

UPSC-CSE **2027/28**



DAILY CURRENT AFFAIRS



ONE STOP SOLUTION

By **Faiyaz Sir**



**08
SEPTEMBER**



**COMPLETE
COVERAGE**



**EXAM
FOCUSED**



**ANALYSIS
MADE EASY**



**STATIC + CURRENT
INTEGRATION**



**STAY AHEAD
STAY PREPARED**



सही समय का इंतजार मत करो,
बल्कि **हर समय** को सही बनाने
की कोशिश करो।



आज क्या पढ़ेंगे?

1. साइबर-फिजिकल सिस्टम्स (CPS)

LAST
PIB

2. Nicotine

3. महत्वपूर्ण तथ्य

SAT
FH





भारत सरकार
पत्र सूचना कार्यालय



हमारे बारे में • प्रेस विज्ञप्ति • गैलरी • अनुसंधान इकाई • मीडिया सुविधाएं • आर्काइव • तथ्यों की जांच • उन्नत खोज

होम / सभी विश्लेषक / **Explainer Details**

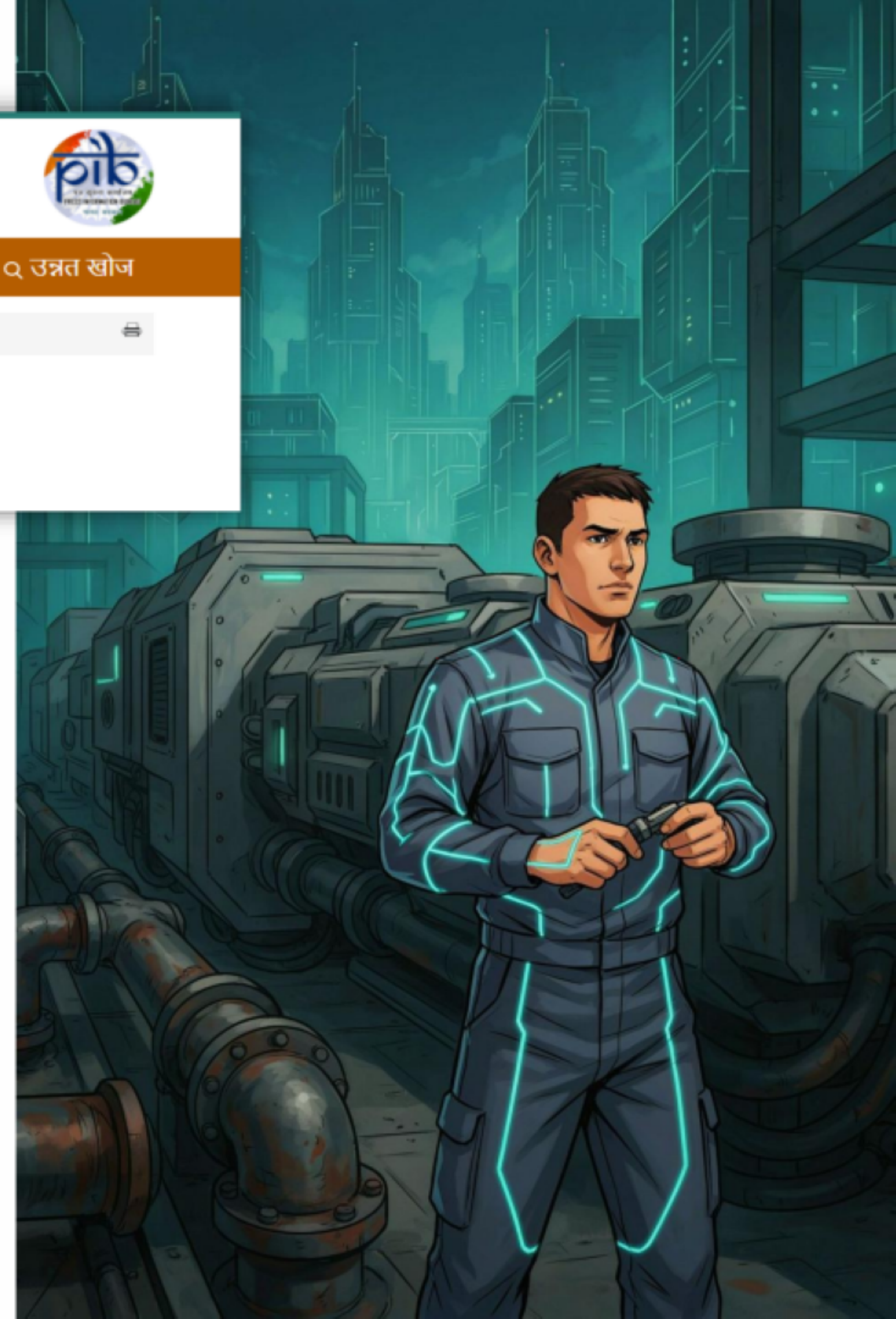
Technology

587

167

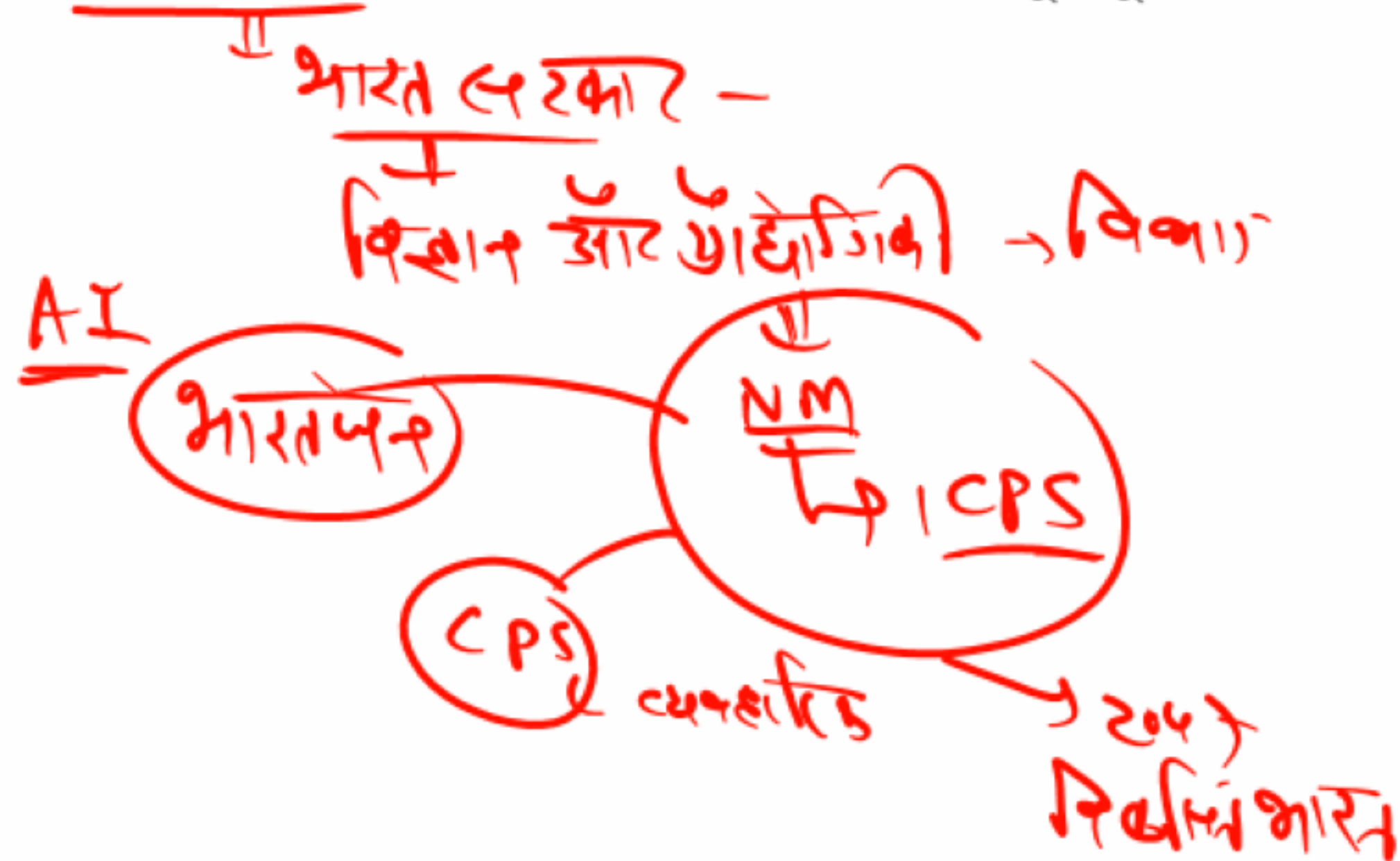
साइबर-फ़िज़िकल सिस्टम्स

टेक्नोलॉजी पर आधारित भविष्य की नींव



चर्चा में क्यों?

विज्ञान और प्रौद्योगिकी विभाग (DST) द्वारा संचालित 'इंटरडिसिप्लिनरी साइबर-फिजिकल सिस्टम्स पर राष्ट्रीय मिशन' (NM-ICPS) के अंतर्गत हाल ही में देश के तकनीकी विकास, स्वदेशी एआई 'भारतजेन' और विभिन्न क्षेत्रों में सीपीएस अनुप्रयोगों की प्रगति के आंकड़े सामने आए हैं, जो भारत को डिजिटल और भौतिक रूप से आत्मनिर्भर 'विकसित भारत' बनाने में महत्वपूर्ण भूमिका निभा रहे हैं।



साइबर-फिजिकल सिस्टम (CPS)

साइबर-फिजिकल सिस्टम (CPS) डिजिटल और फिजिकल दुनिया का एक अत्याधुनिक मेल है, जिसके माध्यम से मशीनें संवेदन (sensing), विश्लेषण (analysis) और त्वरित प्रतिक्रिया देने में सक्षम होती हैं। भारत सरकार ने देश में स्वदेशी क्षमताओं को सुदृढ़ करने और एक आत्मनिर्भर पारिस्थितिक तंत्र विकसित करने के लिए 'इंटरडिसिप्लिनरी साइबर-फिजिकल सिस्टम्स पर राष्ट्रीय मिशन' (NM-ICPS) की शुरुआत की है।

NM-ICPS



साइबर-फिजिकल सिस्टम (CPS) क्या है?

मूल अवधारणा

यह सेंसर, सॉफ्टवेयर और संचार नेटवर्क के माध्यम से कंप्यूटिंग टेक्नोलॉजी को भौतिक प्रणालियों (Physical Systems) से जोड़ता है।

Defn

प्रमुख अनुप्रयोग

- ड्राइवरलेस कारें: न्यूनतम मानवीय हस्तक्षेप के साथ सड़कों पर संचालन।
- ✓ स्मार्ट फैक्ट्रियां: उत्पादन प्रक्रियाओं की निगरानी और स्वचालन (Automation)।
- ✓ मेडिकल डिवाइस: रोगियों की निरंतर रियल-टाइम मॉनिटरिंग।
- ✓ स्मार्ट बिल्डिंग्स: ऊर्जा उपयोग, तापमान और प्रकाश व्यवस्था का स्वचालित नियंत्रण।

इंटरडिसिप्लिनरी साइबर-फिजिकल सिस्टम्स पर राष्ट्रीय मिशन (NM-ICPS) ✓

नोडल विभाग

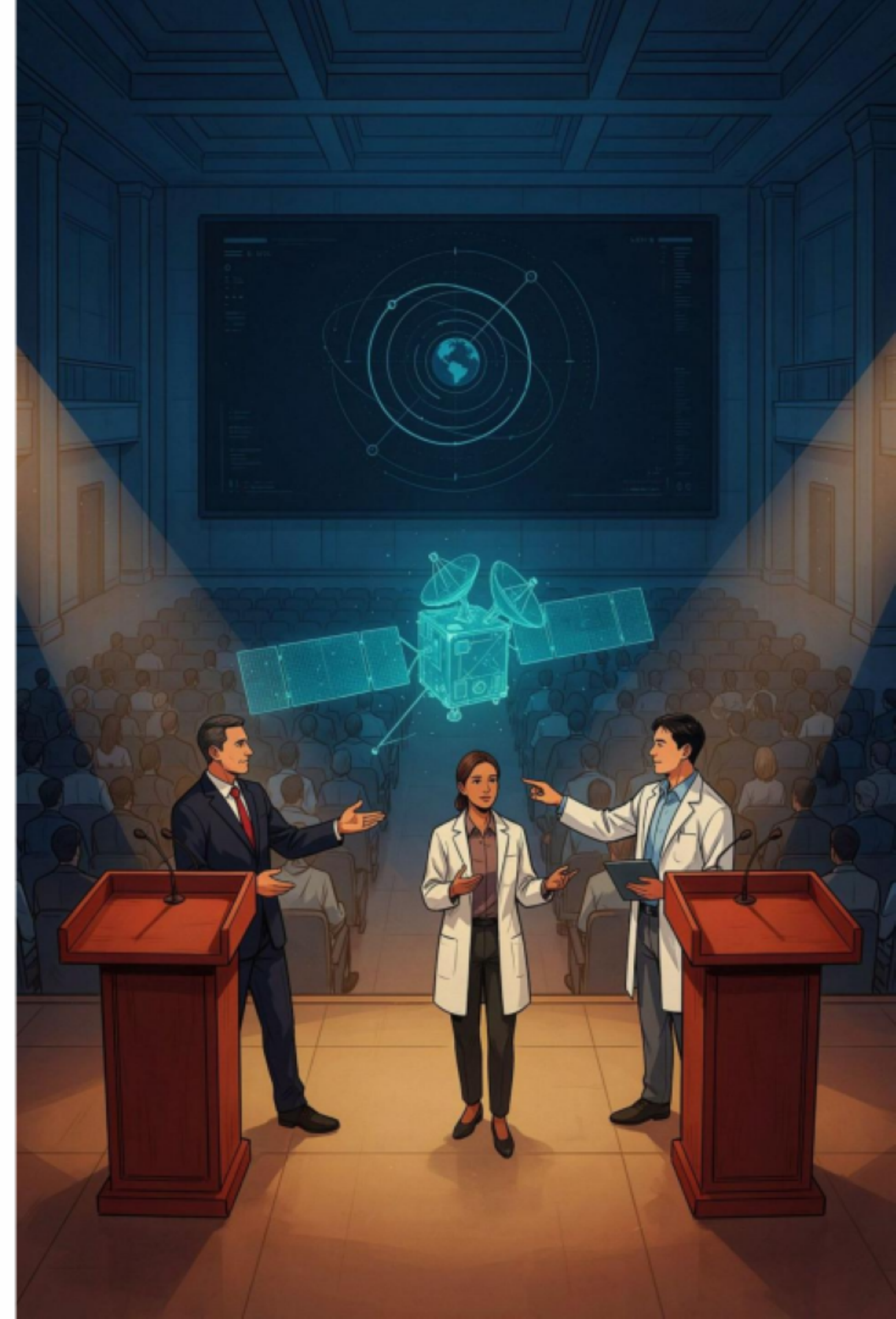
विज्ञान और प्रौद्योगिकी विभाग (DST)।

स्वीकृति एवं बजट

केंद्रीय मंत्रिमंडल द्वारा वर्ष 2018 में 9 वर्षों के लिए ₹3,660 करोड़ के कुल बजट के साथ अनुमोदित। ✓

