

24<sup>th</sup> Oct, 2024

## 1. **BRICS Summit 2024** **GS 2 (International Relations)**

### • **Why in News:**

- The 16th BRICS Summit concluded with the adoption of the '*Kazan Declaration*', a comprehensive document outlining key areas of cooperation and the bloc's unified stance on global issues.

### • **Key Outcomes of the Kazan Declaration**

- Under the theme "*Strengthening Multilateralism for Just Global Development and Security*", the Kazan Declaration emphasised the importance of BRICS solidarity and strategic partnerships. The leaders pledged their commitment to fostering peace, ensuring a fairer international order, and promoting sustainable development. The key-outcomes are as follow:

### • **Geopolitical Concern**

- **Diplomatic Resolutions for International Conflicts:** The summit highlighted the critical need for peaceful resolutions to international conflicts through diplomacy. The declaration underscored the importance of adhering to the United Nations Charter, particularly in relation to the ongoing Ukraine conflict. Leaders expressed appreciation for mediation efforts aimed at facilitating dialogue and resolving the conflict peacefully.
- **Concerns Over Palestine:** The situation in Palestine was a focal point of concern, with the declaration noting the severe humanitarian crisis in the **Occupied Palestinian Territory**. The BRICS leaders voiced their grave apprehension regarding the escalation of violence in Gaza and the West Bank, calling for immediate measures to alleviate the situation.
- **Middle East Crisis:** The declaration also addressed the escalating humanitarian crisis in the Middle East, particularly in Southern Lebanon. Leaders condemned the civilian casualties and damage to infrastructure resulting from military actions, urging for a cessation of hostilities.

### • **Global Governance and Multilateralism**

- **Role of the G20:** The importance of the G20 in global decision-making processes was emphasized. The leaders recognized the necessity for the G20 to function effectively, advocating for a consensus-driven approach focused on achieving tangible outcomes.
- **Reform of Financial Architecture:** The BRICS nations reiterated their commitment to reforming the international financial architecture to enhance global governance. They called for a more agile and representative multilateral system capable of addressing financial challenges, stressing the need for reforms that promote inclusive growth.
- **Innovative Financial Practices:** The declaration encouraged the exploration of new financial practices, highlighting the BRICS Interbank Cooperation Mechanism (ICM) as a means to facilitate innovative financial solutions. The leaders reaffirmed their support for a robust International Monetary Fund (IMF), emphasizing the need for a quota-based and adequately resourced financial safety net.

### • **Economic Cooperation and Local Currencies**

- **Strengthening Trade in Local Currencies:** A significant aspect of the summit was the agreement to enhance trade and financial settlements in local currencies. The declaration welcomed initiatives aimed at utilizing local currencies for BRICS financial transactions and establishing independent cross-border settlement infrastructures.

## BRICS nations should strengthen financial integration: Modi

**Kallol Bhattacharjee**  
NEW DELHI

India favours greater financial integration among the member-countries of the BRICS grouping, Prime Minister Narendra Modi declared on Wednesday at the 16th BRICS meeting in Kazan.

He placed India's uncompromising position on international terrorism at the plenary session of the BRICS summit that blamed Israel for "unprecedented escalation of violence" in Gaza Strip and expressed "alarm" over the situation in Lebanon.

"We welcome efforts to increase financial integration among BRICS countries. Trade in local currencies and smooth cross-border payments will strengthen our economic cooperation. The Unified Payments Interface [UPI] developed by India is a huge success sto-



**On the high table:** Prime Minister Narendra Modi and other leaders attend the BRICS summit in Kazan on Wednesday. REUTERS

ry and has been adopted in many countries," said Mr. Modi, urging more countries to join India in doing trade in local currencies or locally developed payment mechanisms.

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- **BRICS Grain Exchange:** The leaders endorsed the initiative to create a BRICS Grain Exchange, which would facilitate commodities trading within the bloc. This move is seen as a step towards greater economic integration among member nations.
- **Expansion of BRICS:** Recognizing the growing interest from nations in the Global South, the leaders established a BRICS Partner Country category. New members, including Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE, are welcomed to join the bloc, indicating a commitment to expanding BRICS influence and partnerships.
- **Pandemic Preparedness and Environmental Conservation**
  - **Health Initiatives:** The summit highlighted the necessity of strengthening health systems through collaborative efforts. Leaders supported initiatives related to vaccine research and development, early warning systems for infectious diseases, and the establishment of a BRICS TB Research Network.
  - **Addressing Antimicrobial Resistance:** The Kazan Declaration acknowledged the threat posed by antimicrobial resistance (AMR), welcoming the outcomes of the UNGA High-Level Meeting on AMR.
  - **Conservation of Big Cats:** India's initiative for an **International Big Cats Alliance** received recognition, with BRICS countries pledging to collaborate on the conservation of endangered species. This highlights the bloc's commitment to environmental sustainability.
- **What is BRICS?**
  - BRICS stands for **Brazil, Russia, India, China and South Africa**.
  - The group started in 2006, and **Brazil, Russia, India and China** convened for the first BRIC summit in 2009. **South Africa** joined a year later (2010).
  - In August 2023, it was expanded to welcome five new members: **Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE**.
  - The aim of the alliance is to challenge the economic and political monopoly of the West. The group sets priorities and has discussions once every year during the summit, which members take turns hosting.
  - **Rising economic influence of BRICS nations:** BRICS member states now represent **45% of the world's population**. The BRICS countries account for **35% of global GDP**. The bloc is responsible for about 25% of the world's exports.

