नहीं हैं।
- We need scientifically informed mitigation strategies, including guidelines for using dust suppressants and scientific disposal mechanisms for collection.
हमें scientifically informed mitigation strategies चाहिए, जिनमें dust suppressants के उपयोग और वैज्ञानिक dust disposal के दिशा-निर्देश हों।
- Addressing road and open-area dust across India will require a holistic and time-bound approach, embedded within a long-term, sustainable urban planning framework.
भारत में सड़क और खुले क्षेत्रों की धूल से निपटने हेतु holistic, time-bound, और sustainable urban planning आधारित दृष्टिकोण चाहिए।
- A comprehensive, science-based regulatory mechanism for cleaner road construction and maintenance, considering open roadsides and air quality as critical components of infrastructure development plans, is essential.
स्वच्छ सड़क निर्माण और मेंटेनेंस हेतु science-based regulatory mechanism आवश्यक है जो open roadsides और air quality को इन्फ्रास्ट्रक्चर योजना के मुख्य तत्व माने।
- Thoughtfully designed and consistently implemented dust control strategies can significantly enhance air quality, protect public health, and help build more resilient and liveable cities.
सुसंगत और thoughtfully designed dust control strategies वायु गुणवत्ता सुधार सकती हैं, public health की रक्षा कर सकती हैं और शहरों को अधिक resilient एवं रहने योग्य बना सकती हैं।



Moss spores survive space exposure, testing life's bounds

GS III: Environment
Vasudevan Mukunth

How far can plant life be pushed in harsh environments? Climate change as much as humans' plans for colonies on the moon or Mars makes this question urgent. Scientists already know that some microbes and crop seeds can tolerate heavy doses of radiation, deep cold, and vacuum.

Mosses and other bryophytes were among the first plants to colonise land and have survived repeated shifts in the earth's climate, yet their limits in true space conditions were not well known. Previous space experiments mostly used vascular plants, which have specialised tissues to transport water and minerals through their bodies. Research on mosses stopped at simulations in labs.

In a study published on November 20 in *iScience*, researchers from Japan chose the model moss *Physcomitrium patens* because its life cycle and stress responses have been well studied in the lab. They examined which moss tissues could withstand extreme stress, and whether any of them could stay alive in open space outside the International Space Station (ISS).

The team first compared three moss tissues – young filaments (protonemata), stress-induced brood cells, and spores inside their capsule – in simulated conditions, including intense ultraviolet (UV) light, freezing, high heat, vacuum, and vacuum plus short-wave UV. Then they sent the most resilient stage, spores encased in their sporangium, to a platform outside the ISS for nine months and measured how many spores still

The study strengthened the idea that bryophytes could help green extraterrestrial bases and support life-support systems while giving astrobiologists a clearer view of how robust plant life could be beyond the earth

germinated when they returned.

In the ground tests, protonemata died quickly under strong UV, long freezing at minus 80 °C, and when heated to 55 °C. Brood cells performed better but still failed under the strongest treatments. Spores protected by the sporangium were far tougher: many survived UV doses about 1,000x higher than brood cells, 30 days of deep freezing, and 30 days at 55° C, with only partial loss of germination. They also tolerated nearly a month in high vacuum and strong vacuum-UV with almost no drop in viability. In space, spores from all dark and UV-shielded groups germinated at about 95%, showing that vacuum, temperature swings, and microgravity had little effect. Even in the fully exposed group, which received space UV, about 86% of spores still germinated.

The results suggested while the *P. patens* spores themselves were intrinsically stress-resistant, the sporangium added a protective shell against radiation, temperature extremes, and vacuum – echoing the way seed coats protect embryos in higher plants, and may reflect early evolutionary solutions that helped the first land plants cope with dry, exposed conditions.

By comparing UV tolerance across many organisms, the authors also showed that moss spores rival or exceed famous radiation-resistant microbes and some crop seeds, especially in their ability to handle very-short-wavelength UV. At the same time, the study noted the spores were less impressive at ultra-low temperatures than some tree seeds, that pigment damage could matter over longer missions and estimated that spores might survive 15 years in space based on limited data and needs testing.

Even so, the authors added, their work strengthened the idea that bryophytes could help “green” future extraterrestrial bases and support closed life-support systems while giving astrobiologists a clearer view of how robust plant life could be beyond the earth.

सीमाएँ अच्छी तरह ज्ञात नहीं थीं।

- Previous space experiments mostly used **vascular plants**, which have specialised tissues to transport water and minerals through their bodies. Research on mosses stopped at **simulations in labs**.
पूर्व अंतरिक्ष प्रयोगों में अधिकांशतः **vascular plants** का उपयोग हुआ, जिनमें पानी और खनिजों को ले जाने वाले विशेष ऊतक होते हैं। काई पर शोध **प्रयोगशाला सिमुलेशन** तक ही सीमित था।
- In a study published on **November 20** in *iScience*, researchers from Japan chose the model moss **Physcomitrium patens** because its life cycle and stress responses have been well studied in the lab.