उद्देश्य

शिक्षाविदों (Academics), उद्योगों, सरकार और अंतरराष्ट्रीय संगठनों को एक मंच पर लाकर वैज्ञानिक अनुसंधान को राष्ट्रीय प्राथमिकताओं से जोड़ना।



संस्थागत ढांचा: टीआईएच (TIH) और टीटीआरपी (TTRP)

टेक्नोलॉजी इनोवेशन हब (TIH)

मिशन के तहत प्रमुख शैक्षणिक संस्थानों में सेक्शन-8 कंपनियों के रूप में 25 टीआईएच स्थापित किए गए हैं, जो प्रौद्योगिकी विकास, कौशल प्रशिक्षण और स्टार्टअप इनक्यूबेशन पर कार्य करते हैं।

टेक्नोलॉजी ट्रांसलेशन रिसर्च पार्क (TTRP)

अनुसंधान को व्यावसायिक उत्पादों में बदलने के लिए चार प्रमुख संस्थानों में टीटीआरपी चुने गए हैं:

- आईआईटी कानपुर: साइबर सुरक्षा।
- आईआईएससी बेंगलुरु: रोबोटिक्स और एआई सिस्टम।
- आईआईटी (आईएसएम) धनबाद: माइनिंग टेक्नोलॉजी।
- आईआईटी इंदौर: डिजिटल हेल्थकेयर।

प्रमुख उपलब्धियां (अगस्त 2026 तक)

1,146

तकनीकें सक्षम

कृषि, स्वास्थ्य सेवा, माइनिंग आदि क्षेत्रों में 1,329 तकनीक उत्पाद विकसित।

1,136

स्टार्टअप इनक्यूबेट

24,000 से अधिक रोजगार सृजित हुए हैं।

5,824

फेलोशिप

2.46 लाख से अधिक पेशेवरों को कौशल प्रशिक्षण दिया गया।

200

अंतरराष्ट्रीय सहयोग

वैश्विक स्तर पर तकनीकी भागीदारी बढ़ाने के लिए स्थापित।



भारतजेन (BharatGen): सॉवरेन एआई क्षमता

नेतृत्व एवं विशेषताएं

नेतृत्व: आईआईटी बॉम्बे के नेतृत्व में विभिन्न शैक्षणिक संस्थानों द्वारा विकसित।

विशेषताएं: यह भारत की सभी 22 अनुसूचित भाषाओं का समर्थन करता है।

प्रमुख मॉडल

- **परम-2:** 17 अरब पैरामीटर वाला फाउंडेशन मॉडल।
- **श्रुतम और सूक्तम:** स्पीच-टू-टेक्स्ट और टेक्स्ट-टू-स्पीच मॉडल (12 भारतीय भाषाओं में)।
- **डोमेन-विशिष्ट मॉडल:** आयुर्वेद के लिए 'आयुर् परम', कृषि के लिए 'कृषि परम' और कानूनी क्षेत्र के लिए 'कानूनी परम'।

विभिन्न क्षेत्रों में व्यावहारिक अनुप्रयोग



स्वास्थ्य देखभाल

आईआईटी इंदौर के दृष्टि सीपीएस फाउंडेशन द्वारा 'चरकडीटी' (मानव शरीर का डिजिटल ट्विन) का विकास।



खनन

खतरनाक और दूर-दराज के क्षेत्रों के लिए 50 किमी तक डेटा भेजने वाले उन्नत ड्रोन।



साइबर सुरक्षा

आईटी-ओटी सिक््योरिटी ऑपरेशन्स सेंटर और क्रिप्टो-फॉरेंसिक टूल का विकास।

निष्कर्ष

साइबर-फिजिकल सिस्टम्स और एनएम-आईसीपीएस जैसी पहलें भारत को तकनीकी रूप से आत्मनिर्भर 'विकसित भारत' बनाने की दिशा में मील का पत्थर साबित हो रही हैं। यह मिशन न केवल वैज्ञानिक अनुसंधान को बढ़ावा दे रहा है, बल्कि देश की सामाजिक-आर्थिक चुनौतियों के लिए स्वदेशी और प्रभावी समाधान भी सुनिश्चित कर रहा है।



कृषि

मिट्टी, मौसम और माइक्रोकलाइमेट की निगरानी के लिए 'एग्री-आईओटी फार्म मैनेजमेंट सिस्टम'।



संचार

आईआईआईटी बेंगलुरु द्वारा विकसित 5जी-एडवांस्ड ओआरएएन मैसिव एमआईएमओ रेडियो यूनिट।



मोबिलिटी

आईआईटी हैदराबाद के 'तिहान फाउंडेशन' द्वारा ऑटोनॉमस नेविगेशन हेतु भारत का पहला टेस्टिंग ग्राउंड।

UPSC PYQ

भारत में
साइबर

Q. भारत में, किसी व्यक्ति के साइबर बीमा कराने पर, निधि की हानि की भरपाई एवं अन्य लाभों के अतिरिक्त, सामान्यतः निम्नलिखित में से कौन-कौन से लाभ दिये जाते हैं? (2020) ✓

1. यदि कोई मैलवेयर कंप्यूटर तक उसकी पहुँच बाधित कर देता है, तो कंप्यूटर प्रणाली को पुनः प्रचालित करने में लगने वाली लागत ✓
2. यदि यह प्रमाणित हो जाता है कि किसी शरारती तत्व द्वारा जान-बूझकर कंप्यूटर को नुकसान पहुँचाया गया है तो नए कंप्यूटर की लागत ~~7~~ ✗
3. यदि साइबर बलात ग्रहण होता है तो इस हानि को न्यूनतम करने के लिये विशेषज्ञ परामर्शदाता की सेवाएँ लेने पर लगने वाली लागत ✓
4. यदि कोई तीसरा पक्ष मुकदमा दायर करता है तो न्यायालय में बचाव करने में लगने वाली लागत ✓

नीचे दिये गए कूट का प्रयोग कर सही उत्तर चुनिये:

(a)

केवल 1, 2 और 4

(b) ✓

केवल 1, 3 और 4

(c)

केवल 2 और 3

(d)

1, 2, 3 और 4



Mains Practice Question

साइबर-फिजिकल सिस्टम (CPS) क्या है? 'अंतःविषयक साइबर-भौतिक प्रणालियों पर राष्ट्रीय मिशन' (NM-ICPS) किस प्रकार भारत में स्वदेशी तकनीकी क्षमताओं को सुदृढ़ करने और 'विकसित भारत' के विजन को साकार करने में सहायता कर रहा है? विश्लेषणात्मक चर्चा कीजिए। (250 शब्द)

Are nicotine pouches beyond the law?

Does COTPA cover nicotine pouches? Why are they not covered by the law banning vapes? Could nicotine pouches be treated as food under Indian law? Can they be legally imported into India? Can nicotine pouches be sold at duty-free shops?

The Hindu

EXPLAINER

Murali Neelakantan

The story so far:

A new study led by the ICMR-National Institute of Cancer Prevention and Research has found that nicotine pouches are reaching Indian cities through online platforms, hookah shops and gig delivery services. The study comes after a warning from the World Health Organization in May 2026 about the dangers these products pose. Yet it is far from settled which Indian law, if any, governs them.

What are nicotine pouches?

A nicotine pouch is a small, tobacco-free, tea-bag-like sack containing nicotine, flavourings and plant-based fibres. Users place the pouch between the lip and gum for up to an hour, allowing nicotine to be absorbed directly into the bloodstream without smoke, vapour or spitting.

Does COTPA cover nicotine pouches?

The Cigarettes and Other Tobacco Products Act, 2003 (COTPA) governs the marketing, advertising and sale of cigarettes and other tobacco products. But its definition of tobacco products does not extend to all products containing nicotine. Had the legislature intended to cover every extract of the tobacco plant, it could have said so. Restrictions on the freedom of trade and commerce must be strictly construed and since nicotine pouches are not among the products listed in the Cigarettes Act, they fall outside it.

Are they regulated by the Drugs Act?

Nicotine is not listed as a drug in any schedule of the Drugs and Cosmetics Act, 1940. Nicotine patches and gums have, however, been approved as drugs by the Drug Controller General of India for therapeutic use in treating nicotine addiction. Schedule K under the Drugs and Cosmetics Rules, 1945 lists gums and lozenges and exempts them from licensing and prescription requirements if they contain less than 2 mg of nicotine.

If nicotine were not considered a drug



GETTY IMAGES

at all, there would be no reason to exempt certain nicotine products in Schedule K. The very fact that only some nicotine products are exempted suggests that all others are meant to be regulated by the Drugs Act.

Against this, pouches are arguably unlike patches and gums. They make no therapeutic claim and do not purport to treat addiction; they are a substitute for cigarettes. On this reading, they do not qualify as drugs under the Drugs Act.

Why are they not covered by the law banning vapes?

The import and sale of vapes is banned by the Prohibition of Electronic Cigarettes Act, 2019 ("PECA"). If vapes were drugs, no separate legislation would have been needed: the government could have regulated them, or refused licences, under the Drugs Act. The enactment of PECA therefore suggests that the Drugs Act did not give it adequate power to ban them. Nicotine pouches are different from vapes: they contain no electronic device and produce neither smoke nor vapour. They are consequently not covered by PECA.

Could pouches be treated as food?

The Prevention of Food Adulteration Act and the Food Safety and Standards Act define food broadly: any processed, partially processed or unprocessed substance intended for human consumption. Court rulings on supari and chewing tobacco establish that the

definition has a very wide amplitude, encompassing items that are chewed rather than swallowed. It is arguable, then, that nicotine pouches could fall within the broad definition of food.

Can pouches be imported into India?

Import restrictions flow from two statutes: the Foreign Trade (Development and Regulation) Act, 1992 and the Customs Act, 1962. The Foreign Trade Act empowers the Central government to prohibit, restrict or regulate imports; the Directorate General of Foreign Trade (DGFT) administers this and publishes the ITC-HS classification listing which goods are free, restricted or banned. Section 11 of the Customs Act allows the government to prohibit goods wholly or partly by notification, on grounds that include the protection of human, animal or plant life.

After the World Customs Organization updated the Harmonized System, a sub-category was introduced for oral nicotine products that do not involve combustion: 2404 91 30 covers tobacco-free single-use pouches of the Zyn or Lyft type, and 2404 91 90 covers other oral nicotine products not meant for therapeutic uses. These replaced a residual category for other manufactured tobacco substitutes; the codes for medicaments apply only where a product is strictly a cessation aid. Under the DGFT schedule and the rules of the Central Board of Indirect Taxes and Customs, goods under 2404 91 30 are "restricted".

Unlike "free" items, they cannot be cleared merely on payment of duty, and unlike "prohibited" e-cigarettes, they are not banned outright – but they require a specific licence or permission. In deciding, the DGFT cross-references the health and other ministries.

What about duty-free shops?

Nicotine pouches are currently available at a few duty-free stores at Indian airports. Such stores are licensed under Section 58 of the Customs Act and cannot claim to be entirely outside Indian law.

It is sometimes said that a duty-free shop lies outside the territory of India, and that it is the passenger who imports the goods on crossing customs control. In *Fleming Duty Free Shop Pvt. Ltd. v. Shri Koushik Bhattacharya* (2024), the Calcutta High Court held that a duty-free store did not "import" goods into India, being deemed to be located outside it for the purposes of the Customs Act, and that legal metrology labelling requirements therefore did not apply. This should not be read to mean no Indian law applies to duty-free shops. If no Indian law applied to stores, could they stock arms and ammunition? If a crime was committed in a duty free store, which court would have jurisdiction to try the case? Which police station would have jurisdiction to register a case? That would be just too absurd.

Cigarettes, alcohol, jewellery, watches, food and small electronic items are some of the goods permitted at duty-free shops. Nicotine pouches are not – unless one can argue they are food. Given their customs classification as restricted, it is unlikely that any import licence has been granted.

What is the legal position?

The legal position is intricate, but the remedy is not. A notification under the Customs Act and the Foreign Trade Act banning the import and sale of nicotine pouches on health grounds would take minutes to issue. If the government moves as slowly as it did with vapes, pouches will become fashionable, and demand will settle in. A ban notified after that point will only produce smuggling on the scale we now see with vapes and cause damage to health that will be hard to mitigate. (Murali Neelakantan is a lawyer)

THE GIST

Nicotine pouches are not covered by COTPA or PECA, while their status under the Drugs Act is debatable. They could also arguably fall within the broad definition of food

Tobacco-free, single-use nicotine pouches require a specific licence or permission under the DGFT's ITC-HS classification; they are not prohibited outright like e-cigarettes

The government can prohibit their import and sale on health grounds. Delaying action could lead to established demand and smuggling, as seen with vapes

Handwritten mark

Are nicotine pouches beyond the law?

1. निकोटीन पाउच क्या हैं और विवाद क्यों है?