## 2. The Shifting Sands within Global Supply Chains

### GS 3 (Economy)

- **Why in News:** The global supply chain is undergoing a significant transformation, driven by national security concerns and geopolitical tensions. Recent developments, including the U.S. proposed bans on certain vehicle technologies linked to China and an Israeli attack on communication systems, highlight the urgent need to re-evaluate supply chain strategies.
- **Shift from Efficiency to Resilience**
  - **Historical Context:** For decades, supply chains prioritized efficiency, utilizing a "just in time" model that emphasized cost-effective global sourcing, predominantly through Chinese manufacturing.
  - **Emerging Concerns:** The U.S.-China rivalry and the COVID-19 pandemic prompted a shift towards "just in case" strategies, with nations recognizing the vulnerabilities tied to over-reliance on Chinese exports and the need for resilient supply chains.
  - **Impact on Policy:** This evolution has led to broader discussions about security, evidenced by actions against Chinese telecom firms and heightened scrutiny of technology from adversarial nations.

### The shifting sands within global supply chains

Global supply chains are at an inflection point. While the COVID-19 pandemic shifted the focus from efficiency (just in time) to resilience (just in case), two developments in September 2024 indicate that another shift is underway in how supply chains are envisioned and operationalised – this time towards security (just to be secure).

**Moves by the U.S. and Israel's pager attack**  
On September 23, the United States Department of Commerce proposed rules which, if accepted, "would prohibit the import or sale of certain connected vehicle systems designed, developed, manufactured, or supplied by entities with a sufficient nexus to the PRC or Russia". The proposed rules target both the software and hardware associated with vehicle connectivity systems as well as automated driving systems. While the 100% tariffs on Chinese EVs announced by the U.S. earlier this year stemmed from competition concerns aimed at reducing their sale in the domestic market, the newly proposed rules, which stem from national security concerns, would effectively ban their sale in the U.S.

The U.S. case against Chinese connected car tech is that both hardware and software components in cars employing some form of external communication capabilities can be potentially misused. The idea is that cars with connected car tech are essentially mobile listening posts, and that malicious actors can use their cameras and sensors for espionage purposes. Worse, these cars may even be disabled or hijacked – especially those level 3 and above on the Society of Automotive Engineers' levels of driving automation. For security hawks, handing over such control to a state with which you may be in a future conflict simply carries overwhelming risks.

If there was any strand of thought moderating the hawkish focus on supply chain security, that



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**Proposed U.S. rules on Chinese connected car tech and Israel's pager attacks** indicate the changing focus of global supply chains – from resilience to security

evaporated as the world came to terms with the Israeli supply chain attack, on September 17-18, targeting pagers and walkie-talkies used by Hezbollah in Lebanon. More than 30 people including children were killed while thousands were injured. The fallout was felt far and wide leaving everyone wondering about the state of advanced technologies used or embedded in products across industries when even basic, old-fashioned devices could be made to explode.

While the U.S. proposed rules and the Israeli pager attack have reignited and amplified the supply chain security debate, it arguably began a few years ago when the U.S., Australia, Japan and even India effectively banned Huawei and other Chinese telecom players from participating in the 5G rollout for security considerations. The motivating fear was that China could install backdoors in the telecom infrastructure giving it the capability to surveil or sabotage the same. Since then, supply chain security concerns have spread to other tech industries such as semiconductors.

**From efficiency to resilience to security**  
During the heydays of globalisation, especially from the 1980s till the 2010s, supply chains were configured to ensure maximum efficiency; that is, weaving a complex supply chain for each product or service in a way that components were procured and assembled at various locations across the world based on cost and other considerations. These "just in time" supply chains were to some extent immune from great power politics. China established itself as a central supply node in this arrangement. A combination of various factors in the late 2010s and early 2020s such as the U.S.-China rivalry and resultant technology decoupling and the COVID-19 pandemic shifted the focus away from "just in time" to "just in case".

That is, there was a recognition in the U.S., Europe, India and elsewhere that supply chains

had become too dependent on Chinese exports. Supply chain resilience, as a result, became all the rage. But, almost simultaneously, security considerations around Chinese involvement in telecom infrastructure also led to another shift – from resilience to security. This shift has only solidified in the wake of Israel's supply chain attack.

**India and supply chain security**  
How can India ensure that its supply chains are secure? Extreme measures such as outright banning import of a range of tech products and services would not work. Neither would fully subscribing to the "just in case" strategy that focuses on supply chain resilience.

What can work is a two-pronged approach involving both "just to be secure" and "just in case" strategies. The "just to be secure" strategy can be put in motion through "trust but verify" and "zero trust". Certain tech products and services (say those used in communications, transport or critical infrastructure broadly defined) can be subjected to trust but verify entailing methods such as periodic audits, on-site inspections, and establishment of a mechanism that ensures compliance with national and international security standards. But a more narrowly defined set of technologies that are most critical (say those used by Indian military, intelligence agencies, or for cutting edge research and development) should be subjected to zero trust. Assuming by default that all tech products and services are compromised and applicable to friends and foe alike, zero trust would entail developing the most stringent checks during procurement as well as continuous monitoring and verification. For all the rest less critical technologies, the "just in case" strategy involving diversification of vendors and friendshoring would suffice in taking care of larger supply chain concerns about cascading fallos due to single points of vulnerabilities and failures.



- **National Security Focus**

- **S. Regulatory Changes:** The U.S. proposed rules to ban imports of connected vehicle systems from China and Russia, citing national security risks, including espionage capabilities linked to vehicle connectivity.
- **Israeli Security Incident:** The recent Israeli attack, which resulted in significant casualties through the targeting of basic communication devices, underscored the potential vulnerabilities present in all technology sectors.
- **Broader Implications:** These events have intensified the discourse around supply chain security, revealing that even foundational technologies can pose significant risks if not adequately secured.

- **India's Strategic Response**

- **Dual Approach:** India must adopt a dual strategy that combines "just to be secure" and "just in case" methodologies to fortify its supply chains against external threats.
- **Implementation of Trust Mechanisms:** For critical technologies, India should implement a "trust but verify" approach, involving audits and compliance checks, while employing "zero trust" principles for technologies vital to national security.
- **Diversification and Friendshoring:** For less critical technologies, India can pursue diversification of vendors and friendshoring to mitigate risks associated with supply chain vulnerabilities.

