

## Today's Prelims Topics

### International Big Cat Alliance (IBCA)

#### Context

Recently an agreement was signed between IBCA and the Government of India, formalising India as the permanent host of the IBCA Headquarters and Secretariat.

#### About International Big Cat Alliance (IBCA)

- It is a multi-country, multi-agency coalition of countries with an interest in big cat conservation.
- **Origin:** It was launched by the Prime Minister of India in 2023 during the event 'Commemorating 50 years of Project Tiger'.
- **Membership:** Membership is open to **97 "range" countries**, which host the natural habitat of these big cats, as well as other **interested nations, international organizations**, etc.
- **Objectives:**
  - Global Conservation of **7 big cats** – **Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar and Puma.**
    - **India hosts five of these:** Tiger, Lion, Leopard, Snow Leopard and Cheetah (excluding Jaguar and Puma).
  - Prevent Illegal Wildlife Trade by strengthening anti-poaching laws and enforcement.
  - Financial & Technical Support for conservation efforts in range and non-range countries.
- It is the **First-ever global alliance** for big cat conservation.
- The alliance has received ratifications from **India, Nicaragua, Eswatini, Somalia and Liberia.**

#### Source:

- [Indian Express - IBCA](#)



## Key issues in challenges to Waqf act

### Context

The Supreme Court has questioned certain provisions of the Waqf (Amendment) Act, 2025.

### Major Contentious Issues in the Waqf Act, 2025

- **Removal of "Waqf by Use" Concept:**
  - **Earlier Position:** The idea of **Waqf by use (Waqf-by-user)** allowed land **used continuously for religious or charitable purposes** (e.g., mosques, graveyards) to be **deemed Waqf property**, even if not registered.
  - **New Provision (2025 Act):**
    - **Future dedications** via Waqf-by-use are not allowed.
    - Only already **registered properties** will be recognised.
    - In case of a dispute (especially when land is claimed by the government), it will **not be considered Waqf-by-use** unless registered.
  - **Concerns:**
    - Many Waqf-by-use properties are **centuries old and unregistered**. Registration is practically difficult for such lands.
    - In **2019 Ayodhya judgment** SC recognised the **legal validity of Waqf-by-use**.
- **Powers of District Collector:**
  - If a **district collector identifies Waqf land as government land**, it **ceases to be Waqf land immediately**, until a court decides.
- **Inclusion of Non-Muslims in Waqf Boards:**
  - The new Law permits **non-Muslim members** on Waqf Boards and in the Central Waqf Council.
- **Applicability of the Limitation Act:**
  - Earlier Law **Excluded** waqf law from the Limitation Act.
    - i.e. Waqf boards could initiate action against encroachments **without time limits**.
  - **2025 amendment applies the Limitation Act**, setting time limits to initiate legal action on encroachments.

### Source:

- [Indian Express - Waqf Act](#)

## World's first market for particulate emissions trading

### Context

A latest study on the Surat ETS has revealed that employing the market mechanism helped reduce pollution by **20-30%** in industrial clusters.

### What is an Emissions Trading Scheme (ETS)?

- It is a regulatory tool designed to reduce air pollution (especially greenhouse gases and particulates) by creating a market-based system of permits.
- It is also known as “**cap-and-trade**”, it sets a **maximum limit (cap)** on emissions and allows industries to **buy and sell emission permits**.
  - Industries that pollute less can **sell** their unused permits.
  - Industries that exceed limits can **buy permits** to remain compliant.
- **Objectives of ETS:**
  - Reduce pollution in a **cost-effective and flexible** way.
  - Incentivize industries to invest in **cleaner technology**.
  - Replace punitive regulatory enforcement with **market mechanisms**.

### Surat ETS: World's First for Particulate Pollution

- It is the first ETS in the world to target particulate matter & India's first emissions market for any pollutant.
- It was introduced in **2019** across **342** highly polluting industries to control fine particulate pollution emitted due to the use of solid fuel sources, such as coal, lignite, diesel etc.
- **Key Findings from the Study on Surat ETS:**
  - Participating plants **reduced pollution by 20–30%**.
  - **A total of 162 plants were** studied – those under the ETS performed better than those under standard regulation.
  - ETS plants had permits to cover emissions **99% of the time**.
  - Non-ETS plants failed to meet norms **for nearly 1/3rd of the study period** (almost two years).