- **उत्पाद की बनावट:** यह छोटे चाय के बैग (tea-bag) जैसे पाउच होते हैं, जिनमें तंबाकू की पत्तियां नहीं होतीं। इनमें शुद्ध निकोटीन, फ्लेवरिंग और प्लांट-बेस्ड फाइबर होते हैं।
- **इस्तेमाल का तरीका:** इसे ऊपरी होंठ और मसूड़े के बीच रखा जाता है। निकोटीन धीरे-धीरे रक्त (bloodstream) में अवशोषित होती है। इसमें न धुआं बनता है, न वाष्प (vapour), और न ही थूकने की जरूरत होती है।
- **विवाद की वजह:** ICMR (इंडियन काउंसिल ऑफ मेडिकल रिसर्च) के एक हालिया अध्ययन के अनुसार, ये पाउच ऑनलाइन प्लेटफॉर्म और हुक्का शॉप्स के जरिए भारतीय शहरों में तेजी से फैल रहे हैं। WHO (विश्व स्वास्थ्य संगठन) द्वारा मई 2026 में इनके खतरों पर दी गई चेतावनी के बावजूद, यह स्पष्ट नहीं है कि भारत का कौन सा कानून इन पर लागू होता है।

2. भारतीय कानूनों के तहत कानूनी स्थिति (विस्तृत विश्लेषण)

• COTPA, 2003 (तंबाकू नियंत्रण अधिनियम):

- यह कानून सिगरेट और अन्य तंबाकू उत्पादों के विज्ञापन और बिक्री को नियंत्रित करता है।
- **समस्या:** COTPA की परिभाषा केवल तंबाकू युक्त उत्पादों पर लागू होती है, न कि केवल निकोटीन पर। चूंकि इन पाउच में तंबाकू का पौधा (tobacco plant) इस्तेमाल नहीं होता, इसलिए ये COTPA के दायरे से बाहर निकल जाते हैं।

• ड्रग्स एंड कॉस्मेटिक्स एक्ट, 1940 (दवा कानून):

- निकोटीन को इस कानून की किसी भी अनुसूची (schedule) में 'दवा' के रूप में सूचीबद्ध नहीं किया गया है।
- निकोटीन पैच और गम्स को केवल इसलिए छूट/मंजूरी मिली है क्योंकि वे धूम्रपान छोड़ने (therapeutic use) के इलाज के रूप में बेचे जाते हैं।
- **समस्या:** निकोटीन पाउच कोई मेडिकल या इलाज का दावा नहीं करते; ये सिगरेट का एक विकल्प हैं। इसलिए इन्हें 'दवा' मानकर रेगुलेट करना कानूनी रूप से कठिन है।

PECA, 2019 (वेप/ई-सिगरेट बैन कानून):

- भारत ने 2019 में ई-सिगरेट/वेप को पूरी तरह बैन कर दिया था।
- **समस्या:** PECA कानून केवल इलेक्ट्रॉनिक उपकरणों पर लागू होता है जो धुआं या वाष्प पैदा करते हैं। निकोटीन पाउच में कोई इलेक्ट्रॉनिक पार्ट नहीं होता, इसलिए PECA इन पर लागू नहीं होता।

खाद्य सुरक्षा कानून (FSSAI / FEA Act):

- भारतीय कानून में 'भोजन' (Food) की परिभाषा बहुत व्यापक है (ऐसी कोई भी चीज जिसे इंसान खाता या चबाता है)।
- सुपारियों और गुटखे पर अदालती फैसलों से यह स्थापित हो चुका है कि मुंह में रखी जाने वाली चीजें खाद्य श्रेणी में आ सकती हैं। इस आधार पर निकोटीन पाउच को खाद्य सुरक्षा कानूनों के तहत रेगुलेट करने का एक तर्क बनता है।

3. आयात (Import) और ड्यूटी-फ्री दुकानों का नियम

- **आयात नियम (Customs & Foreign Trade Act):**
 - विश्व सीमा शुल्क संगठन (WCO) के नए वर्गीकरण के तहत, निकोटीन पाउच (जैसे Zyn या Lyft) को "Restricted" (प्रतिबंधित) श्रेणी में रखा गया है।
 - इसका मतलब है कि इन्हें भारत में बिना स्वास्थ्य मंत्रालय और DGFT (विदेश व्यापार महानिदेशालय) की विशेष अनुमति/लाइसेंस के कानूनी रूप से आयात नहीं किया जा सकता।
- **ड्यूटी-फ्री शॉप्स (Duty-Free Shops) का भ्रम:**
 - कुछ भारतीय हवाई अड्डों की ड्यूटी-फ्री दुकानों पर यह बिक रहे हैं। दुकानदारों का तर्क होता है कि ड्यूटी-फ्री क्षेत्र भारतीय सीमा शुल्क के बाहर है।
 - **कानूनी सच:** कलकत्ता उच्च न्यायालय (2024 के एक मामले) के अनुसार, यह तर्क गलत है। ड्यूटी-फ्री दुकानें पूरी तरह भारतीय कानूनों से बाहर नहीं हो सकतीं। यदि इन्हें अवैध माना जाए, तो वे ड्यूटी-फ्री में भी नहीं बिक सकतीं।

Q1. भारत में निकोटीन उत्पादों के नियमन (Regulation) के संदर्भ में निम्नलिखित कथनों पर विचार कीजिए:

1. सिगरेट और अन्य तंबाकू उत्पाद अधिनियम (COTPA) 2003 उन सभी उत्पादों पर लागू होता है जिनमें निकोटीन मौजूद होता है, चाहे उसमें तंबाकू की पत्तियां हों या न हों।
2. इलेक्ट्रॉनिक सिगरेट निषेध अधिनियम (PECA), 2019 मुख्य रूप से उन उपकरणों को प्रतिबंधित करता है जो वाष्प (vapour) या धुआं उत्पन्न करते हैं और जिनमें इलेक्ट्रॉनिक घटक होते हैं।
3. विदेश व्यापार महानिदेशालय (DGFT) के तहत, तंबाकू-रहित निकोटीन पाउच को 'प्रतिबंधित' (Restricted) श्रेणी में वर्गीकृत किया गया है, जिसके आयात के लिए विशिष्ट लाइसेंस की आवश्यकता होती है।

→ NM-1C P30
→ Nicotine
525
Notes

उपर्युक्त कथनों में से कौन-सा/से सही है/हैं?

- A. केवल 1 और 2
- B. केवल 2 और 3
- C. केवल 1 और 3
- D. 1, 2 और 3

Mains Examination

- Q2. "तकनीकी नवाचार और तंबाकू-मुक्त विकल्प भारत के मौजूदा स्वास्थ्य एवं श्रम विधायी ढांचे (Legislative Framework) के लिए नई चुनौतियां उत्पन्न कर रहे हैं।" निकोटीन पाउच के मामले का संदर्भ देते हुए, भारतीय कानूनी ढांचे में मौजूद कमियों का विश्लेषण कीजिए और इस प्रकार के उत्पादों के प्रभावी नियमन हेतु उपाय सुझाइए। (250 शब्द, 15 अंक)

महत्वपूर्ण तथ्य

Natural partners

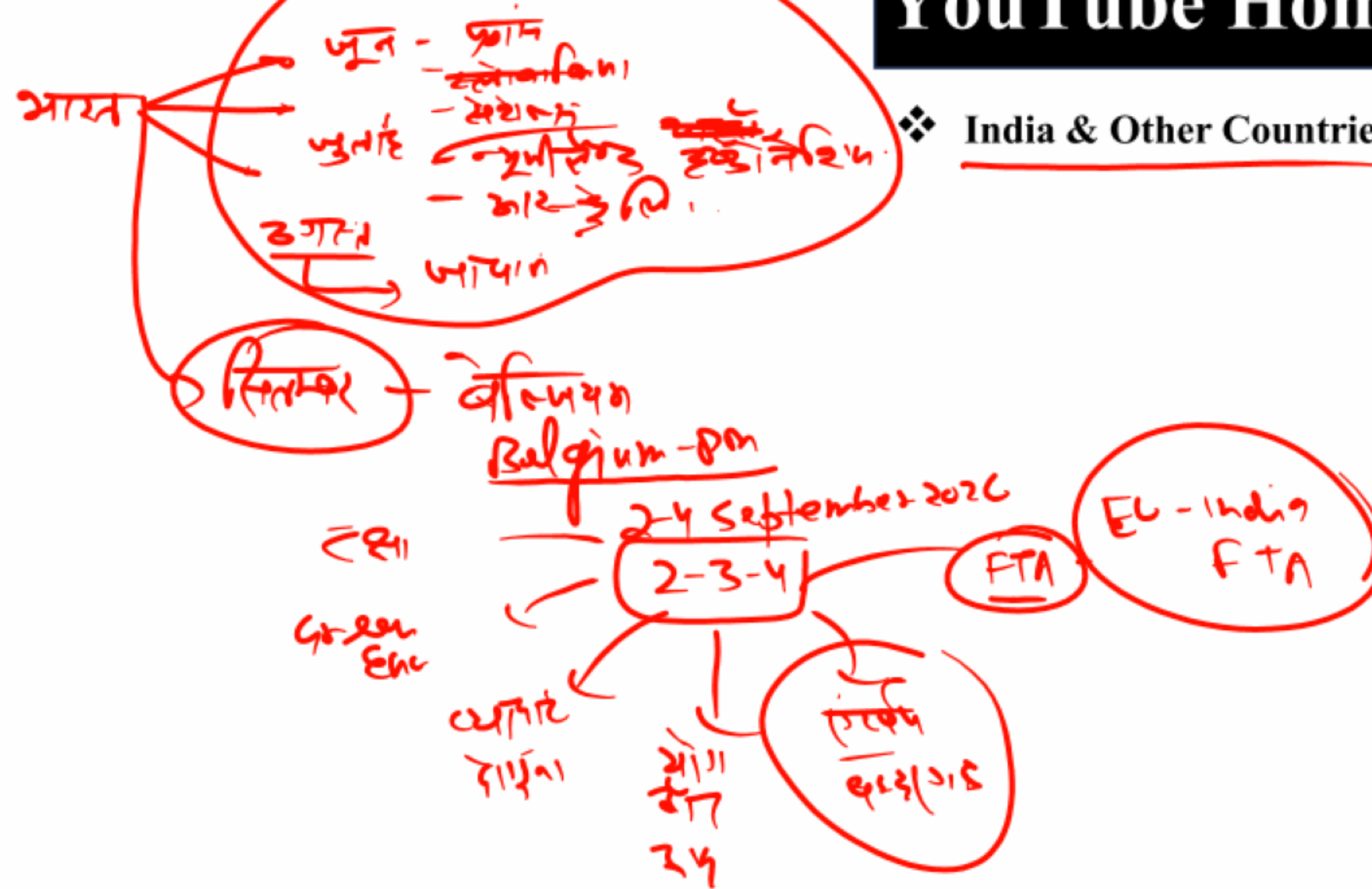
India and Belgium are building ties across sectors despite differences

In terms of size and engagement, Belgium is not one of India's most important partners. However, the visit of the Belgian Prime Minister to Delhi is part of a larger puzzle of India's ties with European countries. These have now gained salience with focus areas for India: in economic relations, defence relations and strategic ties. At the top of the agenda in talks between Prime Ministers Bart De Wever and Narendra Modi was bilateral trade opportunities once the India-European Union Free Trade Agreement (FTA) is signed – which is expected in December. India-Belgium trade is about \$13 billion, a third of which is from over a century of collaboration in the diamond industry. Antwerp is a global hub for diamond trading, while Mumbai and Surat provide the biggest cutting and polishing services. However, once the EU FTA is signed, they hope to benefit from collaboration in other areas including renewable energy and food processing; the Prime Ministers agreed to set a target of doubling bilateral trade in the next five years. Despite being surrounded by friendly European allies, Belgium has a robust high-tech defence industry – small arms, drone and counter-drone technology, ammunition and naval defence – and is keen to make inroads in the Indian market, with India seeking to diversify its procurement beyond global powers. The two sides agreed on an MoU for co-development of military hardware, and signed a letter of intent on defence cooperation. India will appoint a resident defence attaché to Brussels, complementing Belgium's move.

Statements by the two leaders, however, indicated that the visit went beyond the bilateral to a more geopolitical framing of strategic ties, both bilateral as well as between India and Europe. At a business event, Mr. De Wever said that Europe is now realising the truth of India's "warnings" on strategic autonomy from global powers and over dependence in trade and industrial production, in particular referring to China. After the talks, Mr. Modi said that democratic values, a market economy, and people-to-people ties make India and Belgium "natural partners", a theme he has promoted this past year, as he has stepped up visits to Europe and received a number of European leaders in Delhi, in the run-up to his Brussels visit later this year for the FTA. It is also significant that Mr. De Wever's visit comes in the same week that New Delhi is preparing to welcome Russian President Vladimir Putin for the BRICS summit in Delhi. The engagement with Belgium demonstrates a new maturity for both European countries and India. This shows sensitivity to their respective positions on the Russia-Ukraine conflict, indicating that ties outweigh Europe's enmity and India's deep friendship with Moscow.