### 3. Centre finalises stricter norms for Disability Certificates **GS 2 (Governance)**

- **Why in News:** Union Government notified amendments to the **Rights of Persons with Disabilities (RPwD) Rules, 2024**, tightening the norms for getting a disability certificate. However, the **National Platform for the Rights of the Disabled (NPRD)** denounced them and called for their withdrawal.

- **Key Changes in the Amendments**

- The amendments were introduced in the wake of the controversy surrounding **Puja Khedkar**, a dismissed IAS probationer accused of falsifying her disability certificate.
- Broadly, the new norms have brought changes in the process of applications made to obtain **Unique Disability Identity (UDID) cards** and the process of issuance of these cards.
- The new norms also introduced **colour-coded white, yellow and blue UDID cards** signifying ascending levels of disability, with blue being the highest, for persons having disability at 80 per cent and above.
- The **UDID project** initiated by **Department of Empowerment of Persons with Disabilities** aims at building a holistic end-to-end integrated system for **Issuance of Universal ID & Disability Certificates for Person with Disabilities** with their identification and disability details
- **Proof of Identity Requirements:** Individuals applying for a disability certificate must now submit proof of identity, including a photo taken within the last six months and an Aadhaar card.
- **Medical Authority Involvement:** Only medical authorities are deemed competent to process applications for disability certificates. This restricts the involvement of other relevant bodies, potentially complicating the certification process.
- **Extended Processing Time:** The time required to process applications has been increased from one month to three months, potentially delaying access to necessary support and services for individuals with disabilities.
- **Lapsed Applications:** A new clause in **Rule 18** allows applications to become inactive if not decided upon within two years, requiring applicants to reapply or reactivate their application, adding further bureaucratic hurdles.

### Centre tightens norms for disability certificates; activists seek withdrawal

**The Hindu Bureau**  
NEW DELHI

A day after the Union government notified amendments to the Rights of Persons with Disabilities Rules, tightening the norms for getting a disability certificate, the National Platform for the Rights of the Disabled (NPRD) on Wednesday denounced them and called for their withdrawal.

The NGO said the amendments "are regressive in nature and will only add to the already existing hurdles for genuine persons with disabilities to get certified, so essential for identification, accessing services and entitlements".

The government notified the final amendments in an Extraordinary Gazette published on October 22.

The amendments to the rules came in the wake of the row over Puja Khedkar, a dismissed IAS probation-

**Amendments came in the wake of the row over Puja Khedkar, accused of faking her disability certificate**

er accused of faking her disability certificate, among other transgressions.

The new rules will require people with disabilities to mandatorily submit proof of identity. They further require only medical authorities to be considered competent to receive and process applications for disability certificates, also increasing the time taken to process each application from one to three months.

The amended rules also have a clause in Rule 18 that allows for an application to lapse or become "inactive" if the medical authority concerned is unable to decide on it for over two years - following which the applicant will

have to re-apply or approach the authority to reactivate it.

The NPRD, along with over five dozen disability rights bodies and activists, had raised objections to the new rules. "It is regrettable that none of the concerns expressed by various disability rights organisations and activists were considered," NPRD general secretary V. Muralidharan said in a statement on Wednesday.

"The proposed amendments are based on the wrongful understanding that persons with disabilities alone are to be blamed for manipulation of the process. The number of fake certificates being issued is a very small percentage of the total number of disability certificates being issued, and similar flaws exist in almost all systems of documentation in India. Thus, the response of making the process more stringent and difficult is totally flawed," he added.

- **Types of Disabilities**

- As per **the Persons with Disabilities (Equal Opportunities, Protection of Rights & Full Participation) Act, 1995** - A person with disability can be defined as one with one or more of disabilities falling under any of the below mentioned categories:
  - **Blindness:-** "Blindness" refers to a condition where a person suffers from any of the following conditions namely:-
  - **Total absence of sight;** or Visual acuity not exceeding 6/60 or 20/200 (Snellen) in the better eye with correcting lenses; or **Limitation of the field of vision** subtending an angle of 20 degree or worse;
  - **Cerebral Palsy:-** "Cerebral Palsy" means a group of non-progressive conditions of a person characterized by abnormal motor control posture resulting from brain insult or injuries occurring in the pre-natal, peri-natal or infant period of development;
  - **Low vision:-** " Low vision" means a person with impairment of visual functioning even after treatment of standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive device;
  - **Locomotor disability:-** "Locomotor disability" means disability of the bones, joints or muscles leading to substantial restriction of the movement of the limbs or any form of cerebral palsy;
  - **Leprosy-cured:-** "Leprosy-cured person" means person who has been cured of leprosy but is suffering from-
  - **Loss of sensation** in hands or feet as well as loss of sensation and paresis in the eye and eye-lid but with no manifest deformity;
  - **Manifest deformity and paresis** but having sufficient mobility in their hands and feet to enable them to engage in normal economic activity;
  - **Extreme physical deformity** as well as advanced age which prevents him from undertaking and gainful occupation and the expression "Leprosy Cured" shall be construed accordingly;
  - **Mental retardation:-** "Mental retardation" means a conditions of arrested or incomplete development of mind of a person which is specially characterized by sub normality of intelligence;
  - **Mental illness:-** "Mental illness" means any mental disorder other than Mental retardation
  - **Hearing Impairment:-** "Hearing Impairment" means loss of sixty decibels or more in the better ear in the conversational range of frequencies

#### 4. **Stubble-burning violates right to live in a pollution-free environment** **GS 2 (Constitution)**

- **Why in News:** Recently, the Supreme Court raised concerns over the ongoing issue of stubble burning in Punjab and Haryana. The court condemned the selective enforcement of penalties, describing it as a violation of citizens' fundamental right under Article 21 of the Indian Constitution to live in a pollution-free environment.
- **Right to environment in India constitution**
  - **Right to life under Article 21**
    - The Supreme Court in **Subhash Kumar v. State of Bihar, 1991** held that Article 21 includes the right to a wholesome environment.
    - This position was again reaffirmed in **Virender Gaur v. State of Haryana, 1994**.
  - **Directive Principle of State Policy**
    - **Article 48A** puts a duty on the State to protect and improve the environment and further to safeguard the forests and wildlife.