20 November को *iScience* में प्रकाशित एक अध्ययन में, जापान के शोधकर्ताओं ने मॉडल काई

Moss spores survive space exposure, testing life's bounds

मॉस स्पॉर्स अंतरिक्ष के संपर्क में जीवित रहते हैं, जीवन की सीमाओं की परीक्षा करते हुए

Plant Life in Harsh Environments

कठोर पर्यावरणों में पौधों का जीवन

- How far can plant life be pushed in harsh environments? Climate change as much as humans' plans for colonies on the moon or Mars makes this question urgent. Scientists already know that some **microbes** and **crop seeds** can tolerate heavy doses of **radiation**, deep cold, and vacuum.

कठोर पर्यावरणों में पौधों के जीवन को कितना आगे बढ़ाया जा सकता है? **जलवायु परिवर्तन** और मनुष्यों की चंद्रमा या **Mars** पर कॉलोनी की योजनाएँ इस प्रश्न को अत्यंत महत्वपूर्ण बनाती हैं। वैज्ञानिक पहले से जानते हैं कि कुछ **सूक्ष्मजीव (microbes)** और **फसल के बीज** उच्च **radiation**, अत्यधिक ठंड और **vacuum** सहन कर सकते हैं।

- Mosses and other bryophytes were among the **first plants** to colonise land and have survived repeated shifts in the earth's climate, yet their limits in true space conditions were not well known.

काई (mosses) और अन्य **bryophytes** भूमि को उपनिवेश बनाने वाले **पहले पौधों** में शामिल थे और उन्होंने पृथ्वी की जलवायु में बार-बार हुए परिवर्तनों को सहन किया, फिर भी वास्तविक अंतरिक्ष परिस्थितियों में उनकी



Physcomitrium patens को चुना क्योंकि इसकी जीवन-चक्र और तनाव प्रतिक्रिया का प्रयोगशाला में विस्तृत अध्ययन हो चुका था।

- They examined which moss tissues could withstand extreme stress, and whether any of them could stay alive in **open space outside the ISS**.
उन्होंने जाँच की कि कार्ई के कौन-से ऊतक अत्यधिक तनाव सहन कर सकते हैं और क्या उनमें से कोई **ISS के बाहर खुले अंतरिक्ष** में जीवित रह सकता है।
- The team first compared three moss tissues — young filaments (**protonemata**), stress-induced **brood cells**, and **spores** inside their capsule — in simulated conditions, including intense **UV light**, freezing, high heat, **vacuum**, and vacuum plus short-wave UV.
टीम ने सिमुलेटेड परिस्थितियों में तीन ऊतकों की तुलना की— युवा फिलामेंट (**protonemata**), तनाव-उत्पन्न **brood cells**, और कैप्सूल के भीतर **spores** — जिनमें तीव्र **UV light**, फ्रीज़िंग, उच्च तापमान, **vacuum**, और vacuum + short-wave UV शामिल थे।
- Then they sent the most resilient stage, **spores encased in their sporangium**, to a platform outside the **ISS** for **nine months** and measured how many spores still germinated.
फिर उन्होंने सबसे अधिक सहनशील अवस्था **sporangium में बंद spores** को **ISS** के बाहर स्थित प्लेटफॉर्म पर **नौ महीने** के लिए भेजा और वापसी पर उनकी अंकुरण क्षमता जाँची।
- In ground tests, **protonemata** died quickly under strong UV, long freezing at **-80°C**, and at **55°C** heat.
भूमि परीक्षणों में, **protonemata** तीव्र UV, लंबे समय तक **-80°C** पर फ्रीज़िंग और **55°C** तापमान में जल्दी मर गए।
- Brood cells performed better but still failed under the strongest treatments.
Brood cells ने बेहतर प्रदर्शन किया, लेकिन सबसे कठोर परिस्थितियों में वे भी विफल रहे।
- Spores protected by the **sporangium** were far tougher: many survived UV doses about **1000× higher** than brood cells, **30 days** of deep freezing, and **30 days** at **55°C**, with only partial germination loss.
sporangium द्वारा संरक्षित spores बहुत अधिक मजबूत थे: कई spores **1000× अधिक UV**, **30 दिन** की गहरी फ्रीज़िंग और **30 दिन 55°C** तापमान में जीवित रहे, केवल आंशिक अंकुरण हानि के साथ।
- They also tolerated nearly a **month** in high vacuum and vacuum-UV with almost no drop in viability.
उन्होंने उच्च vacuum और vacuum-UV में लगभग **एक महीने** तक बिना किसी महत्वपूर्ण हानि के जीवित रहना सहन किया।
- In space, spores from all dark and UV-shielded groups germinated at about **95%**, showing that vacuum, temperature swings, and microgravity had little effect.
अंतरिक्ष में, अंधेरे और UV-शिल्डेड समूहों के spores लगभग **95%** अंकुरित हुए, दर्शाता है कि vacuum, तापमान परिवर्तन और microgravity का बहुत कम प्रभाव हुआ।
- Even in the fully exposed group, which received **space UV**, about **86%** of spores still germinated.
यहाँ तक कि पूरी तरह खुले समूह में, जिसे **space UV** प्राप्त हुआ, लगभग **86%** spores अंकुरित हुए।
- The results suggested while **P. patens spores** themselves were intrinsically stress-resistant, the **sporangium** added a protective shell against radiation, temperature extremes, and vacuum — echoing how seed coats protect embryos in higher plants.
परिणामों ने संकेत दिया कि **P. patens spores** स्वयं तनाव-सहिष्णु थे, और **sporangium** ने radiation, अत्यधिक तापमान और vacuum के विरुद्ध एक सुरक्षा परत प्रदान की — ठीक वैसे जैसे उच्च पौधों में बीज-कोट भ्रूण की रक्षा करता है।
- By comparing UV tolerance across many organisms, the authors showed that moss spores rival or exceed famous **radiation-resistant microbes** and some **crop seeds**, especially for very short-wavelength UV.
कई जीवों में UV सहनशीलता की तुलना कर लेखकों ने दिखाया कि कार्ई के spores प्रसिद्ध **radiation-resistant microbes** और कुछ **crop seeds** के बराबर या उनसे अधिक सहनशील हैं, विशेषकर short-wavelength UV के प्रति।
- The study noted spores were less impressive at **ultra-low temperatures** than some **tree seeds**, and pigment damage could matter over long missions; spores might survive **15 years** in space but need further testing.
अध्ययन ने यह भी पाया कि spores **अत्यधिक निम्न तापमान** पर कुछ **tree seeds** जितने प्रभावी नहीं थे,