YouTube Homework

❖ India & Other Countries



महत्वपूर्ण तथ्य



- 8.4 सितंबर 2026 में बेल्जियम के प्रधानमंत्री बार्ट डी वेवर (Bart De Wever) की भारत यात्रा के दौरान दोनों देशों के बीच द्विपक्षीय संबंधों को मजबूत करने के लिए **10 प्रमुख समझौतों (MoUs)** और पहलों की घोषणा की गई। यह वार्ता मुख्य रूप से **"3Ts" - Trade (व्यापार), Technology (तकनीक), और Talent (प्रतिभा)** पर केंद्रित थी।
- दोनों देशों के बीच हुए मुख्य समझौते और निर्णय इस प्रकार हैं:

1. रक्षा एवं सुरक्षा सहयोग (Defence & Security)

- Letter of Intent:** दोनों देशों के रक्षा मंत्रालयों के बीच संस्थागत रक्षा सहयोग के लिए सहमति पत्र पर हस्ताक्षर किए गए।
- रक्षा उद्योग साझेदारी:** भारतीय रक्षा निर्माता संगठन (SIDM) और बेल्जियम सुरक्षा एवं रक्षा उद्योग संघ (BDSI) के बीच सह-विकास और सह-उत्पादन को बढ़ावा देने के लिए समझौता हुआ।
- डिफेंस अटैची:** भारत ने ब्रुसेल्स (बेल्जियम) में अपना स्थायी रक्षा प्रतिनिधि (Resident Defence Attaché) नियुक्त करने की घोषणा की।

2. स्वच्छ ऊर्जा और हरित हाइड्रोजन (Clean Energy & Green Hydrogen)

- नवीकरणीय ऊर्जा MoU:** ग्रीन हाइड्रोजन, ऑफशोर विंड (समुद्री पवन ऊर्जा), और सोलर एनर्जी के क्षेत्र में संयुक्त काम करने के लिए अक्षय ऊर्जा समझौते का नवीनीकरण किया गया।
- क्रिटिकल मिनरल्स:** हरित ऊर्जा उपकरणों के निर्माण के लिए आवश्यक महत्वपूर्ण खनिजों (Critical Minerals) की रीसाइक्लिंग और प्रोसेसिंग में सहयोग पर सहमति बनी।

महत्वपूर्ण तथ्य



3. व्यापार और निवेश (Trade & Investment)

- व्यापार दोगुना करने का लक्ष्य: आगामी 5 वर्षों में द्विपक्षीय व्यापार (जो वर्तमान में ~13 बिलियन डॉलर है) को दोगुना करने का लक्ष्य निर्धारित किया गया।
- इन्वेस्टमेंट फास्ट-ट्रैक मैकेनिज्म: बेल्जियम की कंपनियों के भारत में निवेश को आसान और त्वरित बनाने के लिए 'फास्ट-ट्रैक मैकेनिज्म' की स्थापना की गई।
- इंडिया-बेल्जियम बिजनेस फोरम: नियमित व्यापारिक जुड़ाव के लिए इस बिजनेस फोरम को संस्थागत रूप दिया गया।

4. साइबर अपराध और संगठित अपराध पर रोकथाम

- CBI और बेल्जियम पुलिस समझौता: भारत की केंद्रीय जांच ब्यूरो (CBI) और बेल्जियम की फेडरल पुलिस के बीच ट्रांसनेशनल संगठित अपराध और साइबर क्राइम से निपटने के लिए समझौता ज्ञापन पर हस्ताक्षर किए गए।

5. प्रौद्योगिकी, प्रतिभा और कूटनीति (Tech, Talent & Diplomacy)

- माइक्रोइलेक्ट्रॉनिक्स और सेमीकंडक्टर: बेल्जियम के प्रसिद्ध अनुसंधान संस्थान (IMEC) को भारत के सेमीकंडक्टर इकोसिस्टम से जोड़ने पर चर्चा हुई।
- माइग्रेशन एंड मोबिलिटी: कुशल पेशेवरों और स्वास्थ्य कर्मियों (विशेषकर नर्सों) की आवाजाही को सुगम बनाने के लिए 'माइग्रेशन एंड मोबिलिटी पार्टनरशिप' समझौता जल्द लागू करने पर सहमति बनी।
- कूटनीतिक प्रशिक्षण: भारत के सुषमा स्वराज विदेश सेवा संस्थान और बेल्जियम के विदेश मंत्रालय (FPS) के बीच राजनयिकों के प्रशिक्षण के लिए MoU हुआ।

महत्वपूर्ण तथ्य

‘Conduct worthy of derision’: HC pulls up District Magistrate over NSA detention of student

Ishita Mishra
NEW DELHI

The Allahabad High Court has come down heavily on Gautam Buddha Nagar District Magistrate Medha Roopam, who had issued the order to detain a 25-year-old Delhi University law student under the National Security Act (NSA) over a workers' protest in Noida in April this year. In a detailed order released on Monday, the court observed that Ms. Roopam "desired to make an example" out of the petitioner.

A Bench of Justices Atul Sreedharan and Achal Sachdev had on September 2 quashed the NSA detention of Akriti Chaudhary, who had spent nearly five months in custody.

The Bench had allowed Ms. Chaudhary's *habeas corpus* petition and ordered her immediate re-



Gautam Buddha Nagar District Magistrate Medha Roopam

lease, unless she was required in another case. The court flagged discrepancies in the arrest notice and termed the State's version a "concocted story".

‘Guilty of violating oath’ Pulling up the District Magistrate, the Bench noted, "In this case, the conduct of the District Magistrate, who passed the impugned order, is worthy of derision." The court observed that the District Magistrate "desired to set an exam-

ple" out of the petitioner and deter others from exercising their right to freedom of speech and expression in public spaces in support of workers.

It added that Ms. Roopam is "guilty of violating her oath of allegiance, making this a fit case for the imposition of compensation to the petitioner".

The court directed that Ms. Chaudhary be paid compensation of ₹5 lakh and that the amount be recovered from the salary of the District Magistrate, who passed the order of detention "without application of mind", and "all such other officers who may have been responsible, right down to the Station House Officer" of the police station, who had prepared the initial report warranting the detention of the petitioner under the provisions of the NSA.

IAS
CFC
रुनेय - अड़की

पि + w

गिरफ्तारी और नजरबंदी से
संरक्षण - २२

22(1)(2)(3) 22(4)(7)

महत्वपूर्ण तथ्य

- राष्ट्रीय सुरक्षा कानून (National Security Act - NSA), जिसे आम भाषा में **रासुका** (राष्ट्रीय सुरक्षा कानून) भी कहा जाता है, भारत का एक अत्यंत कठोर निवारक निरोध कानून (Preventive Detention Law) है। यह कानून सरकार को किसी भी ऐसे व्यक्ति को हिरासत में लेने का अधिकार देता है जिससे राज्य या देश की सुरक्षा को खतरा हो।

NSA / रासुका की मुख्य विशेषताएं

- निवारक निरोध (Preventive Detention):** इस कानून के तहत किसी व्यक्ति को अपराध करने के बाद नहीं, बल्कि अपराध करने की आशंका या रोकने के उद्देश्य से गिरफ्तार किया जाता है।
- हिरासत की अवधि:** इसके तहत किसी व्यक्ति को बिना औपचारिक आरोप तय किए 3 महीने तक हिरासत में रखा जा सकता है। सरकार इसे 3-3 महीने के अंतराल पर बढ़ाकर अधिकतम 1 वर्ष (12 महीने) तक बढ़ा सकती है।
- मामले दर्ज करने की वजह:**
 - भारत की रक्षा या राष्ट्रीय सुरक्षा को खतरा।
 - राज्य की सुरक्षा या कानून-व्यवस्था (Public Order) बिगड़ने की आशंका।
 - आवश्यक सेवाओं और आपूर्ति (Essential Services/Supplies) में बाधा डालना।
 - विदेशी नागरिकों को अवैध रूप से भारत में रहने या देश से बाहर भेजने के संदर्भ में।

सामान्य कानून (IPC/CrPC) से रासुका में अंतर

सुविधा / अधिकार	सामान्य गिरफ्तारी (Normal Arrest)	रासुका के तहत हिरासत (NSA Detention)
24 घंटे में मजिस्ट्रेट पेशी	अनिवार्य	❌ लागू नहीं
वकील की सहायता	आरोपी का मौलिक अधिकार	❌ बोर्ड सुनवाई के दौरान वकील रखने की अनुमति नहीं
जमानत (Bail)	नियमित अदालत से संभव	अत्यंत कठिन, केवल हाईकोर्ट समीक्षा/एडवाइजरी बोर्ड के जरिए
एफआईआर की कॉपी/कारण	तुरंत बताना आवश्यक	❌ 5 से 15 दिनों तक कारण छुपाया/रोका जा सकता है

महत्वपूर्ण तथ्य

Manipur to update NRC with 1951 as base year, House told

Kuki-Zo Council urges the Centre to conduct the Census in the State; Home Minister informs the State Assembly that 14,992 out of 24,475 'illegal immigrants' have been pushed back into Myanmar

The Hindu Bureau
GUWAHATI

Manipur Home Minister Konthoujam Govindas on Monday informed the 60-member Assembly that the National Register of Citizens (NRC) in the State will be updated using 1951 as the base year.

Manipur is divided on the NRC issue, for which the Centre recently deferred the Census exercise in the State. While Meitei and Naga organisations want the NRC before the census and delimitation, Kuki organisations have called it "premature and unjustified".

Mr. Govindas said that the State government would pursue the implementation of the NRC with the Centre in line with the resolutions adopted by the House. He cited certain figures to justify the resolutions (2022, 2024, and on September 2).

He told the House that 14,992 out of 24,475 "illegal immigrants" detected in the State so far have been pushed back into Myanmar. The immigrants entered the country through



Women hold placards during a sit-in protest demanding the conduct and update of NRC before the Census in Imphal. ANI

three border districts – Chandel, Kamjong, and Tengnoupal. Manipur has been grappling with the influx of undocumented Myanmar nationals since the military coup in the neighbouring country in February 2021. Insisting that the pushback process was being carried out through diplomatic channels, Mr. Govindas said the government instructed the Deputy Commissioners concerned to segregate the "illegal immigrants" from

local Indian communities.

The Home Minister further informed the House that the government constituted a 12-member panel on August 7, 2024, under the chairmanship of former Minister Awangbow Newmai to detect and identify the influx of illegal immigrants and the unnatural growth of new villages. A Cabinet Sub-Committee was also constituted on February 16, 2023, in this regard.

The Kuki-Zo Council

(KZC), the apex community body, on Monday urged the Centre to conduct the Census operation in the State, insisting that "politically motivated demands" should not obstruct it.

In a memorandum to Union Home Minister Amit Shah, the KZC said any decision concerning the NRC remained within the Centre's constitutional and legal authority.

The organisation also appealed to the Centre to re-impose President's Rule in Manipur if the State government continued to fail in its constitutional duty to protect all citizens, and expedite the political dialogue towards a "separate administration" in the form of a Union Territory with a legislature for the Kuki-Zo community.

"The Kuki-Zo people seek neither privilege nor preferential treatment. We seek equal protection, justice, security, and a political future in which our people can live with dignity and without fear," the KZC said.

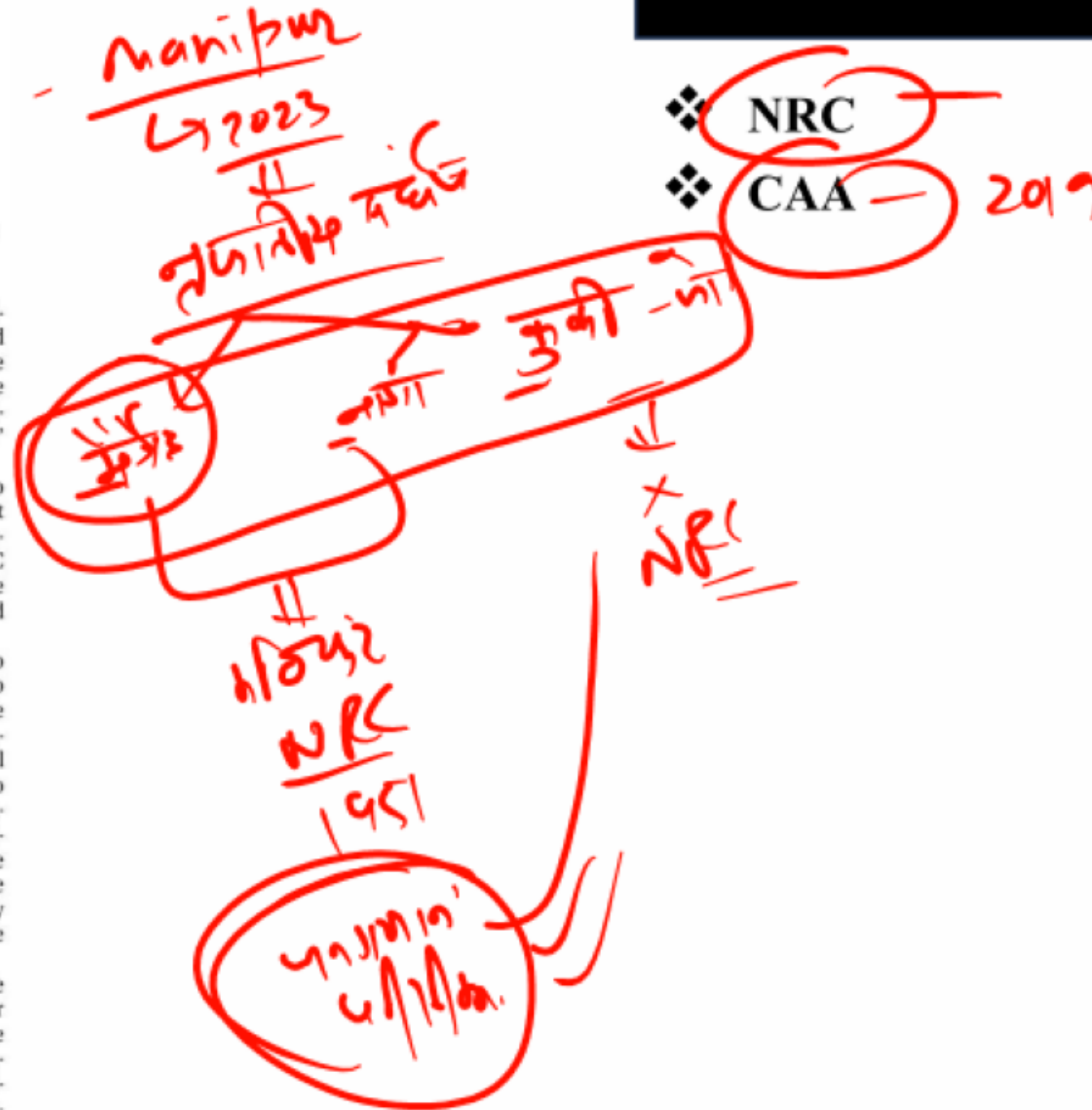
All Naga MLAs abstained from the final sitting of the Manipur Assembly session on Monday.

YouTube Homework

❖ NRC

❖ CAA

2019



Delhi HC calls for hostel audit; collapse toll 7

Building owner arrested, along with spouse and son; five Delhi local body officials suspended

Delhi govt. mulls policy for buildings used for different purposes, including as PG hostels

Rescue work completed on Monday; all the debris removed; remains of deceased handed over to kin

Shrimansi Kaushik
Soibam Rocky Singh
NEW DELHI

The death toll in the collapse of a building housing students in the Satya Niketan area rose to seven on Monday, even as the Delhi High Court expressed deep concern over the safety of students living in similar paying guest (PG) accommodations across the national capital.

It directed the Municipal Corporation of Delhi (MCD) to inspect all PG hostels under its jurisdiction within a week.

The police arrested Hariram Gupta, 82, a retired Indian Air Force sergeant; his wife Urmila Gupta, 75; and their son Mahesh Gupta, 52. While the property was registered in Ms. Gupta's name, the men's PG accommodation was allegedly being run by her husband and son, the police said.



Over the course of the 28-hour rescue operation, at least 12 people were taken to AIIMS Trauma Centre, while three were taken to Safdarjung hospital for treatment. SHASHI SHODHAK KASHYAP

A search is on for those operating it and the labour contractors that were carrying out repairs in the building's basement.

"Their role will also be examined in the case and accordingly action will be taken," said Amit Goel, Deputy Commissioner of Police, South West.

Five officials of the MCD – the civic body responsible for issuing PG licences and enforcing building norms – were suspended.