- In **Sher Singh vs State of H.P. 2014**, the National Green Tribunal held that the State is under a constitutional obligation to protect and improve the environment.
- In **M.C. Mehta vs Union of India, 2002**, the court held that Article 39(e), 47 and 48A collectively cast a duty on State to secure public health and environment protection.

#### ○ Fundamental Duties

- Article 51A(g) puts a fundamental duty on the citizens to protect and preserve the environment.

### • Stubble Burning

#### ○ Why Farmers opt for Stubble Burning?

- Rice and wheat straws left in the field, after combine harvesting, are generally burnt by the farmers to **facilitate seed bed preparation and seeding**.
- Farmers find this method as quick and cheap compared to other practices for crop residue management.
- Since input costs of farming is going up day by day, farmers are not willing to further invest in equipments useful for crop residue management.
- Happy Seeder (a tractor-operated machine for in-situ management of paddy stubble) continues to be an expensive method for majority of farmers.

#### ○ Areas where this practice is rampant

- Burning of agricultural residue is done on a large-scale basis in states such as **Punjab, Haryana, Uttar Pradesh, Rajasthan and National Capital Region of Delhi**.
- This is prevalent in other states too. This includes: Bihar, Odisha, West Bengal etc.

### • Impact

#### ○ Environmental Pollution

- Agriculture fires are a major contributor to air pollution in north India in October-November.
- Pollutants from these fires spread across the region, triggering smog and extreme air quality situations.
- An increase in the concentration of particulate matter (PM) 2.5 and PM 10 in the atmosphere is observed in these months

#### ○ Harmful to the health of soil

- Burning of crop residues removes huge amount of nutrient from the soil.
- Practices like residue burning has further reduced the organic carbon content in soil.

### • Steps Taken by the government to tackle the issue of farm fires

#### ○ Taken by Centre

- A Central Sector Scheme on **'Promotion of Agricultural Mechanisation for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi'** was approved.
- Farmers are being provided 50 percent of the cost of machinery/equipment as financial assistance for the purchase of such machinery.
- The central government has released Rs 3,062 crore to the governments of Punjab, Delhi and states in NCR during the five-year period from 2018 to 2023 towards effective management of stubble.
- Profit from the left-over biomass is shared with farmers.

#### ○ Pusa Decomposer by Indian Agricultural research Institute (IARI)

- The Pusa decomposer is a bio-enzyme developed by IARI to decompose crop residue.

## 'Stubble burning goes against right to live in pollution-free space'

**The Hindu Bureau**  
NEW DELHI

The Supreme Court on Wednesday said continuing cases of stubble burning and the "pick-and-choose" policy adopted by the Punjab and Haryana governments to penalise a few while letting many violators go "scot-free" after paying a nominal fine violated citizens' right to live in a pollution-free environment.

"There is a fundamental right vested in every citizen under Article 21 of the Constitution to live in an environment free of pollution," a three-judge Bench headed by Justice A.S. Oka observed. The court said officials had failed in not only effectively implementing existing laws but also allowed blatant violation of the fundamental rights guaranteed under Article 21. "It is time governments [the Centre and National Capital Region States] addressed the question of how they are going to protect the rights of citizens to live with dignity in a pollution-free environment," the top court said.

Justice Ahsanuddin Amanullah said the onset of every winter brought cases of pollution to the court, which has passed a number of orders. "But



Proper machinery for collection of fines are not formulated yet, says Supreme Court Bench. AFP

what has actually changed," he asked.

Justice Oka pointed out that a proper machinery for collection of fines under Section 15 of the Environment (Protection) Act, 1986 had not been formulated. Section 15 outlines the penalties for violating the provisions of the Act. Penalties include five years of imprisonment and ₹1 lakh as fine.

Additional Solicitor-General Aishwarya Bhati, appearing for both the Centre and the Commission for Air Quality Management, said the entire machinery would be put in place in two weeks. *Amicus curiae* Aparajita Singh drew the court's attention to air pollution in urban areas of the national capital.

**DELHI'S POLLUTION WOES**  
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- It decomposes stubble within 20-25 days after spraying and turn it into manure, improving the soil quality.
- **Taken by State Governments and Other agencies**
  - States governments and other agencies are sensitising farmers on healthier practices.
  - The Punjab government had proposed to provide cash incentives to farmers for not burning stubble.
  - It also decided to provide non-fiscal incentives to these industries in terms of availability of Panchayat land for storage of paddy straw with lease agreement upto 33 years.
- **Key highlights of the observation made by SC**
  - **Fundamental Right to a Pollution-Free Environment**
    - The Supreme Court emphasized that every citizen has a fundamental right under Article 21 of the Indian Constitution to live in a pollution-free environment.
    - It stressed that violations of this right go beyond mere implementation of laws, highlighting the blatant infringement of fundamental rights.
  - **Section 15 of the Environment Protection Act Rendered "Toothless"**
    - The court criticized the ineffectiveness of the amended Section 15 of the Environment Protection Act-1986, which replaced criminal penalties with financial penalties for environmental violations.
    - This provision has become "toothless" due to the Centre's failure to establish necessary support systems, such as framing rules and appointing adjudicating officers, even after six months of the amendment's enactment.
  - **Inadequate Enforcement Mechanism**
    - The absence of appointed adjudicating officers prevents law enforcement from imposing penalties under the amended Section 15, leaving environmental violations unpunished.