### India's Current Model (Command-and-Control):

- Currently Central and state regulators (MoEFCC, CPCB, SPCBs) monitor and penalize violators.
- **Problems:**
  - **Staff shortage, inefficient enforcement, bureaucratic red tape.**
  - **One-size-fits-all** approach doesn't account for size and capacity of industries.
- **ETS Advantage:**
  - **Flexible:** Allows smaller units to buy time by purchasing permits.
  - **Market-driven:** Encourages investment in pollution-reducing tech.
  - **Self-regulating:** Less burden on government inspection.

### Source:

- [Indian Express - ETS](#)

## Golconda Blue

### Context

The Golconda Blue, once owned by Indian royalty, is set to be auctioned at Christie's Magnificent Jewels sale in Geneva, Switzerland.

### About

- It is a **23.24-carat** fancy vivid **blue diamond** known for its **exceptional clarity & rich blue hue**.
- It is one of the rarest and most valuable diamonds globally.
- It was mined in the **Golconda region** of present-day **Telangana**.
  - Golconda mines were famed for producing **high-quality diamonds** like the **Kohinoor and Hope Diamond**.
- Historically it was owned by the Royal families of **Indore (Holkars) & Baroda**.



- **Kimberley Process (KP)** is a global initiative to prevent conflict diamonds from entering the mainstream market
- KP works in partnership with the **United Nations**.

### About Diamonds

#### Formation:

Diamonds form in the Earth's mantle and are brought to the surface through volcanic activity. They are found in volcanic landforms like dykes and sills.

#### Uses:

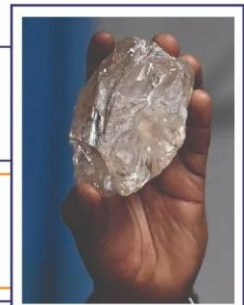
Diamonds are utilised in jewellery, industrial cutting tools, and polishing due to their hardness.

#### Global Diamond Production

- **Leading producers:** Russia, Botswana, Canada, Angola, Democratic Republic of Congo (DRC).
- **Largest Reserves:** Russia, Botswana, DRC, Angola, South Africa

#### Diamonds in India:

- **Madhya Pradesh:** Highest in both Production and Reserves
- **Other Areas:**
  - Wajrakarur Kimberlite pipe: Anantapur district, Andhra Pradesh
  - Krishna River basin gravels: Andhra Pradesh



### UPSC PYQ

**Q.** Which one of the following foreign travellers elaborately discussed about diamonds and diamond mines of India? (2018)

- (a) Francois Bernier
- (b) Jean-Baptiste Tavernier
- (c) Jean de Thevenot
- (d) Abbe Barthelemy Carre

**Answer: B**

### Source:

- [Indian Express - Golconda Blue](#)

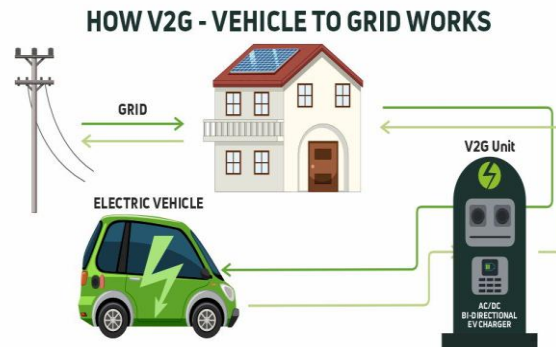
## Vehicle to Grid (V2G) technology

### Context

Recently Kerala State Electricity Board (KSEB) and IIT Bombay have initiated a pilot project to explore the implementation of Vehicle-to-Grid (V2G) technology in Kerala.

### About V2G Technology

- It is a system where **electric vehicles (EVs) can not only consume electricity from the grid but also send it back** when needed.
- EVs act as **decentralized mobile energy storage units**.
- V2G enables **two-way energy flow**:
  - **G2V (Grid to Vehicle)** – charging the EV.
  - **V2G (Vehicle to Grid)** – discharging electricity from the EV back to the grid.