Chief Minister Rekha Gupta said the government is exploring a policy to govern buildings used for several purposes, including PG accommodations.

Over the course of the 28-hour rescue operation, at least 12 people were brought to AIIMS Trauma Centre, while three were taken to Safdarjung hospital for treatment. At AIIMS, six people were brought

BJP is evading accountability for tragedy: Rahul

NEW DELHI
Accusing the BJP government of evading accountability for the Satya Niketan building collapse in Delhi, Leader of the Opposition in the Lok Sabha, Rahul Gandhi on Monday targeted Prime Minister Narendra Modi, saying Mr. Modi uses labels such as "dimagi Naxal" (intellectual Naxal) and "naraaz phospha" (angry uncle) on anyone who asks questions. » PAGE 5

dead, while one person later died of injuries. At least three are said to be critical, the hospital said. One person is stable, while another was discharged on Sunday. The patients at Safdarjung are also stable.

The rescue work was declared complete at 5 p.m.

on Monday, with agencies saying the debris had been removed entirely from the site. The mortal remains of those deceased were handed over to the family members, the police said.

Safety of students

In the High Court, a Bench of Chief Justice R.K. Upadhyaya and Justice Tejas Karia said the deaths raised serious concerns about the safety of students living in PG accommodations and the acute shortage of hostel facilities for outstation students in Delhi. The deceased students hailed from several States, including Uttar Pradesh, Chhattisgarh, and Madhya Pradesh.

The court directed the MCD to ascertain whether PG buildings in its jurisdiction had been constructed with valid permissions, whether they complied with building bye-laws, and whether any violations

had taken place.

The High Court said the responsibility for the incident could not, *prima facie*, be confined to the property owner, as the role of university authorities and the MCD also required examination. It directed the civic body to conduct its inspection at the highest executive level and fix responsibility on public servants if the building was found to have been built without authorisation.

"These PGs are not only dangerous, they are also causing threat to the lives of students," the Bench observed, stressing the need for greater hostel capacity for students coming from across the country. A Delhi Court remanded Mr. Gupta and his wife to judicial custody, while their son has been sent to police custody for two days.

DATA POINT
» PAGE 9

Global watchdog says rise of 'digital hawala' is aiding money laundering, terror financing

Devesh K. Pandey
NEW DELHI

A centuries-old underground banking system is now transforming into a tech-enabled network, with virtual assets adding new layers to "digital hawala".

The shift is being exploited for purposes ranging from routine money laundering to, in some cases, financing terrorist organisations, the latest Financial Action Task Force (FATF) report said.

The global money laundering and terror financing watchdog's report, titled "Investigating Professional Money Laundering, Underground Banking, and the Use of Hawala and Other Similar Service Providers", identifies the fusion of virtual assets with the traditional "hawala" system as

one of the most significant developments. According to the report, nearly 70% of surveyed jurisdictions have reported the integration of new technologies into such networks.

Forms of digital hawala

The study has flagged six forms of "digital hawala" – a term covering a spectrum of technologies that facilitate the coordination, execution, settlement, or concealment of transactions.

One configuration involves digital coordination but traditional settlement, with operators using encrypted messaging applications, shared ledgers and online platforms to communicate instructions, recruit clients and couriers, and maintain records. The second is "digital customer interface", such as mobile



The latest FATF report has flagged six forms of "digital hawala". FILE PHOTO

wallets or fintech apps, although settlement between operators happens via cash or trade in both cases.

The next is virtual asset-based settlement, where stablecoins are used to settle balances directly. In the "integration with formal digital infrastructure" con-

figuration, funds are moved via payment service providers, fintech platforms, and virtual International Bank Account Numbers (IBANs).

The fifth is artificial intelligence-based tools for automated transaction structuring, dynamic mule-account routing, and high-speed fiat-to-cryptocurrency conversion. The last one involves "hawala" apps, which may be bundled digital ecosystems combining messaging, cloud storage, social media, Virtual Asset Service Providers (VASPs), lending apps, and even gaming platforms.

The FATF found that these configurations make transactions faster, more opaque and more complex, while expanding the network's reach and resilience.

The report said that digitisation is acting as a catalyst for traditional settlement mechanisms rather than replacing them, with cash remaining critical at the collection and exit points.

Turkiye case study

It cited a case study of Türkiye's discovery of a "digital hawala" network financing the terror group, the Islamic State of Iraq and the Levant (ISIL). In 2023, raids on a self-described ISIL "administrative officer" led to the seizure of about \$57,250 in cash, followed by a further \$5,54,000, along with "hawala" notebooks and digital transfer receipts.

A jeweller and two mobile phone shops operated as fronts, and the transfers were disguised as charity donations.

YouTube Homework

 **FATF**

 **PMLA**

 **ED**

महत्वपूर्ण तथ्य



- फिनेंशियल एक्शन टास्क फोर्स (FATF) ने हाल ही में अंडरग्राउंड बैंकिंग और हवाला नेटवर्क पर एक रिपोर्ट जारी की है। इसके अतिरिक्त, जून 2026 की अपनी प्लैनरी (Plenary) बैठक में FATF ने वैश्विक मनी लॉन्ड्रिंग और टेरर फंडिंग से जुड़े नए फैसले और रिपोर्ट्स प्रस्तुत किए थे।

FATF की हालिया विशेष रिपोर्ट: हवाला और अंडरग्राउंड बैंकिंग (सितंबर 2026)

- FATF की नवीनतम रिपोर्ट में दुनिया भर में अवैध वित्तीय लेन-देन, हवाला नेटवर्क और अंडरग्राउंड बैंकिंग के बढ़ते खतरे पर प्रकाश डाला गया है।
- व्यापक प्रसार: रिपोर्ट के अनुसार, 80% से अधिक देशों ने माना है कि पेशेवर मनी लॉन्ड्रिंग के लिए अंडरग्राउंड बैंकिंग और हवाला नेटवर्क मुख्य जरिया बन चुके हैं।

- **डिजिटल हवाला (Digital Hawala):** तकनीक के बढ़ते इस्तेमाल के साथ "डिजिटल हवाला" का ट्रेंड तेजी से बढ़ा है। अपराधी एन्क्रिप्टेड मैसेजिंग ऐप्स (जैसे WhatsApp, Telegram, Signal), मोबाइल वॉलेट्स, फिनटेक ऐप्स और क्रिप्टोकॉइन्स/स्टेबलकॉइन्स (Stablecoins) का इस्तेमाल करके अवैध धन को एक देश से दूसरे देश भेज रहे हैं।
- **व्यावसायीकरण (Money Laundering as a Service):** अब हवाला और अंडरग्राउंड बैंकिंग साधारण नकदी लेनदेन तक सीमित नहीं है, बल्कि यह एक व्यावसायिक ढांचा बन गया है। इसमें वित्तीय सलाहकार, वकील, अकाउंटेंट और रियल एस्टेट एजेंट भी शामिल पाए गए हैं।
- **अपराधों में विविधता:** इस नेटवर्क का इस्तेमाल सिर्फ ड्रग तस्करी के लिए ही नहीं, बल्कि साइबर क्राइम, वित्तीय धोखाधड़ी (Online Fraud), और आतंकवादी संगठनों (Terrorist Financing) को फंडिंग देने में हो रहा है।

महत्वपूर्ण तथ्य



India can cut steel emissions before coal plants lock them in

India's green steel journey is still nascent but recent developments, policies have indicated that this hard-to-abate sector's industry is rising up to the net-zero challenge, balancing growing demand with climate goals remains formidable, however, with a lot riding on the availability of green hydrogen

Twinkle Yadav

A slew of announcements over the last few months from the Indian government have placed steel sector decarbonisation high on the agenda of the country's stakeholders, including a 15,000-crore scheme announced last year to accelerate steel sector decarbonisation in the country that is set to launch in the coming months.

India's steelmaking emissions are among the highest in the world, roughly 12% higher than the global average, and account for nearly 12% of the country's total greenhouse gas emissions. Driven by strong demand from infrastructure development, construction, and automotive manufacturing, India's steel production in FY 2023-24 was the second highest in the world, at around 165 million tonnes, behind only China.

However, steel is a notoriously hard-to-abate industry, and India has its own set of challenges in bringing decarbonisation emissions down to zero.

Carbon-intensive method

The government's ongoing National Mission on Green Steel aims to lower steelmaking emissions intensity by nearly one tonne (1,000 kg) down to 2.1 tonnes of carbon dioxide equivalent (CO₂e) per tonne of crude steel by 2030-31. A certification scheme is launched under the Mission in 2024 and any steel manufacturer with an emissions intensity of less than 3.1 t/t CO₂e will be considered "green" and the government could still have an intensity of up to 2.5 t/t CO₂e.

Indeed, the private estimates that steelmaking lower around 1.80-1.75 t/t CO₂e, making India's current steel still highly carbon-intensive.

"India is a developing economy, and we do not have much scrap available. If we have sufficient scrap, we can switch that usage to produce new steel, which reduces our costs and emissions associated with making new steel," Anshu Aggarwal, an analyst at the Centre for Research on Energy and Clean Air, an independent research organisation, said.

The traditional way to make steel involves heating coal to provide intense heat in a blast furnace, where iron ore is melted into liquid form using adding coal-to-iron scrap. The carbon-rich liquid is then treated with pure oxygen at high speed in electric scrap furnace to convert it into high-quality molten burning away of the impurities. This method, called BF-BOF (blast furnace-basic oxygen furnace), is widely used worldwide, and it is highly carbon-intensive.

Reducing emissions to produce green steel will involve skipping the first step entirely, when possible, by melting steel scrap to produce new steel and recycling coal-powered blast furnaces with electric arc furnaces (EAFs), which use electricity to produce steel from scrap, or direct reduced iron (DRI). Steel with a new zero-carbon footprint involving scrap (i) emissions could also use green hydrogen instead of natural gas to reduce iron ore and be powered by clean electricity generated from renewable sources.

However, 30-40% of global steelmaking still uses BF-BOF, according to a Nature Reviews Chemistry article. The remaining uses the EAF method, which has less than half the emissions intensity of BF-BOF steel.

Just a reflection

In India, the steel industry is incredibly more heterogeneous, as per an India Steel Association report, 41% of total crude steel is produced at BF-BOF plants, 38% from EAF paths, and 19% from electric induction furnaces which use electromagnetic heating systems and batches of scrap or DRI and are known to be energy-efficient. Given the growing demand for used and recycled plastic steel plants, BF-BOF capacity is projected to increase to 50% by 2030.

In these circumstances, India essentially has a large window of opportunity to increase use of the bigger players in green steel and iron production. "If India decides to go the easy route and invest in greater pathways rather than in coal-based steel, China's efforts, a researcher working on steel sector decarbonisation at the Potsdam Institute for Climate Impact Research, Germany, and lead author of a recent paper investigating pathways to zero-house emissions from steel industry through strategic green investments, said.

"And this greener pathway also has high potential for emission reductions compared to the cost of reducing steel



The molten metal is being poured from a ladle into a mould, where it is solidified into liquid form using cooling coils to shape it. Representative image, not for scale.

emissions have mostly using technology with carbon capture and storage or carbon dioxide removal," she added. According to the paper, published in Nature Climate Change, avoiding new BF-BOF and not relying on scrap furnace that are due for use, and diverting the investments in building EAFs, could almost halve global emissions and emissions.

"It is true that since the majority of these BF-BOF plants in India have not been greened, you could expect emissions growth towards 2040-45, and this would not require additional investments. It would just be a reflection," Dr. Bachert said.

India's steel plants are indeed headed for exiting their furnace, a capital-intensive but essential maintenance task done every two decades that can extend a plant's lifetime by another 10-20 years. "In while looking to coal-based steel production and high emissions for that time, more than 40 million tonnes per annum of blast furnace capacity is due for retiring before 2030, according to an analysis by Deloitte, an independent research body examining India's decarbonisation efforts based on steel sector.

Twisting technology

In their study, Bachert et al. modelled two global steel sector transition pathways aligned with 1.5 degree climate of warming by the end of the century, with emissions of up to 1.7 degree Celsius. They found China and India dominate the dynamics of the last two decades, directly their way into BF-BOF investments that far exceed those of other regions.

In the slow transition scenario, using blast furnaces are reduced and accelerated BF-BOF plants are developed at slower, taking 10-15 years for decades and relying significantly more on already mature carbon dioxide removal

technologies in later, in addition to deep emissions cuts in other sectors to compensate for steel sector emissions. To offset, the team's analysis showed early investment shifts – particularly in rapidly growing economies such as India – can substantially reduce future emissions at comparatively low costs, making early action in steel a high-leverage climate mitigation opportunity as in the last transition scenario.

"India, it is the most mature green technology that you operate, either with natural gas, which still has emissions of around 1.8 t/t CO₂e per tonne of steel or with green hydrogen, which is then almost zero emissions," Dr. Bachert said.

According to the team's model, India first operates these BF-BOF plants at roughly with natural gas until 2040-2050, after which it switches to hydrogen or green hydrogen becomes sufficiently competitive. "If you wanted to operate such a plant with green hydrogen, my feeling is that this would be a very high cost," she continued.

In conclusion, the researchers suggested steel is not a "hard-to-abate" sector that is a sector lacking a "hard-to-abate barrier" that can be overcome at relatively moderate costs through timely investment decisions.

Defining green steel?

"When you compare a sector like steel with others, it is relatively much more to abate because the technology is already there, even though it is more expensive," Dr. Bachert said.

"The one thing to pay the green premium and basically go over this investment barrier. But even you cannot, it is one of the most difficult hard-to-abate sectors."

"If we invest in EAF now, it could be much easier for us to make it easier later

rather than investing in BF-BOF now and becoming a stranded property later," Dr. Aggarwal said. "Because we have already seen this with thermal power plants, where it becomes really difficult to close them down, as a lot of investment has gone into them, and you want a return on your investments. We do not want to repeat the same story with steel." However, she warned that natural gas-based EAFs also carry the risk of fuel shortages, import dependence, geopolitical shocks, and stranded natural gas infrastructure when used as a bridge fuel to reduce steel emissions.

According to Aggarwal, India's steel plants have the first integrated steel producer to reduce green steel certification in industry this year. According to green sector (GSA), BF steel plants had been awarded the same certification as of March 31, covering a production volume of 12.34 million tonnes.

"You may have your doubts about whether India's green steel is really green, and the brackets for green steel certification are too high not to be very effective, but then at the end of the day we have taken that initiative of defining what green steel is, unlike anywhere else in the world," Dr. Aggarwal added. "What we have not done is close the kind of market where there is also demand for green steel."