### Ministry to provide hourly weather forecasts for villages

The Panchayati Raj Ministry, in collaboration with the India Meteorological Department, will on Thursday launch a new initiative to provide gram panchayats with daily weather forecasting and provision to check hourly weather forecasts. The Ministry, in a press release, said the initiative was aimed at enhancing preparedness to deal with natural disasters and help the farmers. It would help promote sustainable agricultural practices, making rural population more climate-resilient and better equipped to tackle environmental challenges. The forecasts will be available on the digital platform e-GramSwaraj and mobile application Meri Panchayat.

## **5. Gram Panchayat-Level Weather Forecasting** **GS 2 (Governance)**

- **Why in News:** The **Ministry of Panchayati Raj (MoPR)**, in collaboration with the **India Meteorological Department (IMD)**, **Ministry of Earth Sciences (MoES)**, is set to launch a landmark and a transformative initiative to provide Gram Panchayats with **5 days daily weather forecasting** and provision to check hourly weather forecast – **Gram Panchayat-Level Weather Forecasting**.
- **About the initiative**
  - This initiative is aimed at **empowering rural communities** and **enhancing disaster preparedness** at the grassroots.
  - It will directly benefit farmers and villagers across the country.
  - As part of the **Government's 100 Days Agenda**, this initiative strengthens grassroots governance and promotes sustainable agricultural practices, making rural populations more climate-resilient and better equipped to tackle environmental challenges.
  - **This is the first time that localized weather forecasts will be available at the Gram Panchayat level, supported by IMD's expanded sensor coverage.**
  - The forecasts will be disseminated through the **Ministry's digital platforms:**
    - **e-GramSwaraj**, which enables efficient governance, project tracking, and resource management
    - **Meri Panchayat app**, which fosters community engagement by allowing citizens to interact with local representatives and report issues



- **Gram Manchitra**, a spatial planning tool that provides geospatial insights for development projects

## 6. Ancient Meteorite Impact ("Fertilizer Bomb")

### Recent events of importance

- **Why in News:** Around **3.26 billion years ago**, a **massive meteorite** struck Earth, causing **catastrophic destruction**. This meteorite was estimated to be 23 to 36 miles wide (37 to 58 km), making it 50 to 200 times the size of the asteroid that caused the **dinosaurs' extinction**. Despite the devastation, this event may have actually helped early life on our planet.
- **About**
  - The meteorite (named S2) was a type called a **carbonaceous chondrite** that is rich in **carbon** and also contains **phosphorus**.
  - Its diameter was approximately 23-36 miles (37-58 km), making it about 50-200 times the mass of the asteroid that wiped out the dinosaurs, aside from their bird descendants.
  - It was the size of four Mount Everests.
  - Before the S2 meteorite struck Earth, the planet was still young and looked different compared to today.
  - It was mostly a water world with only a few landmasses sticking out of the sea, and life consisted of simple, **single-celled microorganisms**.
  - **The Impact:** The meteorite was a carbonaceous chondrite, rich in carbon and phosphorus.
    - **Immediate Effects:** The impact was incredibly powerful, vaporizing the rock it hit and creating a cloud of dust that darkened the sky. This would have led to a tsunami and caused severe heating, with upper ocean layers starting to boil.
    - **Destruction of Life:** The initial aftermath would have wiped out many microorganisms that relied on sunlight, particularly those in shallow waters.
    - The colossal impact wiped **T-Rex** and **Stegosaurus** from the face of Earth and reshaped the course of evolution.
  - **Benefits:** Despite the destruction, the impact delivered essential nutrients to the environment:
    - **Nutrients Delivered:** The meteorite brought phosphorus, a crucial nutrient for life, especially for the molecules that store and transmit genetic information.
    - **Mixing of Waters:** The tsunami mixed iron-rich deep waters with shallow waters, creating conditions favorable for microbial life, as iron provides energy for many microorganisms.
- **Meteorites**
  - Meteorites are space rocks that fall to Earth's surface.
  - **Meteorites** are the last stage in the existence of these type of space rocks. Before they were meteorites, the rocks were meteors. Before they were meteors, they were **meteoroids**.
  - **Meteoroids** are lumps of rock or metal that orbit the sun.
  - Meteoroids become **meteors** when they crash into Earth's atmosphere and the gases surrounding them briefly light up as "shooting stars."
  - While most meteors burn up and disintegrate in the atmosphere, many of these space rocks reach Earth's surface in the form of meteorites.



A bed of rock showing chunks of ripped-up seafloor debris from a tsunami that followed a huge meteorite impact about 3.26 billion years ago in a region called the Barberton Greenstone Belt, South Africa. REUTERS

**Ancient meteorite was 'giant fertilizer bomb' for life on earth**

Reuters

The space rock that slammed into the earth 66 million years ago caused a global calamity that doomed the dinosaurs. But that was far from the largest meteorite to strike our planet.

One up to 200 times bigger landed 3.26 billion years ago, triggering worldwide destruction at an even greater scale. But new research shows the disaster actually may have been beneficial for the early evolution of life by serving as "a giant fertilizer bomb" for the bacteria and other single-celled organisms called archaea that held dominion at the time, providing access to key nutrients phosphorus and iron.

Researchers assessed the effects of this meteorite impact using evidence from ancient rocks in a region called the Barberton Greenstone Belt in northeastern South Africa. They found ample signs from the geochemical signature of preserved organic material and fossils of mats of marine bacteria that life bounced back with aplomb.

"Life not only recovered quickly once conditions returned to normal within a few years to decades, it actually thrived," said Harvard University geologist Nadja Drabon, lead author of the study published on Monday in the journal Proceedings of the National Academy of Sciences.

"At this time, the earth was something of a water world, with limited emergence of volcanoes and continental rocks. There

**The meteorite spanned approximately 37.58 km, making it about 50-200 times the mass of the asteroid that wiped out the dinosaurs**

was essentially no oxygen gas in the atmosphere and oceans, and no cells with nuclei," Harvard geologist and study co-author Andrew Knoll said.

The meteorite was a carbonaceous chondrite rich in carbon and containing phosphorus. Its diameter was approximately 37.58 km, Drabon said, making it about 50-200 times the mass of the asteroid that wiped out the dinosaurs.