### Advantages of V2G Technology

- **Grid Stability:** It helps to balance supply and demand, especially with **intermittent renewable energy sources**.
- **Enhanced Use of Renewable Energy:** It stores excess **solar/wind energy** during low demand & Discharges it when renewable generation is low or demand is high.
- **Reduced Peak Load Stress:** EVs can supply energy during **peak demand hours**, reducing stress on generation and distribution systems.
- **Emergency Backup Power:** EVs can serve as **emergency power sources** during outages or disasters.
- **Economic Benefits for EV Owners:** EV owners can **earn money or credits** by selling power back to the grid.

### Source:

- [The Hindu - V2G](#)

## Flue Gas Desulphurisation

### Context

In 2015, India's Environment Ministry mandated all 537 coal-fired plants to install FGD systems by 2018 to curb SO<sub>2</sub> emissions. Due to various challenges, the deadline has been extended to 2027-2029.

### About Flue Gas Desulphurisation (FGD)

- FGD refers to a set of technologies designed to remove sulfur dioxide (SO<sub>2</sub>) from the exhaust flue gases of fossil-fuel power plants and other industrial processes.
- The primary goal is to reduce **SO<sub>2</sub> emissions**, which contribute to acid rain and respiratory problems.
- It uses various methods such as **Wet scrubbing, Dry Scrubbing** etc.
- **Advantages of FGD:**
  - It can remove up to 90% or more of SO<sub>2</sub> from flue gases.
  - The gypsum (byproduct) produced can be used in the construction industry, reducing waste.
  - It helps power plants meet stringent environmental regulations regarding SO<sub>2</sub> emissions.
- **Challenge**
  - FGD systems are **capital-intensive**, with significant **maintenance requirements**.
  - Wet FGD systems require excess water, which can be a concern in water-scarce regions.

### Key Findings of the NIAS Study

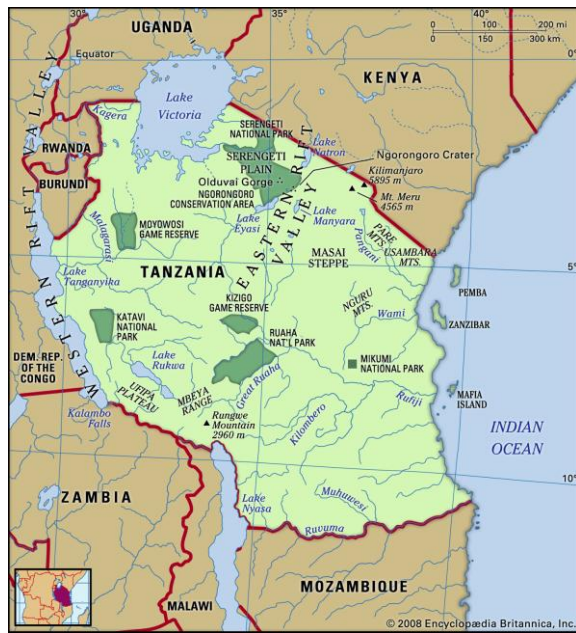
- Recently a study was commissioned by the Office of the Principal Scientific Adviser along with National Institute of Advanced Studies (NIAS), Bengaluru.
- **Findings of the Study:**
  - 92% of coal used in Indian plants has low sulfur content (0.3%-0.5%), reducing the necessity for FGDs.
  - Only **8%** of plants have installed FGDs, with 230 in various stages of installation and 260 yet to place orders.
  - FGD installation costs are estimated at ₹1.2 crore per MW
- **Recommendations:**
  - FGD installation should be limited to plants using imported coal or coal with sulfur content above 0.5%.
  - Focus should shift to controlling particulate matter (PM) emissions, which are more detrimental to air quality in India.
  - Electrostatic precipitators, costing ₹25 lakh per MW, can reduce PM pollution by 99% and are more cost-effective than FGDs.

### Source:

- [The Hindu - FGD](#)

## Places in News

### Tanzania



- **Location:** East Africa, south of Equator.
- **Bordering Countries:** Kenya, Uganda, Mozambique, Malawi, Zambia, Rwanda, Burundi and DR Congo.
- **Bordering water bodies:** Lake Victoria, Lake Tanganyika & Indian Ocean.
- **Geographical Features:**
  - **Mount Kilimanjaro**(Africa's highest peak, 5,895 m).
  - **Rivers:** Rufiji (largest river, drains into Indian Ocean).