Future green pathway?

This January, the European Union's Carbon Border Adjustment Mechanism came into effect, imposing steep penalties on carbon-intensive imports, including India's high-emission steel, which is expected to several European countries. In response, India has been working alternative markets and boosting domestic consumption, while the market and compliance obligations may be forcing the steel industry to rethink investment decisions and adopt steel production on a large scale with lower emissions intensity.

In March, the Union Ministry of New and Renewable Energy funded three pilot green hydrogen projects totalling more than 10,000 tonnes per annum innovation and validate the technical feasibility of using 100% green hydrogen in furnace and other stages for low-carbon steel production. Last year, BHEL (Bhilai Steel Plant) was the first, and India's largest, commercial-scale green hydrogen plant in Karnataka's Vijayanagara to supply 100% green hydrogen to adjusting BHEL steel's 240 tons.

According to Aggarwal, India, in the meantime, is providing its green steel to buyers interested in reducing their scope 1 emissions.

India's green steel journey is still nascent but recent developments and policies have indicated that this hard-to-abate sector's industry is rising up to the net-zero challenge. However, balancing growing demand with climate goals remains a formidable challenge for now, with a lot riding on green hydrogen availability and affordability. (The Wire) (Email: an.singh@thewire.com)



An electric arc furnace melting scrap into a molten steel. The transition could cut the steel's carbon footprint.

महत्वपूर्ण तथ्य



- भारत के इस्पात (Steel) क्षेत्र में द्वितीयक इस्पात (Secondary Steel) उद्योग की भूमिका बेहद महत्वपूर्ण है। भारत सरकार के इस्पात मंत्रालय ने इस क्षेत्र को आधुनिक, ऊर्जा-कुशल और पर्यावरण के अनुकूल बनाने के लिए दिशा-निर्देश और नीतियां तैयार की हैं।

National Strategy for Sustainable Secondary Steel Scheme (राष्ट्रीय टिकाऊ द्वितीयक इस्पात रणनीति)

- द्वितीयक इस्पात क्षेत्र वह है जो स्क्रेप (Scrap/रद्दी लोहा), डायरेक्ट रिड्यूस्ड आयरन (DRI/स्पंज आयरन) या पिग आयरन का उपयोग करके इंडक्शन फर्नेस (IF) और इलेक्ट्रिक आर्क फर्नेस (EAF) के जरिए इस्पात का निर्माण करता है।
- मुख्य उद्देश्य:
 - प्राथमिक (Primary) इस्पात निर्माताओं (जैसे SAIL, Tata Steel) की तुलना में द्वितीयक इस्पात क्षेत्र को अधिक कुशल, प्रतिस्पर्धी और हरित (Green Steel) बनाना।
 - डीकार्बोनाइजेशन (Decarbonisation): कार्बन उत्सर्जन को कम करना और स्क्रेप-आधारित इस्पात निर्माण को बढ़ावा देना।
 - गुणवत्ता में सुधार: BIS (भारतीय मानक ब्यूरो) के मानदंडों को लागू करके उत्पादित इस्पात की गुणवत्ता में सुधार करना।

2070 Net Zero Emission

प्रमुख घटक:

- National Steel Scrap Recycling Policy:** स्क्रेप की उपलब्धता बढ़ाने के लिए व्हीकल स्क्रेपेज नीति और स्क्रेपिंग सेंटर्स का विकास।
- ऊर्जा दक्षता (Energy Efficiency):** इंडक्शन फर्नेस में नई तकनीकों और सौर/नवीकरणीय ऊर्जा के इस्तेमाल को बढ़ावा देना।
- PLI स्कीम का सहारा:** विशेष (Specialty Steel) और गुणवत्ता वाले इस्पात के उत्पादन के लिए इंसेंटिव देना।

भारत का इस्पात उत्पादन, आयात और निर्यात (Steel Sector Statistics)

- भारत विश्व का दूसरा सबसे बड़ा कच्चा इस्पात (Crude Steel) उत्पादक देश है (चीन के बाद)। वित्तीय वर्ष 2024-25 और 2025-26 के आंकड़ों के अनुसार भारत का व्यापार और उत्पादन परिदृश्य:
- 1. उत्पादन (Production):**
 - भारत का कुल कच्चा इस्पात उत्पादन लगभग 140 - 145 मिलियन टन (MT) प्रति वर्ष के स्तर पर पहुंच चुका है।
 - इसमें से लगभग 40% से 45% हिस्सा द्वितीयक इस्पात क्षेत्र (Secondary Steel Sector) से आता है।

महत्वपूर्ण तथ्य



2. आयात (Imports):

- भारत प्रति वर्ष लगभग 8 से 10 मिलियन टन (MT) इस्पात का आयात करता है।
- चिंता का विषय: हाल के वर्षों में चीन, दक्षिण कोरिया और वियतनाम से सस्ते और अतिरिक्त इस्पात के आयात (Dumping) में वृद्धि देखी गई है, जिस पर सरकार 'एंटी-डंपिंग ड्यूटी' या आयात शुल्क के जरिए नियंत्रण लगाने का प्रयास कर रही है।

3. निर्यात (Exports):

- भारत प्रति वर्ष लगभग 4.5 से 6.5 मिलियन टन (MT) तैयार इस्पात (Finished Steel) का निर्यात करता है।
- प्रमुख निर्यात बाजार: यूरोप (EU देश), मध्य पूर्व (Middle East), और दक्षिण-पूर्व एशियाई देश।
- चुनौती: यूरोपीय संघ द्वारा लागू किए जा रहे CBAM (Carbon Border Adjustment Mechanism - कार्बन बॉर्डर टैक्स) के कारण भारत से यूरोप को होने वाले इस्पात निर्यात पर सख्त पर्यावरणीय मानक लागू हो रहे हैं।
- राष्ट्रीय इस्पात नीति 2017 (National Steel Policy 2017) का लक्ष्य भारत सरकार ने लक्ष्य रखा है कि वर्ष 2030 तक भारत की कुल कच्चा इस्पात उत्पादन क्षमता को 300 मिलियन टन (MT) तक पहुंचाया जाए, जिसमें द्वितीयक इस्पात क्षेत्र की भागीदारी महत्वपूर्ण होगी।

महत्वपूर्ण तथ्य

YouTube Homework

Ground control

ISRO must focus on space technology as a tool for development

The irony was evident: on the day the Indian Space Research Organisation (ISRO) had its greatest success of the year – the launch of its first geosynchronous imaging satellite (EOS-05) on a temperamental GSLV – its employee organisations demanded clarity on its long-term plans. But this grievance was long in the making. Since the Indian Space Policy of April 2023, the message has been clear that ISRO would, one day in the unspecified future, stop making commercial satellites and launch rockets. Clearly inspired by NASA, it expects to focus on ambitious exploratory missions and, literally, moonshots. Why would a space agency ramping up space missions upset a section of employees? This is not the paradox it presents. The letter, co-signed by nine employee associations, and addressed to the chairman, seeks clarity on staff-strength, recruitment and the outsourcing of core functions. ISRO says that it will “not be privatised or reduced”; IN-SPACE, set up to facilitate private participation, says the agency will “not be diminished”, only that the industry’s role must grow. Both are silent on the core concern – potential job losses. This brings up an underlying tension that ISRO must deal with: does its vision of India’s space sector align with its founding principles, of not being enamoured of space races and being laser-focused on space technology as a tool for social development? Or is the image of power, where India is one of a handful of space-faring countries with a mushrooming of ‘space startups’, now the bedrock of that vision?

With a budget 16 times the Department of Space’s – \$24.4 billion against ₹13,705 crore – NASA too has scaled back since the 1960s: from 0.7% of American GDP in 1966 to 0.1% now, and from 36,000 civil servants at Apollo’s peak to about 14,000 today. Unlike NASA, which in its early years designed and made every nut and bolt, ISRO has always had a manufacturing relationship with the private sector (Walchandnagar, L&T). What is different is that the buzz is not about established companies building on experience but new entrants with fleeting foreign capital, most interested in satellite data as a service. No sector can hope to be static; survival can mean significant changes to how it operates. There is yet no serious reckoning with the might of China’s space programme. If India’s space sector in 2035 is to be known as a source of export earnings, a nucleus of value-added services that brings in jobs and absorbs skilled labour, then hard choices taken today may be worth it. But jumping onto a bandwagon of space – as fuel for the science fiction fantasy of billionaires and colonial notions of conquest, to align with some misplaced notion of an ‘exclusive’ club – is foolhardy. ISRO must have a transparent policy that spells this out.

Editorial

कल का ल Notes

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ISRO - GSLV F-17 - EOS-05

ISRO

Privatization - 2014

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महत्वपूर्ण तथ्य



India's opportunity to put BRICS back together →

BRICS
12-13 September 2026
New Delhi
अद्यतन तथ्य

BRICS has strayed quite far from where it started. To be held this weekend (September 12-13, 2026) the 18th BRICS Summit, in New Delhi, gives India a huge opportunity to bring coherence back to the expanded group and give it direction if it is to be an effective body in shaping global events.

BRICS was formed to give a greater voice to Brazil, Russia, India, China and South Africa, the emerging economies, in global governance and institutions, particularly financial and economic institutions, and to aim for a more equitable multilateral order. India was initially an enthusiastic participant, seeing the group as a vehicle for genuine reform of multilateral institutions. The first summit hosted by India (the fourth BRICS summit), in 2012, focused on the theme "Global Stability, Security and Prosperity," tacitly reflecting a much broader geopolitical canvas. The Indian presidency helped lead to the establishment of the BRICS Bank, the New Development Bank. Other Indian initiatives followed, including the integration of a counter-terrorism architecture into BRICS' work.

The emergence of the China challenge
However, China had other plans. At the time, even if it was not anti-West, China saw BRICS as a counterpoise to western domination – a view that India also initially shared in the context of reform. More importantly, China needed a group such as BRICS, consisting of emerging economies, to amplify its global ambitions, given that BRICS countries accounted for nearly 20% of world GDP in 2010. Further, China wanted to use BRICS mechanisms such as BRICS Plus and BRICS Outreach to reach out to the Global South and consolidate their profile as a second pole in a future bipolar world.

Suddenly, India not only had a reform agenda on its hands but also had to act as a counterweight to China's larger designs on BRICS. India, Brazil and South Africa soon realised that Chinese support for the reform of multilateral institutions was selective. For example, China resisted supporting the three countries' bid for permanent seats on the United Nations Security Council. Consequently, India started focusing more on BRICS consolidation and intra-BRICS matters to resist Chinese grandstanding. In fact, this year's theme for India's chairship has four pillars – Resilience, Innovation, Cooperation and Sustainability – and draws on Prime Minister Narendra Modi's vision of "Humanity First" and a "people-centric" approach to BRICS cooperation.

In addition, there was a real danger that the principle of consensus, which had kept BRICS a cohesive group, would be bypassed and that BRICS would go the way of the Shanghai Cooperation Organisation (SCO), where the majority can bulldoze their views through. India and Brazil resisted these efforts. The 2019 BRICS Summit in Brasilia was held without any other invited guest countries – just the five original members. But in 2020, under the Russian presidency, probably the first non-consensus chair's statement on COVID-19 was issued,



T.S. Tirumurti

Chair,
Steering Committee,
Deccan Centre
for International
Relations,
former Permanent
Representative of
India to the United
Nations, New York,
and former Sherpa
of BRICS

bypassing the sacred principle of consensus. If non-consensus documents are increasingly resorted to, as we saw at the BRICS Foreign Ministers' meeting in May 2026 in New Delhi due to the inability of the new members to agree, then BRICS will cease to be effective.

Membership expansion tests BRICS cohesion

But then, it was difficult to resist the Chinese juggernaut. China pushed for the expansion of the New Development Bank and then for the expansion of BRICS itself. India resisted, as did Brazil. But that was not to be, and BRICS now has 11 members, following the addition of Egypt, Ethiopia, Iran, Saudi Arabia, the United Arab Emirates and Indonesia, as well as 10 partner countries.

India's sagacity has now been vindicated, as the new members of BRICS have started fighting among themselves. While the original five have their differences, some of them serious, they know how to address them with maturity for the greater good of the group. The new members do not have any such compunctions and are subverting BRICS through their bilateral conflicts. BRICS should not go the way of the South Asian Association for Regional Cooperation (SAARC), with bilateral disputes paralyzing the group.

In addition, the tussle over the direction BRICS should take has begun. India has tried to keep BRICS as a "non-West" group, as opposed to the increasing pressure from some members to turn BRICS into an anti-West group. An anti-West slant is becoming increasingly difficult to avoid, with China competing with the United States for global leadership, Russia at war with Ukraine with the full backing of Europe, and Iran being bombarded by the U.S. and Israel. It becomes even harder to maintain the "non-West" line when Brazil and India have been subjected to punitive tariffs by U.S. President Donald Trump, and the U.S. Congress is considering legislation that would give the President the power to levy punitive tariffs on countries importing Russian oil. The question being asked is: how can India stop BRICS from becoming anti-West at a time when the Quad (Australia, India, Japan, the U.S.) is being emasculated by the U.S., India-U.S. relations are under great pressure, Pakistan is being courted by the U.S. at India's expense, and global institutions are being made dysfunctional by the West? The more erratic the U.S. is vis-à-vis BRICS, the greater the chances of BRICS going in the wrong direction. Fortunately, India's effort to prevent an anti-western drift is shared by many other BRICS members, since they too have much to gain by engaging with multiple actors from different camps in their national interest. They want change, but not geopolitical realignment with China and Russia. This is the direction of BRICS's future.

But there is a much larger question. Both the U.S. and China are enunciating parallel visions of the world and playing by their own rules, rather than internationally negotiated ones. Both are, in effect, challenging existing international norms and global institutions and setting up parallel

structures and standards in emerging areas such as Artificial Intelligence, digital and Internet governance, data ownership, state control, 5G/6G and telecom, satellite navigation, and electric vehicles. Neither is looking for reform of existing institutions. China has just set up a new World AI Cooperation Organisation in Shanghai, in addition to other parallel initiatives such as the Asian Infrastructure Investment Bank, the Belt and Road Initiative and the Digital Silk Road, which challenge the Bretton Woods institutions and their governance and financing models. They see BRICS as one of the vehicles through which to pursue their broader goals. For example, the push for de-dollarisation through the establishment of a parallel BRICS currency is receiving a lukewarm response, since many members are uncomfortable with a renminbi-dominated currency and would prefer merely interlinking payment systems, central bank digital currencies and national-currency transactions. Nevertheless, after the success of its pilot project, China is formally launching its ambitious mBridge, an alternative financial payment system. The last thing India wants is an alternative Bretton Woods system dominated by China.