और लंबे मिशनों में pigment क्षति मायने रख सकती है; spores 15 वर्ष तक अंतरिक्ष में जीवित रह सकते हैं, पर और परीक्षण आवश्यक हैं।

- Even so, the authors added, their work strengthened the idea that **bryophytes** could help “green” future **extraterrestrial bases** and support closed **life-support systems**, while aiding astrobiologists in understanding plant survival beyond Earth. फिर भी, लेखकों ने कहा कि उनका कार्य इस विचार को मजबूत करता है कि **bryophytes** भविष्य के **extraterrestrial bases** को “green” बनाने और बंद **life-support systems** को सहारा देने में सक्षम हो सकते हैं, साथ ही पृथ्वी से परे पौधों की सहनशीलता समझने में astrobiologists की मदद कर सकते हैं।

Rivers of salt: life on Bangladesh’s climate frontline

GS III: Environment
Climate Change
KHULNA

On Bangladesh’s coast, where mighty Himalayan rivers meet the sea, water defines every rhythm of life, and every struggle.

Rising seas driven by climate change are swallowing low-lying areas, while stronger storms push saltwater further inland, turning wells and lakes brackish, according to government scientists.

For the millions living in the ecologically sensitive deltas of mudflats and mangrove forests, finding clean drinking water has become an escalating challenge.

Cyclone Aila in 2009 was a turning point. Embankments broke and saltwater swept inland, flooding not only homes, but seeping into once-fertile land. The water that once sustained communities became undrinkable, and the land began to crack under layers of salt.

Balancing act

The people of Khulna and Satkhira districts today live in a fragile balancing act between land and sea. Many families live in houses built on bamboo stilts to escape tidal floods. Children bathe in yellow, saline water and grow up in a landscape of constant change, where rivers erode their homes and schools, and displacement has become the norm.

Men migrate for months seeking work. Women and children walk for hours across parched, cracked soil to fetch water from distant ponds, or harvest rainwater, and store it in tanks supplied by charities.

Each household stores a few thousand litres, rationed carefully until the next monsoon arrives. The daily act of collecting and storing water has become a quiet ritual of endurance.

वह पानी जो कभी समुदायों को जीवन देता था, पीने योग्य नहीं रहा और भूमि नमक की परतों के नीचे दरकने लगी।

Balancing act संतुलन का संघर्ष

Rivers of salt: life on Bangladesh’s climate frontline

नमक की नदियाँ: बांग्लादेश की जलवायु सीमारेखा पर जीवन

- On Bangladesh’s coast, where mighty Himalayan rivers meet the sea, water defines every rhythm of life, and every struggle.