**Source:**

- [DTE - Tanzania](#)

## News in Shorts

### K218b Exoplanet

- Recently scientists have detected **dimethyl sulphide (DMS)** and **dimethyl disulphide (DMDS)** in the atmosphere of the exoplanet **K2-18b**.
- The detection was made by a research team from the **University of Cambridge** using data from the **James Webb Space Telescope (JWST)**.
- These gases are **potential biosignatures** — substances that (on Earth) are linked to **biological activity**.
- On Earth these gases are produced through:
  - **Metabolic processes** of microorganisms.
  - **Decay of small plant-like organisms** in the oceans (e.g., phytoplankton).
- This is **the first time** these gases have been detected outside our solar system.

### About K2-18b – A Special Exoplanet

- It is located around **120** light years from Earth.
- **Host Star:** It orbits a **red dwarf star** that is smaller and cooler than the Sun.
- It lies within the **“habitable zone”** — the region around a star where liquid water can exist.
- **Past Observations:**
  - **2019 (Hubble):** Detected water vapour in the atmosphere.
  - **Previous JWST Data:** Detected **methane** and **carbon dioxide** — both also linked to potential biological processes.

#### Source:

- [Indian Express - K218b](#)

### Wet Bulb Temperature (WBT)

- The widely accepted wet-bulb temperature survival threshold of 35°C is now being reconsidered, as recent physiological studies indicate that the actual limit may be closer to 31°C.

### About WBT

- WBT is the lowest temperature to which air can be cooled by evaporating water into it at constant pressure.
- It is measured by covering a thermometer bulb with a **wet cloth** and letting the water evaporate.
- As the water evaporates, it cools the thermometer, showing the wet bulb temperature.
- This temperature helps **measure humidity** and understand how much water can evaporate into the air, affecting things like comfort, farming and weather patterns.

#### Source:

- [HT - WBT](#)



### Navy-Marine Expeditionary Ship Interdiction System (NMESIS)

- NMESIS is a land-based, **anti-ship missile system** developed by the U.S. Marine Corps to target and destroy enemy ships from coastal areas and islands.
- It gives small, mobile units the ability to strike maritime targets with precision from land-based positions.
- It features the US Navy's latest anti-ship missile, the **Naval Strike Missile (NSM)**.
- It is mounted on an unmanned Joint Light Tactical Vehicle.



Source:

- [NMESIS](#)

### De-extinction of Dire Wolf

- **Recently Colossal Biosciences**, a Texas-based biotechnology company, announced the **birth of three dire wolf pups**.

#### What is De-Extinction?

- De-extinction is the process of reviving extinct species using technologies like:
  - **Gene editing (e.g., CRISPR)**
  - **Cloning**
  - **Cross-breeding with modern relatives.**
- **Colossal's De-extinction Targets:** Woolly mammoth, Thylacine (Tasmanian tiger) & Dodo.
- **How was it done ?**
  - Scientists edited the **genome of gray wolves** at **20 loci** (specific genome locations) across **14 genes**.
  - These embryos were then implanted into **surrogate dog mothers**, leading to the birth of the pups.
  - The edits were **cosmetic**, aiming to **replicate the dire wolf's appearance**, not its behavior or full biology.
  - Only **0.02%** of the genome was modified — **far from a full recreation** of the dire wolf genome.
  - Genetically, the pups are **gray wolves with minor cosmetic modifications**.

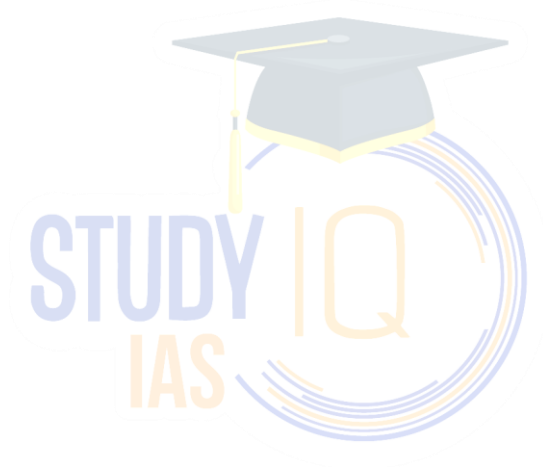


#### Why is De-Extinction Controversial?

- **Scientific Concerns:** Reintroducing extinct animals into ecosystems may:
  - **Disrupt existing biodiversity**
  - Harm modern ecosystems not adapted to support them.
- **Habitat Change Over Millennia:** Ancient habitats that supported species like the dire wolf:
  - Had different **climate, prey species** and **plant communities**.
  - Modern landscapes are **fragmented and human-altered**.