India can course correct BRICS

The 2026 Summit in Delhi provides an opportunity for course correction, and India has worked hard to persuade the new members to overcome their political differences. In a world in flux, India has to revive the original *raison d'être* of BRICS and shape the expanded grouping into a vehicle for reform and stability, while stopping others from hijacking it.

At the 2018 BRICS Summit in South Africa, Mr. Modi first articulated his vision of "reformed multilateralism" at the leaders' retreat. By 2019, this vision had found its way into the BRICS Summit document in Brasilia, with India, Brazil and South Africa pushing for it. The time has come to revive this agenda and make BRICS a strong voice for the "non-West" middle powers – and, by extension, for the Global South.

In Davos, the Canadian Prime Minister spoke about broadly West-centric middle powers coming together. A Global South middle power is very different. And if there is a credible organisation of Global South middle powers, it is BRICS. It has its problems. To begin with, China is hardly a middle power and has disproportionate influence within BRICS. India and China need to find greater synergy on emerging global issues, even as their bilateral differences are being contained. Further, some middle powers that ought to be there are not represented in BRICS. However imperfect its composition may be, it is clear that BRICS has great geopolitical and geo-economic potential.

At a time when the profile of BRICS is only increasing, with many countries wanting to join it, India should proactively embrace the BRICS reform agenda to serve its larger interest of multi-alignment. If India does not, others will take BRICS in a different direction.

The Delhi summit offers India an opportunity to restore BRICS's original purpose

महत्वपूर्ण तथ्य



भारत में 18वाँ BRICS शिखर सम्मेलन (India's Presidency - 2026)

- BRICS की अध्यक्षता वर्णमाला क्रम (B-R-I-C-S) के अनुसार रोटेट होती है। 2024 में रूस (कज़ान) और 2025 में ब्राजील के बाद, वर्ष 2026 में 18वें BRICS शिखर सम्मेलन की मेजबानी भारत कर रहा है। (भारत इससे पहले 2012, 2016 और 2021 में मेजबानी कर चुका है)।
- BRICS दुनिया की प्रमुख उभरती हुई अर्थव्यवस्थाओं (Emerging Economies) का एक अंतर-सरकारी संगठन है। यह पश्चिमी देशों के वर्चस्व वाले आर्थिक-राजनीतिक संगठनों (जैसे G7, IMF, World Bank) के समकक्ष 'ग्लोबल साउथ' (Global South) की आवाज़ बनने के लिए गठित किया गया था।

1. इतिहास और विकास की समयरेखा:

- 2001:** 'गोल्डमैन सैक्स' के अर्थशास्त्री जिम ओ'नील (Jim O'Neill) ने एक रिसर्च पेपर में **BRIC** (Brazil, Russia, India, China) शब्द गढ़ा। उनका अनुमान था कि ये चार देश 2050 तक वैश्विक अर्थव्यवस्था पर हावी होंगे।
- 2006:** चारों देशों के विदेश मंत्रियों की बैठक के साथ औपचारिक संवाद शुरू हुआ।
- 2009:** रूस के येकातेरिनबर्ग में पहला BRIC शिखर सम्मेलन आयोजित हुआ।
- 2010:** दक्षिण अफ्रीका शामिल हुआ और इसका नाम **BRICS** हो गया।
- 2024 (BRICS+ विस्तार):** 1 जनवरी 2024 को ऐतिहासिक विस्तार हुआ। इसमें मिस्र (Egypt), इथियोपिया (Ethiopia), ईरान (Iran), और संयुक्त अरब अमीरात (UAE) आधिकारिक तौर पर नए सदस्य बने।

महत्वपूर्ण तथ्य



2. BRICS की वैश्विक क्षमता

- **जनसंख्या:** विश्व की लगभग 45% से अधिक आबादी इन देशों में रहती है।
- **अर्थव्यवस्था:** वैश्विक सकल घरेलू उत्पाद (GDP - PPP के आधार पर) में इसकी हिस्सेदारी लगभग 35-37% है, जो G7 देशों से अधिक है।
- **वैश्विक तेल उत्पादन:** नए सदस्यों (विशेषकर UAE और ईरान) के जुड़ने से दुनिया का लगभग 40% से अधिक कच्चा तेल BRICS+ देश नियंत्रित करते हैं।

3. मुख्य संस्थागत संरचना:

- **न्यू डेवलपमेंट बैंक (NDB):** 2014 में फोर्टालेज़ा सम्मेलन (ब्राजील) के दौरान स्थापित। मुख्यालय: शंघाई (चीन)। यह IMF और वर्ल्ड बैंक का विकल्प बनकर विकासशील देशों को बुनियादी ढाँचे (Infrastructure) के लिए ऋण प्रदान करता है।
- **कंटेनजेंट रिज़र्व अरेंजमेंट (CRA):** वैश्विक वित्तीय संकट या भुगतान संतुलन (Balance of Payments) की स्थिति से निपटने के लिए एक आपातकालीन कोष।

महत्वपूर्ण तथ्य

CACHE

Can air-cooling handle the heat from a 1-GW data centre?

Air-cooling uses less water and is cheaper and well-established, but it cannot practically handle the heat load of a 1-GW data centre on its own, while liquid-cooling imposes higher costs upfront, air-cooling imposes a performance and efficiency tax.

Yandean Wikandh

The story so far

Following sustained local protests and pressure from civil society groups, Google has reportedly said its planned 1-GW data centre in Vishakhapatnam district will use air-cooling technology to cool its servers. While air-cooling requires less water, it comes with its own trade-offs.

Why does a large data centre generate heat?

A large data centre will have several million processors, each with billions of transistors. Each transistor manipulates the electrical current flowing through it to perform operations on data. As it does, the resistance the transistor's material poses to the flow of current will release some heat, as will the charging and discharging of transistors. Across trillions of transistors, the amount of heat thus generated can be considerable.

A 1-GW data centre will in principle produce 1 GW of heat. The planned Google 'hyperscaler' near Vishakhapatnam and the newly announced Tata Consultancy Services (TCS) 'HyperVault' will each be 1-GW facilities. How much of that power is for the data centre alone is unclear. Assuming it is 1 GW, each facility will effectively have to remove 1 GW of heat out of and into the environment. In the very first step, the heat from each chip is moved from the silicon die holding it to a designated heat sink, such as a cooling plate. But what happens from the heat sink depends on which cooling technology the facility uses.

How does a data centre move heat?

Since the heat comes from transistors, it helps to understand the architecture first. Billions of transistors make a processor. One or more processors make up a server. Multiple servers fill a rack. Multiple racks are combined into clusters. Multiple clusters make up one data centre.

There are several cooling options depending on economic feasibility, scale of operations, and local conditions.

In air-cooling, fans push cool air through or around the server racks, and the hot air at the end is collected and cooled. Some common configurations include computer room air conditioning (CRACs), which use ACs with refrigerants; computer room air handlers (CRAHs), which use chilled water to cool the air; hot aisle/cold aisle containment, where hot and cold air are kept physically separate; and free cooling, where heat from servers is simply expelled into naturally cooler outside air. A related version is the rear-door heat exchanger: air leaving the servers passes through a heat exchanger attached to the back of each rack, where chilled water absorbs the heat, and the cooler air is returned to the servers.

Another popular option is direct liquid cooling, where a specific liquid is brought in contact with the components generating heat. In one version called cold-plate cooling, a metal plate embedded with channels to carry the liquid is placed directly against a processor. The liquid draws the heat via the plate and flows from there via tubes to a heat exchanger, where it loses the heat, before returning. Liquid-cooling is usually more effective than air-cooling because water-based liquids typically have higher



Close encounters: An Amazon Web Services data centre adjacent to single-family homes in Stone Ridge, Virginia, U.S.A.

heat capacity than air, for the same volume. The heat capacity of a substance is the amount of heat it has to be given to raise its temperature by, say, 1°C. So the higher its heat capacity, the more heat it can absorb before itself warming up.

That said, the server can still air-cool those components that do not merit liquid cooling. Third is an option called immersion cooling, where the electronics themselves are immersed in a non-conductive liquid. In single-phase immersion, the liquid draws heat, which is pumped away through a heat exchanger. In two-phase immersion, the liquid boils as it draws heat; the heat is drawn away, e.g., by a fan, and the vapour condenses back. The latter is useful because heat transfer is more efficient at higher temperatures.

Because the heat sink of a liquid is in contact with the electronics, the heat is moved more efficiently, and so immersion cooling can handle very high power densities. However, it requires specialised hardware and maintaining the coolant through complex processes.

Fourth is evaporative-cooling: the heat is removed from the servers, e.g., using air-cooling, then transferred to water, which is then allowed to evaporate in cooling towers or evaporative condensers. If the local air isn't very humid, evaporative-cooling can be highly energy efficient. However, it requires large quantities of water.

Another similar option is dry-cooling, where a heat exchanger is simply exposed to the ambient air and fitted with large fins to encourage the heat to leave. While this avoids the water demand of evaporative-cooling, it also incurs large heat-exchange surfaces, especially in places with warm weather.

Then there are chilled-water systems that use a central chilled water plant; geothermal heat rejection, an experimental technology where the heat is pumped into heat exchangers underground; natural water cooling, where a large, natural water body like a nearby lake is used as the heat sink, and

heat sense, where the heat is moved to serve applications like industrial processes or desalination.

All of them come with trade-offs. E.g., the geothermal option is hard to scale up while moving heat is hard without heat pumps because the heat usually needs to be at a higher temperature to be useful.

Is air-cooling good?

Generally, air-cooling imposes lower infrastructure costs up front than a liquid-cooling setup. Current construction benchmarks suggest liquid-cooled facilities will incur a 7-10% premium on the total project cost due to the demand for complex piping and leak detection systems and special coolant distribution units.

Air-cooling is also a proven technology by now and comes with a deep and mature pool of technicians and maintenance protocols. In fact, irrespective of the cooling technology used in a cluster's heat hotspots, engineers often prefer to air-cool racks producing 20 kW or less of heat. It is an added bonus if the ambient conditions are naturally cool or arid, in which case air-side economisers that pull in outside air for cooling purposes can reduce the energy diverted to mechanical cooling by 70%. But all this said, as of 2026, using air-cooling alone to cool a 1-GW data centre is considered impractical, both physically and economically. While liquid-cooling imposes higher costs upfront, air-cooling levies a performance and efficiency tax, so to speak, that can increase the total cost of ownership for an air-cooled 1-GW facility within a few years of operation.

The most important reason is the 'thermal wall': air-cooling can remove at best around 40 kW per rack. However, modern artificial intelligence (AI) chips like the Nvidia Blackwell generate 700-1,000 W per GPU, so a rack could emit around 120-150 kW. At this scale, air-cooling the racks will require them to be installed inside a wind tunnel, with the power consumption skyrocketing.

Air-cooling will also demand acoustic control as the number of fans and chillers required will create large amounts of noise.

In fact, air-cooling chillers and air handling units can produce up to 100 dB, and if the resulting low-frequency hum is not quickly dampened, it can travel several kilometres if atmospheric conditions are also favourable, disturbing the sleep of people in the way. For this mix of pros and cons, many 1-GW data centres today use hybrid cooling: air-cooling for low-density servers and other areas, rear-door heat exchangers to push air-cooling to remove up to 50 kW, and direct-to-chip (DTC) liquid-cooling for high-density AI clusters, including the Nvidia Blackwell.

What have Google and TCS committed to?

After concerns were raised about the water demands of the Google hyperscaler data centre, Vishakhapatnam MP M. Jagan said, "Google has confirmed it will use air-cooling technology... there is no question of impact to water supply."

The tech giant has also said it will replenish 100% of water consumed for non-cooling needs across its operations by 2030, quantified under the Volumetric Water Benefit Accounting standard. Hindustan Times also quoted Alexander Smith, principal of Global Infrastructure and Energy, Asia Pacific, Google, as saying "Google is also planning integrated watershed management measures, including rainwater catchment systems on data-centre buildings, groundwater recharge infrastructure, water pumps, and water ATMs".

Likewise, after quoted HyperVault CEO Deepesh Kisan Nanda saying, "We are building infrastructure for where AI is going: higher density, liquid cooling, larger power blocks, and faster deployment". Per news agency ANI, the HyperVault will also feature DTC cooling as well as use renewable energy.