बांग्लादेश के तट पर, जहाँ शक्तिशा ली हिमालयी नदियाँ समुद्र से मिलती हैं, पानी जीवन की हर लय और हर संघर्ष को निर्धारित करता है।

- Rising seas driven by climate change are swallowing low-lying areas, while stronger storms push saltwater further inland, turning wells and lakes brackish, according to government scientists.

सरकारी वैज्ञानिकों के अनुसार, जलवायु परिवर्तन से बढ़ते समुद्र निम्न-स्तरीय क्षेत्रों को निगल रहे हैं, जबकि अधिक शक्तिशाली तूफान खारे पानी को अंदर की ओर धकेल रहे हैं, जिससे कुएँ और झीलें खारी हो रही हैं।

- For the millions living in the ecologically sensitive deltas of mudflats and mangrove forests, finding clean drinking water has become an escalating challenge.

कीचड़ वाले डेल्टा और मैन्ग्रोव जंगलों के पर्यावरण-संवेदनशील क्षेत्रों में रहने वाले लाखों लोगों के लिए स्वच्छ पेयजल पाना एक बढ़ती चुनौती बन गया है।

- Cyclone Aila in 2009 was a turning point. Embankments broke and saltwater swept inland, flooding not only homes, but seeping into once-fertile land.

2009 का चक्रवात आइला एक महत्वपूर्ण मोड़ था। तटबंध टूट गए और खारा पानी अंदर तक बह गया, जिसने घरों के साथ-साथ कभी उपजाऊ रही भूमि को भी डूबो दिया।

- The water that once sustained communities became undrinkable, and the land began to crack under layers of salt.



- The people of **Khulna** and **Satkhira** districts today live in a fragile balance between land and sea.
आज **खुलना** और **सातखीरा** जिलों के लोग जमीन और समुद्र के बीच एक नाजूक संतुलन में जीते हैं।
- Many families live in houses built on bamboo stilts to escape tidal floods.
कई परिवार ज्वारीय बाढ़ से बचने के लिए बांस के खंभों पर बने घरों में रहते हैं।
- Children bathe in yellow, saline water and grow up in a landscape of constant change, where rivers erode their homes and schools, and displacement has become the norm.
बच्चे पीले, खारे पानी में नहाते हैं और एक ऐसे परिवेश में बड़े होते हैं जहाँ नदियाँ उनके घर और स्कूल काट लेती हैं, और विस्थापन सामान्य बात बन गई है।
- Men migrate for months seeking work.
पुरुष महीनों तक काम की तलाश में प्रवास करते हैं।
- Women and children walk for hours across parched, cracked soil to fetch water from distant ponds, or harvest rainwater, and store it in tanks supplied by charities.
महिलाएँ और बच्चे सूखी, फटी हुई जमीन पर घंटों चलते हैं ताकि दूर के तालाबों से पानी ला सकें, या वर्षा जल एकत्र कर सकें और इसे दानदाताओं द्वारा उपलब्ध कराए गए टैंकों में भर सकें।
- Each household stores a few thousand litres, rationed carefully until the next monsoon arrives.
हर घर कुछ हज़ार लीटर पानी संग्रहीत करता है, जिसे अगली मानसून तक सावधानीपूर्वक राशन किया जाता है।
- The daily act of collecting and storing water has become a quiet ritual of endurance.
पानी इकट्ठा करने और संग्रहित करने का दैनिक कार्य एक शांत सहनशीलता का अनुष्ठान बन चुका है।

PATRIOTIC IAS



Southeast Asia's rivers, people at risk from toxic mines: study

Over 2,400 mines in the region could be releasing toxins such as cyanide and mercury into water-bodies downstream, says a Stimson Center study; this exposes millions of people living along these rivers to health risks, and even global consumers

GS III: Environment

Reuters
THAILAND

For most of her life, 59-year-old farmer Tip Kamlue has irrigated her fields in northern Thailand with the waters of the Kok River, which flows down from neighbouring Myanmar before joining with the Mekong River that cuts through Southeast Asia.

But since April, after authorities warned residents to stop using the Kok's water because of concerns over contamination, Ms. Tip has been using groundwater to grow pumpkins, garlic, sweet corn and okra.

"It's like half of me has died," she said, standing by her fields in Tha Ton sub-district.

Across mainland Southeast Asia, more than 2,400 mines — many of them illegal and unregulated — could be releasing deadly chemicals such as cyanide and mercury into river water, according to research from the U.S.-based Stimson Center think tank released on Monday.

"The scale is something that's striking to me," said Brian Eyer, senior fellow at Stimson, pointing to scores of tributaries of major rivers, like the Mekong, the Salween and the Irrawaddy that are probably highly contaminated.