"The effects of the impact would have been quick and ferocious. The impactor hit with so much energy that it and whatever sediment or rock it hit vapourised. This rock vapour cloud and dust ejected from the crater would have circled the globe and turned the sky black within hours," Drabon said.

"The impact likely occurred in the ocean, initiating a tsunami that swept across the globe, ripping up the sea floor and inundating coastlines. Lastly, a lot of the impact energy would get transferred into heat, meaning the atmosphere started heating up so much that the upper layer of the oceans started boiling," Drabon added.

It probably would have taken a few years to decades for the dust to settle and for the atmosphere to cool enough for the water vapour to return to the ocean, Drabon said. Microbes depending on sunlight and those in shallow waters would have been decimated.

But the meteorite would have delivered a large amount of phosphorus, a nutrient for microbes crucial for the molecules central to storing and conveying genetic information. The tsunami also would have mixed iron-rich deep waters into shallower waters, creating an environment ideal for many types of microbes because iron provides them with an energy source.





- **Challenges**
  - **Challenges of Implementing Solar Radiation Management (SRM)**
    - SRM, while theoretically possible, faces significant technological and financial obstacles.
    - Large-scale manipulation of natural processes carries risks, including unpredictable impacts on global and regional weather patterns.
    - Ethical concerns arise, as altering sunlight could affect agriculture, ecosystems, and biodiversity, potentially harming some species.
  - **Limitations of Carbon Capture and Sequestration (CCS)**
    - Although CCS is technically viable in some situations, various studies suggest that heavy dependence on CCS to meet climate goals is not practical.
    - It highlights that focusing on CCS instead of renewable energy could add at least \$30 trillion to global costs by 2050.
    - Additionally, there may not be enough suitable underground sites to safely store large quantities of carbon dioxide.
  - **Conclusion: The Inevitable Role of CCS and CDR Technologies**
    - Despite their limitations, CCS and CDR remain crucial components in any strategy to combat climate change.
    - Achieving the 1.5°C or 2°C targets is considered impossible without incorporating these technologies, given the current levels of global warming.
- **Use of diamonds to cool down the Earth**
  - **About the news**
    - A research study has argued that diamonds can really be the answer to the global climate crisis.
    - They were testing out various aerosols to cool Earth, when they found that more than anybody, diamonds can prove to be more effective.
  - **The proposal**
    - As per their analysis, shooting five million tonnes of diamond dust into the stratosphere each year, over the course of 45 years, could cool our planet by an impressive 1.6°C.
  - **Why diamond**
    - Researchers had shortlisted calcite, diamond, aluminum, silicon carbide, anatase, and rutile, and created a 3D model.
    - They found out that diamond particles were highly effective in reflecting sunlight and heat, while simultaneously staying in the atmosphere for long enough.
    - Further since diamonds are chemically inert, they won't react with other elements in the atmosphere
  - **Not the first time such a solution has been proposed**
    - Several other compounds, such as sulphur, calcium, aluminium, and silicon, have been suggested previously for doing the same job.
    - Sulfur dioxide has been a leading candidate for solar radiation management due to its natural cooling effects observed during volcanic eruptions, where it reflects sunlight away from Earth.
    - However, artificial injection poses significant risks, including the potential for acid rain, damage to the ozone layer, and disruption of weather patterns, making it a controversial geo-engineering option.
    - The central idea here is to scatter material that can reflect solar radiation into Space and prevent it from reaching Earth, thereby cooling down the planet.
    - The installation of space-based mirrors has also been proposed.
  - **Associated challenge**
    - While the study looks promising on paper, the biggest obstacle in making it practical is the price of diamonds, one of the most expensive elements in the world.
    - The cost of producing and distributing the required quantity of synthetic diamonds would be staggering, with estimates reaching as high as \$200 trillion—which is double the global economy in 2023.

## 8. E. coli Outbreak GS 2 (Health)

- **Why in News:** A deadly outbreak of E. coli (E. coli O157:H7 strain) in the US, linked to McDonald's Quarter Pounder hamburgers has swept across 10 states, leaving one person dead and dozens hospitalised.
- **About E.coli:**
  - coli is a bacterium found in the intestines of animals and in the environment, including water and food.
  - People can get sick from **coli poisoning** when they consume contaminated foods or through contact with animals, the environment or other people who are infected.
  - While many strains are harmless, some can lead to serious illness.
  - coli O157:H7 strain produces a toxin that can result in severe diarrhoea, kidney failure, and other serious health issues.
  - Severe cases can lead to **hemolytic uremic syndrome (HUS)**, a life-threatening complication affecting the kidneys.
  - **Symptoms:** Fever, stomach cramps, and bloody diarrhoea, and the incubation period for E. coli is relatively short, with symptoms appearing within a few days of infection.
  - **Coli** can be contagious. It can spread from person to person, especially through improper hand hygiene after using the bathroom or changing diapers.

### MCDONALD'S-LINKED OUTBREAK IN UNITED STATES: WHAT IS E.COLI?

ANONNA DUTT  
NEW DELHI, OCTOBER 23

ONE PERSON has died and 10 have been hospitalised in the US due to an E.coli infection after eating McDonald's burgers.

While the source of the infection is not known yet, the fast food giant has stopped serving quarter pound patties and sliced onions in several states. Both ingredients are primarily used in the burger.

**Has the outbreak been reported outside the US too?**

No. The outbreak is restricted to 10 states in the United States. However, E.coli, which causes gastrointestinal symptoms, is not uncommon in India. It spreads through contaminated food and water. "We usually see cases during the summer and rainy seasons, when there is an increase in gastrointestinal infections in general," said Dr Anil Gogia, senior consultant of internal medicine at Sir Ganga Ram hospital, New Delhi.

Dr Suranjit Chatterjee, senior consultant of internal medicine at Indraprastha Apollo Hospital, New Delhi, said, "Among gastrointestinal and urinary tract infections, E.coli is one of the most common pathogens."