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S&T
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ऊर्जा → बिजली

Cooling

Water Cooling

Air-Cooling

महत्वपूर्ण तथ्य



- डेटा सेंटर (Data Center) क्या है? डेटा सेंटर एक विशेष रूप से बनाई गई भौतिक सुविधा (Physical Facility) होती है, जहां बड़ी संख्या में नेटवर्क सर्वर, डेटा स्टोरेज सिस्टम और आईटी इंफ्रास्ट्रक्चर रखे जाते हैं। इनका मुख्य काम डेटा को प्रोसेस करना, स्टोर करना, मैनेज करना और इंटरनेट के माध्यम से ट्रांसफर करना होता है। आप जो भी ऑनलाइन सर्विसेज (जैसे UPI, OTT ऐप्स, सोशल मीडिया, क्लाउड स्टोरेज या सरकारी पोर्टल्स) इस्तेमाल करते हैं, उनका सारा डेटा इन्हीं सेंटर्स में सुरक्षित रहता है।

भारत सरकार और राज्य सरकारों के प्रयास

- डेटा को देश की सीमाओं के भीतर रखने (Data Localisation) और भारत को एक ग्लोबल डेटा हब बनाने के लिए केंद्र और राज्य सरकारों ने कई महत्वपूर्ण नीतियां और प्रोत्साहन लागू किए हैं:

1. केंद्र सरकार के कदम:

- ड्राफ्ट नेशनल डेटा सेंटर पॉलिसी (National Data Center Policy): इसके तहत डेटा सेंटर्स के निर्माण के लिए सिंगल-विंडो क्लीयरेंस, सस्ती बिजली और 'डेटा सेंटर पार्क्स' स्थापित करने के लिए दिशानिर्देश बनाए गए।
- इन्फ्रास्ट्रक्चर का दर्जा (Infrastructure Status): सरकार ने डेटा सेंटर्स को 'इन्फ्रास्ट्रक्चर' का दर्जा दिया है, जिससे कंपनियों के लिए बैंकों से रियायती दरों पर लंबे समय के लिए लोन लेना आसान हो गया है।
- डिजिटल पर्सनल डेटा प्रोटेक्शन (DPDP) एक्ट: इस कानून के लागू होने से भारतीय नागरिकों के संवेदनशील डेटा को भारत के भीतर ही प्रोसेस और स्टोर करने की अनिवार्यता बढ़ी है, जिससे नए डेटा सेंटर्स की मांग तेजी से बढ़ी है।
- PLI और डिजिटल इंडिया प्रोत्साहन: इलेक्ट्रॉनिक्स और आईटी इंफ्रास्ट्रक्चर के स्वदेशी निर्माण को बढ़ावा देने के लिए इंसेंटिव दिए जा रहे हैं।

महत्वपूर्ण तथ्य



2. राज्य सरकारों की नीतियां (State Policies):

- **महाराष्ट्र:** भारत का सबसे बड़ा डेटा सेंटर हब है। राज्य सरकार बिजली शुल्क में छूट, सस्ती दरों पर भूमि और नवीकरणीय ऊर्जा (Solar/Wind) के इस्तेमाल पर सब्सिडी प्रदान करती है।
- **तमिलनाडु & कर्नाटक:** समर्पित डेटा सेंटर नीतियां (Dedicated Data Center Policies) लागू की हैं, जिनके तहत स्टाम्प ड्यूटी में छूट, सिंगल-विंडो क्लियरेंस और सब-सी केबल लैंडिंग स्टेशनों का फायदा मिलता है।
- **उत्तर प्रदेश:** ग्रेटर नोएडा क्षेत्र में डेटा सेंटर पार्क्स के लिए जमीन और बिजली में रियायतें देने की विशेष नीति बनाई है।
- **तेलंगाना:** हैदराबाद को आईटी और क्लाउड इंफ्रास्ट्रक्चर हब बनाने के लिए विशेष नीतियां और 24x7 निर्बाध बिजली आपूर्ति की गारंटी दी गई है।

भारत में प्रमुख डेटा सेंटर लोकेशन (कहां-कहां स्थापित हैं)

- भारत में डेटा सेंटर्स का बड़ा हिस्सा उन तटीय और प्रमुख आईटी शहरों में केंद्रित है जहां सब-सी कम्यूनिकेशन केबल्स (Sub-sea Cables) आती हैं और मजबूत फाइबर नेटवर्क मौजूद है:
- **मुंबई और नवी मुंबई (महाराष्ट्र):** भारत की कुल डेटा सेंटर क्षमता का लगभग 45-50% हिस्सा केवल मुंबई/नवी मुंबई में केंद्रित है। वजह: समुद्र के रास्ते आने वाली इंटरनेट केबल्स (Subsea Cable Landing Stations) की मौजूदगी।
- **चेन्नई (तमिलनाडु):** दक्षिण भारत का सबसे बड़ा हब है। मुंबई के बाद सबसे ज्यादा सब-सी केबल्स यहीं लैंड करती हैं।
- **एनसीआर - ग्रेटर नोएडा और गुरुग्राम (दिल्ली-एनसीआर):** उत्तर भारत का प्रमुख हब है, जहां Yotta D1 जैसे देश के बड़े डेटा सेंटर्स स्थापित हैं।
- **हैदराबाद (तेलंगाना):** Amazon Web Services (AWS), Microsoft और Google जैसे दिग्गजों के विशाल डेटा सेंटर रीजन यहां मौजूद हैं।
- **बेंगलुरु (कर्नाटक):** देश की टेक राजधानी होने के कारण आईटी और क्लाउड-आधारित डेटा सेंटर्स की बड़ी संख्या है।
- **पुणे और कोलकाता:** ये उभरते हुए द्वितीय स्तर के (Tier-2) डेटा सेंटर हब्स बन रहे हैं।

C. Rangarajan flags fewer regional rural banks as 'a step in the wrong direction'

Balasubramanyam C.P.
CHENNAI

Former Reserve Bank of India Governor C. Rangarajan has criticised the consolidation of Regional Rural Banks (RRBs), saying the move has undermined their local and regional character and could eventually lead to their merger with universal banks.

"What has happened to Regional Rural Banks?" Mr. Rangarajan asked while speaking at an event in Chennai marking the 10th

anniversary of Equitas Small Finance Bank.

He said RRBs had now been merged, leaving one RRB per State. In one case, he said, the parent bank had also absorbed the RRB. "To me, this is a step in the wrong direction," he said.

"It essentially loses the local and regional character of these banks, and ultimately they may get merged with the universal banks as well."

RRBs were originally set up with the idea that their

local character would help distribute credit more evenly, Mr. Rangarajan said. He also recalled that the evolution of credit provision to vulnerable and weaker sections had involved several institutional initiatives, including bank nationalisation, priority-sector credit, RRBs, Local Area Banks, self-help groups and, subsequently, small finance banks.

According to a July 2025 written reply in the Lok Sabha by Finance Minister Nirmala Sitharaman, the

government has progressively consolidated Regional Rural Banks (RRBs) since 2005 to improve their operational viability and take advantage of economies of scale. In the first phase of amalgamation, between 2005 and 2010, the number of RRBs was reduced from 196 to 82, while subsequent phases brought the number down further. Under the latest 'One State-One RRB' phase, the number was reduced from 43 to 28, effective May 1, 2025.

Mr. Rangarajan also

called on the Reserve Bank of India to consider ways to incentivise the setting up of small finance banks, saying their current numbers would not be sufficient to meet unmet credit needs.

"There is something we must do about SFBs. I believe they will have a role to play," he said.

He said there were currently only 11 small finance banks, adding that this would not be enough to meet the unmet credit needs of the sector.

He said that small fi-

nance banks today have an obligation to fulfil the same set of conditions as universal banks. Unless prospective promoters were motivated by other considerations, he said, there would be little incentive to set up such banks.

"So, I would appeal to the Reserve Bank of India to look at how to incentivise the setting up of small finance banks," he said.

Mr. Rangarajan said the aspiration of SFBs to eventually become universal banks was not a problem.

"There is nothing wrong with that. I am not complaining," he said.

He added that the performance of SFBs in their mandated areas would count and said they had done extremely well in the areas in which they were required to work.

The former chairman of the Prime Minister's Economic Advisory Council said India's response to gaps in credit delivery had repeatedly been to create new institutions. "Whenever we felt that something

was not happening, we said, 'We will create a new institution,'" he said.

But he cautioned that simply creating a new institutional structure would not necessarily solve the underlying problem.

"Creating an institution by itself is not the answer, because institutions can come and still the problems will continue."

He said the record of SFBs showed the spirit with which management took on the task was important.

महत्वपूर्ण तथ्य



- क्षेत्रीय ग्रामीण बैंक (Regional Rural Banks - RRBs) भारत में एक विशेष प्रकार के वाणिज्यिक बैंक (Commercial Banks) हैं, जिन्हें मुख्य रूप से ग्रामीण और अर्ध-शहरी क्षेत्रों में बैंकिंग सेवाएं प्रदान करने और कृषि व ग्रामीण अर्थव्यवस्था को बढ़ावा देने के लिए स्थापित किया गया है।

1. स्थापना और इतिहास

- स्थापना: RRB अधिनियम, 1976 (RRB Act, 1976) के तहत इनकी स्थापना की गई।
- पहला बैंक: भारत का पहला क्षेत्रीय ग्रामीण बैंक 'प्रथमा बैंक' (Prathama Bank) था, जिसकी स्थापना 2 अक्टूबर 1975 को उत्तर प्रदेश के मुरादाबाद में हुई थी।
- सिफारिश: इनकी स्थापना एम. नरसिंहम समिति (Narasimham Committee) की सिफारिशों के आधार पर की गई थी।

2. स्वामित्व और संरचना

- क्षेत्रीय ग्रामीण बैंकों में स्वामित्व तीन धारकों के बीच विभाजित होता है:

शेयरधारक (Shareholder)	हिस्सेदारी (%)
केंद्र सरकार (Central Government)	50%
संबंधित राज्य सरकार (State Government)	15%
प्रायोजक बैंक (Sponsor Bank)	35%

महत्वपूर्ण तथ्य



INBRIEF



Sanjay Agrawal sworn in as Rajasthan HC Chief Justice

Justice Sanjay Kumar Agrawal was sworn in as the 44th Chief Justice of the Rajasthan High Court at a ceremony held at Lok Bhavan in Jaipur on Monday. Governor Haribhau Bagade administered the oath of office in the presence of Chief Minister Bhajan Lal Sharma, his Cabinet colleagues, judges and administrative officials. The Union government notified Justice Agrawal's elevation as the Chief Justice and appointment in Rajasthan following a recommendation by the Supreme Court Collegium. He was first appointed as an additional judge of the Chhattisgarh High Court in September 2013.

महत्वपूर्ण तथ्य



नीति आयोग

नीति आयोग

नीति आयोग की पहल ई-फास्ट इंडिया के तहत भारत में शून्य-उत्सर्जन माल ढुलाई के लिए पीएसीटी की शुरुआत

ए-तम

प्रविष्टि तिथि: 07 SEP 2026 6:20PM by PIB Delhi

पीएसीटी देश भर में माल ढुलाई इकोसिस्टम के हितधारकों के साथ निरंतर संपर्क स्थापित करके बड़े पैमाने पर शून्य-उत्सर्जन ट्रकों के लिए व्यावसायिक आधार को मजबूत करेगा। 5 वें ई-फास्ट इंडिया शिखर सम्मेलन में व्यापार, वित्तपोषण और चार्जिंग साझेदारी को बढ़ावा देने के लिए जेडईटी मार्केटप्लेस की भी शुरुआत की गई।

नीति आयोग के सदस्य श्री राजीव गोबा ने आज 5 वें ई-फास्ट इंडिया समिट 2026 में पीएसीटी का शुभारंभ किया। यह शून्य-उत्सर्जन ट्रकों के उपयोग को बढ़ावा देने की दिशा में एक महत्वपूर्ण कदम है। इस अवसर पर **सड़क परिवहन एवं राजमार्ग मंत्रालय** के सचिव श्री वी उमाशंकर, एमएचआई के एसोसिएट प्रोफेसर डॉ. हनीफ कुरैशी, नीति आयोग की इलेक्ट्रिक मोबिलिटी की कार्यक्रम निदेशक सुश्री अर्चना मित्तल, डब्ल्यूआरआई के कार्यकारी कार्यक्रम निदेशक श्री पवन मुलुकुटला और उद्योग, वित्त और माल ढुलाई क्षेत्र से जुड़े लगभग 250 प्रतिभागी उपस्थित थे।

ई-फास्ट इंडिया प्लेटफॉर्म की एक प्रमुख पहल, पीएसीटी को शिपर्स, लॉजिस्टिक्स सेवा प्रदाता और अन्य इकोसिस्टम हितधारकों से माल ढुलाई की मांग और चिन्हित माल ढुलाई कॉरिडोर में शून्य-उत्सर्जन ट्रकों के उपयोग के लिए डिज़ाइन किया गया है। शिपर्स, लॉजिस्टिक्स सर्विस प्रोवाइडर्स वाहन निर्माताओं, फाइनेंसर्स, चार्जिंग प्वाइंट ऑपरेटर्स और अन्य इकोसिस्टम भागीदारों को एक साथ लाकर, यह प्लेटफॉर्म मांग की स्पष्टता में सुधार, चार्जिंग इंफ्रास्ट्रक्चर नियोजन में सहायता और इलेक्ट्रिक मध्यम और भारी-शुल्क वाहनों के लिए व्यावसायिक आधार को मजबूत करने का लक्ष्य रखता है।

महत्वपूर्ण तथ्य



- **E-FAST India (Electric Freight Accelerator for Sustainable Transport - India)** नीति आयोग की एक राष्ट्रीय पहल है, जिसे सितंबर 2022 में वर्ल्ड रिसोर्सेज इंस्टीट्यूट (WRI) इंडिया और अन्य साझेदारों के सहयोग से शुरू किया गया था।

E-FAST India क्या है?

- **उद्देश्य:** भारत में माल ढुलाई (Freight Transport) के बेड़े को इलेक्ट्रिक वाहनों (EVs) में बदलने में तेजी लाना।
- **मुख्य फोकस:** हेवी-ड्यूटी ट्रकों, कमर्शियल इलेक्ट्रिक वाहनों (e-CEVs) और लॉजिस्टिक्स क्षेत्र का डीकार्बोनाइजेशन (कार्बन उत्सर्जन कम करना)।
- **कार्यप्रणाली:** यह नीति निर्माताओं, लॉजिस्टिक्स कंपनियों, वाहन निर्माताओं (OEMs), वित्तीय संस्थानों और प्रौद्योगिकी प्रदाताओं को एक साथ लाने के लिए एक नॉलेज प्लेटफॉर्म (Knowledge Platform) के रूप में कार्य करता है।
- **महत्व:** भारत का माल ढुलाई क्षेत्र सड़क परिवहन के कुल कार्बन उत्सर्जन में बड़ा योगदान देता है। E-FAST के जरिए स्वच्छ, हरित और टिकाऊ लॉजिस्टिक्स इकोसिस्टम का निर्माण किया जा रहा है।

5वाँ E-FAST सम्मेलन (5th E-FAST India Symposium)

- **कहाँ आयोजित हुआ:** नई दिल्ली (New Delhi)
- **कब आयोजित हुआ:** वर्ष 2025 के अंत में / 2026 की शुरुआत के दौरान (नीति आयोग की वार्षिक E-FAST वार्ताओं की श्रृंखला के तहत)।
- **मुख्य बिंदु:** 5वें E-FAST फोरम में भारी मालवाहक ट्रकों के विद्युतीकरण (Heavy-Duty Truck Electrification), फास्ट-चार्जिंग इंफ्रास्ट्रक्चर के विकास, और ई-लाइट कमर्शियल व्हीकल्स (e-LCVs) के लिए विशेष वित्तीय सहायता और सब्सिडी व्यवस्था पर मुख्य रूप से चर्चा की गई।

Overview

- Cyber Physical System — NM-ICPS
- Nicotine —
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- Delhi HC on Delhi Building Collapse ✓
- FATF Report —→
- Sustainable Steel Scheme —
- ISRO —
- BRICS —
- Data Centers —
- RRB —
- E-Fast India ✓
- Sanjay Agrawal – Chief Justice of Rajasthan

Thank You

Result Mitra