The Stimson report marks the first comprehensive study of potentially



Wake-up call: Villagers of Tha Ton protest calling for the shutdown of mines upstream and the restoration of water quality in the Kok, Sai, Ruak, Mekong and Salween rivers in Myanmar. REUTERS

polluting mines in mainland Southeast Asia. Researchers analysed satellite imagery to identify mining activity including 366 alluvial mining sites, 359 heap leach sites and 77 rare earth mines draining into the Mekong basin.

Most alluvial mining sites are gold mines, though some also extract tin and silver. Heap leach mining sites include those for gold, nickel, copper, and manganese extraction.

The Mekong is Asia's third-largest river and supports the livelihood of more than 70 million people as well as the global export of farm and fisheries products.

"Because so much of the Mekong Basin is essentially ungoverned by national laws and sensible regulations, the basin is unfortunately ripe for this kind of unregulated activity to oc-

cur at a high level of intensity and the huge scale that our data reveals," Mr. Eyer said. The toxic chemicals released through unregulated rare earths mining include ammonium sulphate, and sodium cyanide and mercury that are used for two different types of gold mining, according to Stimson researchers.

That exposes not only the millions of people who live along the Mekong in Southeast Asia to health risks, but also consumers elsewhere. "There is not a major supermarket in the U.S. that doesn't have products from the Mekong Basin, including shrimp, rice and fish," Mr. Eyer added.

China-backed mining
The emergence of new China-backed rare earth mines in eastern Myanmar, not far from the mountainous border with Thai-

land, initially set off concerns among researchers of the danger of downstream pollution along the Kok River, including areas like Tha Ton.

The contamination pattern on samples from the Kok River shows the presence of arsenic — linked to rare earth and gold mining — alongside heavy rare earths like dysprosium and terbium, said Tanapon Phenrat of Thailand Science Research and Innovation, a Thai government research agency.

"It has only been two years since the rise of rare earth and gold mining in Myanmar at the Kok River's source," said Mr. Tanapon, who conducted testing of the waters this year and warns of a sharp rise in contamination levels unless mining is stopped.

Myanmar, which erupted in conflict after the mil-

itary seized power in 2021, is one of the world's largest producers of heavy rare earths, critical minerals infused into magnets that power the likes of wind turbines, electric vehicles and defence systems.

From mining sites in Myanmar, the raw material is transported for processing to China, which has a near-monopoly over production of these vital magnets, with Beijing deploying rare earths as leverage in its tariff war with the U.S. "In general, Chinese nationals work on these mines as managers and technical experts," he said.

In response to questions, China's Foreign Ministry said it was not aware of the situation.

The Thai government has established three new task forces to coordinate international cooperation, monitor the mines' health impact and secure alternative supplies for communities along the Kok, Sai, Mekong and Salween rivers, said Deputy Prime Minister Suchart Chomklin.

In northern Tha Ton, signs still hang on a bridge over the Kok River, calling for authorities to shut down the rare earths mines upriver, and farmers like Ms. Tip are desperate for an intervention.

"I just want the Kok River to be the way it used to be — where we could eat from it, bathe in it, play in it, and use it for farming," she said.

Southeast Asia's rivers, people at risk from toxic mines: study दक्षिण-पूर्व एशिया की नदियाँ और लोग जहरीली खदानों से जोखिम में: अध्ययन

- For most of her life, 59-year-old farmer **Tip Kamlue** has irrigated her fields in northern Thailand with the waters of the **Kok River**, which flows down from Myanmar before joining the **Mekong River**.

अपने अधिकांश जीवन में, 59 वर्षीय किसान **टिप कम्मलुए** ने उत्तरी थाईलैंड में अपने खेतों की सिंचाई **कोक नदी** के पानी से की है, जो म्यांमार से बहकर **मेकांग नदी** में मिलती है।

- But since April, after authorities warned residents to stop using the Kok's water because of contamination concerns, Ms. Tip has been using groundwater to grow crops.
लेकिन अप्रैल से, जब अधिकारियों ने प्रदूषण की चिंताओं के कारण कोक नदी का पानी इस्तेमाल न करने की चेतावनी दी, तब से सुश्री टिप भूजल का उपयोग कर रही हैं।
- "It's like half of me has died," she said, standing by her fields in Tha Ton.
"ऐसा लगता है जैसे मेरा आधा हिस्सा मर गया हो," उन्होंने था टोन में अपने खेतों के पास खड़े होकर कहा।
- Across mainland Southeast Asia, more than **2,400 mines** — many illegal and unregulated — could be releasing **cyanide** and **mercury** into river water, according to the U.S.-based **Stimson Center**.