**How common are E.coli infections?**

More than 500 outbreaks of diarrhoeal diseases were reported across India in 2023, according to the National Centre for Disease Control. E.coli is the most common bacteria isolated from patient samples, according to the latest report of ICMR's Antimicrobial Surveillance Network. The pathogen was found in 23.19% of all types of patient samples from tertiary care hos-

pitals across India, where the surveillance is carried out.

The Food Safety and Standards Authority of India (FSSAI) is working on creating a network of 34 microbiology labs across the country that will test food products for 10 pathogens, including E.coli, salmonella, and listeria. Tests for microbial contamination were missing from most state food safety laboratories in the country.

**What are the infection's symptoms?**

The most common symptoms of E.coli infection include fever of more than 102 degree F, persistent diarrhoea, bloody diarrhoea, and vomiting. The main problem, however, is dehydration due to the inability of the patient to retain water and fluids.

In very few cases, people may get acute kidney injury.

**How is it treated?**

E.coli is a bacterial infection for which antibiotics are prescribed. Doctors emphasise that medicines should not be taken without consultation.

Indiscriminate use of antibiotics leads to antimicrobial resistance and further difficulty in treating common infections. For example, E.coli's susceptibility to even strong antibiotics, such as carbapenem, has been on the decline, reducing from 81.4% in 2017 to 62.7% in 2023 to one type of medicine in this category.

**When should you go to a doctor?**

You must go to a doctor if you have had diarrhoea for more than a couple of days; you have to visit the toilet every half hour; you have bloody diarrhoea; you vomit frequently; and are unable to retain any water and fluids.

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## 9. SC Upholds States' Right to Regulate Industrial Alcohol GS 2 (Governance)

- **Why in News:** In a big victory for states, the Supreme Court (SC), in an 8:1 majority, upheld the states' right to regulate taxes on industrial alcohol, overruling a 1990 judgment.
- **Background of the Case (Issue Before the Court)**
  - The core of the dispute arises from two "overlapping" entries in the Seventh Schedule of the Constitution, which lays down the division of lawmaking powers between the Centre and the states.
  - The case revolves around the interpretation of **Entry 8 of List II (State List)** and **Entry 52 of the Union List in the Constitution**.
    - **Entry 8 of List II (State List)** gives states the power to regulate "the production, manufacture, possession, transport, purchase and sale of intoxicating liquors"
    - **Entry 52 of List I (Union List)** allows the Centre to regulate industries as a whole to the extent "declared by Parliament by law to be expedient in public interest".
  - **Centre VS States Arguments**
    - **Centre:** As alcohol and other products of fermentation industries that deal with non-potable (non-drinkable) alcohol are included in the **Industries (Development and Regulation) Act, 1961**. The Centre argued that it "occupied the field" when it comes to industrial alcohol, and that states could not regulate the subject.

### Taxing industrial alcohol

Can industrial alcohol be included under the definition of 'intoxicating liquor'? What happens when the Union and State Lists contain 'overlapping' entries? Here's why SC held that states can tax industrial alcohol

ADITYA KARPURAM  
NEW DELHI, OCTOBER 23

A NINE-JUDGE Bench of the Supreme Court held in a 11 ruling on Wednesday that states have the power to tax not just alcoholic beverages, but also industrial alcohol. Excise duty levied on drinking alcohol is a key component of the revenue generated by most states – and the top court's ruling will add to their coffers.

The key interpretive question before the court was whether "intoxicating liquor" can be defined to also include "industrial alcohol".

Justices – Chief Justice Dhanu (CJ) D V Chandrachud, and Justices Hrishikesh Roy, Abhay S Oja, B Prasadwala, Manoj Misra, Jai Prakash Singh, and Justice Sanjay Kumar – ruled in favour of the states.

Justice B V Nagaraja in her dissenting opinion held that the power to regulate industrial alcohol should be with the Centre.

**'Overlapping' entries**

The core of the dispute arises from two "overlapping" entries in the Seventh Schedule of the Constitution, which lays down the division of lawmaking powers between the Centre and the states.

Entry 8 of List II (State List) gives states the power to regulate "the production, manufacture, possession, transport, purchase and sale of intoxicating liquors", while Entry 52 of List I (Union List) allows the Centre to regulate industries as a whole to the extent "declared by Parliament by law to be expedient in public interest".

As alcohol and other products of fermentation industries that deal with non-potable (non-drinkable) alcohol are included in the Industries (Development and Regulation) Act, 1961 – a law passed by Parliament – the Centre argued that it "occupied the field" when it comes to industrial alcohol, and that states could not regulate the subject.

States, on the other hand, argued that industrial alcohol can be consumed to produce consumable alcohol (beverage), which requires them to enact legislation.

**Upshot of SC decision**

Industrial alcohol is essentially impure alcohol that is used as an industrial solvent. It is not consumed as a beverage, gin, or spirit, and is therefore, not an intoxicating liquor. It is produced by fermenting grains, fruit, molasses, etc., a process that is called "distillation" – turns

#### THE CASE AND THE BACK STORY

1989: SC in *Synthetic Bricks Chemicals Ltd. v. State of Uttar Pradesh* held that states only have the power to regulate "intoxicating liquor" meant for human consumption, and that only the Centre can regulate "industrial alcohol" after a declaration under the Industries (Development and Regulation) Act, 1961.

1990: UP imposed a licence fee of 15 paise per litre on industrial alcohol obtained from distilleries.

2004: Allahabad HC, struck down the state's levy, relying on the SC's 1989 decision. The UP government went in appeal to SC.

2007: SC referred case to a larger Bench to determine if the *Synthetic Bricks Chemicals* decision needed to be reconsidered, since it did not consider relevant past SC decisions including the decision of a 3-judge Constitution Bench in *Ch. Tilla Ramji v. State of Uttar Pradesh* (1951).

2010: 5-judge Bench referred case to a 9-judge Bench.