मुख्यभूमि दक्षिण-पूर्व एशिया में **2,400 से अधिक खदानें** — जिनमें से कई अवैध और अनियमित — नदियों में **साइनाइड** और **पारा** छोड़ सकती हैं, अमेरिकी **स्टिम्सन सेंटर** के अनुसार।

- “The scale is striking,” said **Brian Eyler**, noting that tributaries of major rivers like the **Mekong, Salween and Irrawaddy** are likely contaminated.
“यह पैमाना चौकाने वाला है,” **ब्रायन आयलर** ने कहा, यह बताते हुए कि **मेकांग, सालवीन और इरावदी** जैसी नदियों की सहायक नदियाँ संभवतः प्रदूषित हैं।
- The Stimson report is the first comprehensive study of potentially polluting mines in the region, identifying **366 alluvial, 359 heap leach**, and **77 rare earth mines** draining into the Mekong basin.
स्टिम्सन रिपोर्ट क्षेत्र में प्रदूषणकारी खदानों का पहला व्यापक अध्ययन है, जिसमें **366 प्लेसर, 359 हीप लीच**, और **77 रेयर अर्थ खदानें** मेकांग बेसिन में बहते हुए पाई गईं।
- Most alluvial mines are gold mines, with some extracting tin and silver; heap leach mines extract gold, nickel, copper, and manganese.
ज्यादातर प्लेसर खदानें सोने की हैं, जबकि कुछ टिन और चांदी निकालती हैं; हीप लीच खदानें सोना, निकेल, तांबा और मैंगनीज निकालती हैं।
- The Mekong supports over **70 million people** and exports farm and fisheries products globally.
मेकांग नदी **70 मिलियन से अधिक लोगों** का जीवन समर्थन करती है और कृषि व मत्स्य उत्पादों का वैश्विक निर्यात करती है।
- Because much of the basin lacks proper laws and regulations, it is vulnerable to unregulated mining, releasing **ammonium sulphate, sodium cyanide, and mercury**.
क्योंकि बेसिन का बड़ा हिस्सा कानूनों और विनियमों से वंचित है, यह अनियमित खनन के प्रति संवेदनशील है, जिससे **अमोनियम सल्फेट, सोडियम साइनाइड, और पारा** निकलता है।
- This endangers millions in Southeast Asia and consumers worldwide who buy products like shrimp, rice and fish from the Mekong Basin.
यह दक्षिण-पूर्व एशिया के लाखों लोगों और दुनिया भर के उपभोक्ताओं को जोखिम में डालता है, जो मेकांग बेसिन से झींगा, चावल और मछली जैसे उत्पाद खरीदते हैं।

China-backed mining चीन समर्थित खनन

- New China-backed **rare earth mines** in eastern Myanmar near Thailand have raised concerns of contamination in the Kok River.
पूर्वी म्यांमार में थाईलैंड के पास नए चीन समर्थित **रेयर अर्थ खदानों** ने कोक नदी में प्रदूषण की चिंता बढ़ा दी है।
- Tests show **arsenic** along with heavy rare earths like **dysprosium** and **terbium** in the river.
परीक्षणों में नदी में **आर्सेनिक**, और **डिसप्रोसियम** व **टर्बियम** जैसे भारी रेयर अर्थ पाए गए हैं।
- Myanmar, in conflict since the 2021 coup, is one of the world's largest producers of heavy rare earths used in **wind turbines, EVs, and defense systems**.
2021 के सैन्य तख्तापलट के बाद संघर्षग्रस्त म्यांमार दुनिया के सबसे बड़े भारी रेयर अर्थ उत्पादकों में से एक है, जो **विंड टर्बाइन, ईवी, और रक्षा प्रणालियों** में उपयोग होते हैं।
- The raw materials go to China for processing, which holds a near-monopoly on rare earth magnet production.
कच्चा माल प्रसंस्करण के लिए चीन भेजा जाता है, जिसके पास रेयर अर्थ चुंबक उत्पादन पर लगभग एकाधिकार है।
- Chinese nationals often manage these mines as experts.
चीनी नागरिक अक्सर इन खदानों में प्रबंधक और तकनीकी विशेषज्ञ के रूप में काम करते हैं।

Regional response क्षेत्रीय प्रतिक्रिया

- Thailand has formed three task forces to coordinate internationally, monitor health impacts, and secure alternative water sources.
थाईलैंड ने अंतरराष्ट्रीय समन्वय, स्वास्थ्य प्रभावों की निगरानी, और वैकल्पिक जल स्रोत सुनिश्चित करने के लिए तीन टास्क फोर्स बनाई हैं।



TELEGRAM CHANNEL: <https://t.me/patrioticIAS>

YOUTUBE CHANNEL: <https://www.youtube.com/@PatrioticIAS>

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- Signs along the Kok River demand closure of the rare earth mines.
कोक नदी के किनारे लगे पोस्टर रेयर अर्थ खदानों को बंद करने की मांग करते हैं।
- Farmers like Ms. Tip desperately want restoration of the river to its old, clean state.
सुश्री टिप जैसी किसान नदी को उसकी पुरानी, स्वच्छ अवस्था में लौटते देखना चाहती हैं।
- "I just want the Kok River to be the way it used to be," she said.
"मैं सिर्फ चाहती हूँ कि कोक नदी वैसी ही हो जाए जैसी पहले थी," उन्होंने कहा।

DM

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PATRIOTIC IAS



Navy gets 'silent hunter', 80% home-grown Mahe

Army chief General Upendra Dwivedi launches warship, says 'true strength' of the armed forces lies in 'synergy', adds that Army, Navy and Air Force form 'the trinity of India's strategic strength'

GS III: Defence

The Hindu Bureau
MUMBAI

INS Mahe, India's first Mahe-class anti-submarine warfare shallow watercraft, was commissioned at the Naval Dockyard by General Upendra Dwivedi, Chief of the Army Staff, on Monday.

With over 80% indigenous components, the ship is another step in the Indian Navy's efforts towards achieving self-reliance, the Navy said. The induction was done after long, rigorous trials for over two years, officials said. Due to its stealth and unyielding readiness, *INS Mahe's* motto is 'Silent Hunters'.

This was the first time an Army chief presided over the commissioning of a naval warship. General Dwivedi said that the true strength of the Indian armed forces lay in synergy among the three services.

"In the age of multi-domain operations, the country's ability to act in concert from the depths of the ocean to the highest frontier will determine the security influence of the In-



INS Mahe, the Mahe-class anti-submarine warfare shallow watercraft at the Naval Dockyard in Mumbai. EMMANUAL YOGINI

dian Republic," he said, adding that Operation Sindoor showcased the seamless harmony between the services.

Major transformation

The Army chief noted that the force is undergoing a major transformation, with joint-ness and integration serving as key pillars.

"As said by Helen Keller, alone we can do so little. Together we can do so much. So, as a soldier, we are standing among seafarers... The sea, land, and the skies from a single continuum of national securi-

ty. And together, the Army, Navy and Air Force form the trinity of India's strategic strength," General Dwivedi said.

INS Mahe, the lead ship of eight vessels in its class, has been designed and built by Cochin Shipyard Limited.

It will form the first line of coastal defence, integrating seamlessly with larger surface combatants, submarines, and aviation assets to maintain constant vigilance over India's maritime areas of operation.

"Today's ceremony not only marks the induction

of a potent new platform to a maritime order of battle, but also reaffirms our nation's increasing capability to design, construct, and field complex combatants with indigenous technology.

This commissioning will significantly augment the Indian Navy's capability to ensure near-sea dominance, strengthen the coastal security grid and safeguard our maritime interests across the vast expanse of our littorals," General Dwivedi said.

Listing out the abilities of the warship, a government statement said, "The ship's combat suite blends multiple systems into a compact yet potent network. She is specially designed to undertake anti-submarine operations in coastal and shallow waters. Fitted with advanced weapons, sensors, and communication systems enabling it to detect, track, and neutralise sub-surface threats with precision, the ship can sustain prolonged operations in shallow waters and features technologically advanced machinery and control systems."

Navy gets 'silent hunter', 80% home-grown Mahe नेवी को मिला 'साइलेंट हंटर', 80% स्वदेशी 'माहे'

Army chief General Upendra Dwivedi launches warship, says 'true strength' of the armed forces lies in 'synergy', adds that Army, Navy and Air Force form 'the trinity of India's strategic strength'

थलसेना प्रमुख जनरल उपेंद्र द्विवेदी ने युद्धपोत लॉन्च किया, कहा कि सशस्त्र बलों की 'वास्तविक शक्ति' 'समन्वय' में है, और सेना, नौसेना व वायुसेना मिलकर भारत की 'रणनीतिक शक्ति की त्रिमूर्ति' बनाते हैं

- INS Mahe, India's **first Mahe-class anti-submarine warfare shallow watercraft**, was commissioned at the Naval Dockyard by **General Upendra Dwivedi**, Chief of the Army Staff, on Monday.