2024: 9-judge Bench led by CJ Chandrachud heard the case over six days and reserved judgment in April.

It into industrial alcohol. This makes the alcohol unfit for human consumption, and significantly lowers its price.

Industries use this impure alcohol to manufacture a range of products including pharmaceuticals, perfumes, cosmetics, and cleaning liquids.

However, this same industrial or denatured alcohol is sometimes used to make illicit liquor, cheap and dangerous intoxicants whose consumption poses severe risks, including blindness and death.

**'Intoxicating liquor'**

CJ Chandrachud held that entries in the Seventh Schedule must be given a "wide meaning", and be deemed to include "industrial" and "auxiliary" matters related to the entry in question.

He then applied this rule to the expression "intoxicating liquor" under Entry 8 of List II, holding that the "Entry seeks to regulate everything from the stage of the raw material to the consumption of 'intoxicating liquor'".

The majority opinion, authored by the CJ, held that "even liquor is not only alcoholic but also traditionally not consumed as a beverage. It may be covered by the phrase 'intoxicating liquor' if it produces the effect of intoxication."

The judgment categorised this by finding that the word "intoxicating" can also refer to poisoning and not just inebriation, indicating that the purpose of the expression "seems to be to) enhance the scope of the Entry to cover liquor which has an impact on health".

Justice Nagaraja on the other hand, found that the deciding factor must be the "nature of the product", consumed. "Merely because there can be a potential misuse of 'industrial alcohol' for example by converting it into 'intoxicating liquor' as a beverage which has an intoxicating effect, Entry 8 - List II cannot be stretched to include such a 'misuse' of the 'disentitled' word."

**The 'federal balance'**

Two interpretations are possible when two entries in the Seventh Schedule are "overlapping": either states can be given the power to regulate intoxicating liquor, or Parliament can be allowed to take complete control of the intoxicating liquor industry by passing a law under Entry 52 of List I.

To address this, the majority held that "when there are two possible interpretations of the entries, the Court must choose the one that maintains the federal balance".

The ruling then held that intoxicating liquor under Entry 8 – which now includes denatured alcohol and the raw material for alcohol production – falls within the exclusive control of states. It held that the Centre cannot regulate matters concerning intoxicating liquor under Entry 52 as this would result in "rendering Entry 8 fully redundant".

While Justice Nagaraja agreed that the Centre and Parliament could not enact laws to regulate "intoxicating liquor", she disagreed on what can be included under this tag. While the majority opinion held that "intoxicating liquor" includes industrial or denatured alcohol, Justice Nagaraja came to the opposite conclusion.

The dissent reasoned that so long as alcohol and fermentation industries remain as industries where the Centre can regulate, the Centre cannot control the entire alcohol production and distribution. The Industries (Development and Regulation) Act, 1961, "state legislatures are deemed to have powers to pass a legislative or to take any action" relating to them.



- **States:** States, on the other hand, argued that industrial alcohol can be misused to produce consumable alcohol illegally, which required them to enact legislation.
- The Supreme Court needed to address whether "**industrial alcohol**" or denatured spirits could be classified under the term "**intoxicating liquor**," thus allowing states to regulate and tax it.
- The controversy traces back to a **1990 Supreme Court judgment** in ***Synthetics & Chemicals vs. State of Uttar Pradesh***, which limited the definition of "intoxicating liquor" to potable alcohol, ruling that states could not tax industrial alcohol.
- The current case revisited this ruling, with the Supreme Court considering its implications on state powers and public health concerns.
- **Key-takeaways from Supreme Court's Ruling**
  - **Definition of Intoxicating Liquor:** The Supreme Court ruled that "industrial alcohol" falls within the meaning of "intoxicating liquor" under **Entry 8 of List II of the Constitution**. This broader interpretation allows states to regulate and tax industrial alcohol.
  - The definition of "**intoxicating liquor**" extends beyond just alcoholic beverages suitable for human consumption. It includes all types of alcohol that could pose risks to public health.
  - The court stated, "**Alcoholic liquor is defined by its ingredients, and 'intoxicating' is defined by its effects.**" This emphasis on public health reinforces states' obligations to prevent misuse of industrial alcohol.
  - **Overruling of Previous Judgment:** The court overruled the earlier decision in ***Synthetics & Chemicals***, asserting that the Entry 8 of List II cannot exclude raw materials used in producing intoxicating liquors. The Bench highlighted the necessity for states to enact regulations to prevent industrial alcohol from being misused as a consumable liquor.
  - **Legislative Powers:** The ruling confirms that the subject of intoxicating liquors falls exclusively within state jurisdiction, allowing state legislatures to enact laws addressing the production, transport, and sale of industrial alcohol. This grants states greater autonomy to combat illegal consumption and regulate alcohol-related activities.
  - The judgment **empowers state governments to introduce more stringent regulations on industrial alcohol, potentially leading to changes in how it is produced, transported, and consumed.**
- **Key-Provisions**
  - **Entry 8 of List II (State List):** It grants states the power to regulate intoxicating liquors.
  - **Entry 52 of the Union List:** It empowers the central government to regulate industries of public interest.
  - **Article 47 of the Constitution:** It states the duty of the state to raise the level of nutrition and standard of living and to improve public health.
- **Industrial alcohol**
  - Industrial alcohol is essentially **impure alcohol** that is used as an industrial solvent. Mixing chemicals such as **benzene, pyridine, gasoline**, etc. in **ethanol**, which is produced by fermenting grains, fruit, molasses, etc., — a process that is called 'denaturation' — turns it into **industrial alcohol**. This makes the alcohol unfit for human consumption, and significantly lowers its price.
  - Industries use this impure alcohol to manufacture a range of products including pharmaceuticals, perfumes, cosmetics, and cleaning liquids.
  - However, this same industrial or denatured alcohol is sometimes used to make illicit liquor, cheap and dangerous intoxicants whose consumption poses severe risks, including blindness and death.