आईएनएस माहे, भारत का पहला माहे-क्लास एंटी-सबमरीन वॉरफेयर शैलो वॉटरक्राफ्ट, सोमवार को थलसेना प्रमुख जनरल उपेंद्र द्विवेदी द्वारा नौसेना डॉकयार्ड में कमीशन किया गया।



- With over **80% indigenous components**, the ship is another step in the Indian Navy's efforts towards achieving **self-reliance**, the Navy said.
नौसेना ने कहा कि **80% से अधिक स्वदेशी घटकों** के साथ यह जहाज़ भारतीय नौसेना के **आत्मनिर्भरता** प्रयासों की दिशा में एक और कदम है।
- The induction was done after long, rigorous trials for over **two years**, officials said.
अधिकारियों ने बताया कि इसको शामिल करने से पहले **दो वर्षों** से अधिक समय तक कड़े परीक्षण किए गए थे।
- Due to its **stealth** and constant readiness, INS Mahe's motto is '**Silent Hunters**'.
अपनी **स्टेल्थ क्षमता** और निरंतर तत्परता के कारण आईएनएस माहे का आदर्श वाक्य '**साइलेंट हंटर्स**' है।
- This was the **first time** an Army chief presided over the commissioning of a naval warship.
यह **पहली बार** था जब किसी थलसेना प्रमुख ने नौसैनिक युद्धपोत के कमीशनिंग समारोह की अध्यक्षता की।
- General Dwivedi said that the true strength of the Indian armed forces lay in **synergy among the three services**.
जनरल द्विवेदी ने कहा कि भारतीय सशस्त्र बलों की असली शक्ति **तीनों सेवाओं के समन्वय** में है।
- "In the age of **multi-domain operations**, the country's ability to act in concert from the depths of the ocean to the highest frontier will determine India's **security influence**," he said.
उन्होंने कहा कि **मल्टी-डोमेन ऑपरेशंस** के युग में समुद्र की गहराइयों से लेकर आकाश की ऊँचाइयों तक एक साथ कार्य करने की क्षमता भारत की **सुरक्षा प्रभावशीलता** निर्धारित करेगी।
- He added that **Operation Sindoor** showcased seamless harmony between the services.
उन्होंने कहा कि **ऑपरेशन सिंदूर** ने सेवाओं के बीच बेहतरीन तालमेल प्रदर्शित किया।

Major transformation बड़ा परिवर्तन

- The Army chief noted that the force is undergoing a major transformation, with **jointness and integration** as key pillars.
थलसेना प्रमुख ने कहा कि सेना एक बड़े परिवर्तन से गुजर रही है, जिसमें **संयुक्तता और एकीकरण** प्रमुख स्तंभ हैं।
- INS Mahe, the **lead ship** of eight vessels in its class, has been designed and built by **Cochin Shipyard Limited**.
आईएनएस माहे, जो इस क्लास के **आठ जहाज़ों में अग्रणी** है, को **कोचीन शिपयार्ड लिमिटेड** द्वारा डिज़ाइन और निर्मित किया गया है।
- It will form the **first line of coastal defence**, integrating with surface combatants, submarines, and aviation assets to maintain vigilance over India's maritime areas.
यह भारत के समुद्री क्षेत्रों पर निगरानी बनाए रखने के लिए सतही लड़ाकू जहाज़ों, पनडुब्बियों और विमानन संसाधनों के साथ एकीकृत होकर **तटीय रक्षा की पहली पंक्ति** बनेगा।
- The commissioning reaffirms India's capability to design, construct, and field **complex combatants with indigenous technology**.
यह कमीशनिंग भारत की **जटिल स्वदेशी तकनीक** से युद्धपोत डिज़ाइन, निर्माण और तैनात करने की क्षमता को पुनः प्रमाणित करती है।
- The ship will significantly strengthen **coastal security** and ensure **near-sea dominance**.
यह जहाज़ **तटीय सुरक्षा** को मजबूत करेगा और **निकट-समुद्री प्रभुत्व** सुनिश्चित करेगा।
- The ship's **combat suite** combines multiple systems into a compact yet potent network.
जहाज़ का **कॉम्बैट सूट** कई सिस्टम को एक कॉम्पैक्ट लेकिन शक्तिशाली नेटवर्क में जोड़ता है।
- She is specially designed for **anti-submarine operations** in coastal and shallow waters.
यह जहाज़ विशेष रूप से तटीय और कम गहराई वाले क्षेत्रों में **एंटी-सबमरीन ऑपरेशन** के लिए बनाई गई है।
- Fitted with **advanced weapons, sensors and communication systems**, it can detect, track and neutralise **sub-surface threats** with precision.
उन्नत हथियारों, सेंसरों और संचार प्रणालियों से लैस, यह जहाज़ सटीकता से **पानी के नीचे के खतरों** का पता लगा, उनका पीछा कर और उन्हें निष्क्रिय कर सकती है।
- The ship can sustain **prolonged operations** in shallow waters and features technologically advanced machinery and controls.
यह जहाज़ उन्नत तकनीकी मशीनरी और नियंत्रणों के साथ कम गहराई वाले पानी में **लंबे समय तक ऑपरेशन** कर सकती है।