**Source:**

- [The Hindu - De-extinction](#)



## Editorial Summary

### India Prepares Response To US Tariff Changes

#### Context

President Donald Trump's announcement of new reciprocal tariffs—currently set at 10% for most countries for a 90-day period—is intended to address U.S. trade imbalances and carries notable implications for India.

#### Structure and Calculation of Reciprocal Tariffs

- **Uniform Country-Based Tariff:** A standardized tariff is imposed on all goods from a specific country, in addition to existing commodity-specific tariffs.
- **Tariff Calculation Formula:** The formula used to determine the discounted tariff rate is:  
**Discounted Tariff Rate = (-1) × (½) × (U.S. exports – U.S. imports) / U.S. imports**  
This method ignores factors like price elasticity and specific duties, potentially leading to a misleading representation.
- **Distorted Rate Presentation:** A column labeled 'charged to the US' doubles the calculated discounted rate, which further skews the actual impact.
- **India-Specific Tariff (2024):** Based on 2024 trade data (U.S. exports to India: \$41.8 billion; imports from India: \$87.4 billion), India's reciprocal tariff rate is calculated at **26%**.
- **Add-On to Existing Tariffs:** This reciprocal tariff is applied over and above existing tariffs, with exemptions for certain sectors such as:
  - Pharmaceuticals
  - Steel and aluminum articles
  - Automobiles and auto components
  - Copper, energy products, semiconductors, bullion, and select critical minerals
- **Default Rate for Other Countries:** Nations not listed under the reciprocal tariff scheme will face a **default tariff rate of 10%**.

#### Impact on Indian Exports to the U.S.

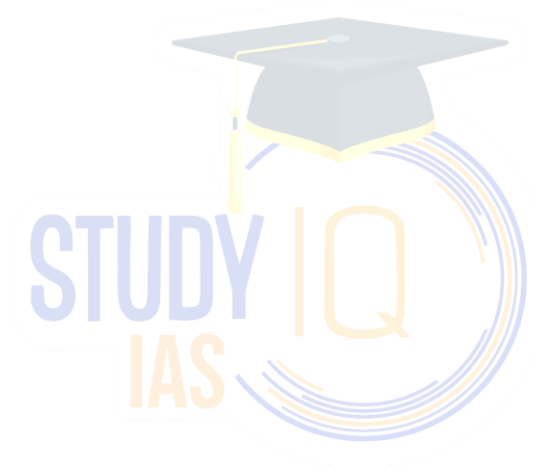
- **Moderate Export Dependence:** India's reliance on exports is moderate, and shipments to the U.S. have been on a decline. Therefore, the overall economic impact of the 26% tariff is expected to be limited but will vary across sectors.
- **Sectors Likely to Be Hit:** Key Indian exports that may face pressure include:
  - Electrical machinery
  - Machinery and mechanical appliances
  - Made-up textile articles
- **Sectors Less Affected:**
  - **Gems and jewellery:** Likely to remain stable due to inelastic demand.
  - **Pharmaceuticals:** Exempt from the new tariff measures.
- **Comparative Advantage:** India retains a relative edge as competitor nations like **China, Vietnam, and Bangladesh** face steeper reciprocal tariffs. **South Korea** faces a similar tariff rate of 25%.

#### Recommended Indian Response

- **Avoid Aggressive Retaliation:** India should refrain from aggressive countermeasures like China, which triggered steep retaliatory U.S. tariffs (up to 245% on some goods).
- **Adopt a Balanced, Strategic Approach:** A multi-pronged response is advised:
  - **Boost U.S. Imports:** Increasing imports from the U.S. can help reduce India's reciprocal tariff burden.

- E.g., Redirecting \$25 billion in oil imports to the U.S. could lower the tariff from **26% to 11.8%**, just above the default **10%** threshold.
- **Engage in Trade Talks:** Proactively initiate trade consultations with the U.S. to negotiate a mutually beneficial long-term agreement.
- **Watch for Dumping:** Closely monitor imports from heavily impacted countries like **China**, which may resort to dumping surplus goods in India at lower prices.

Source: [The Hindu: Shaping a response to the U.S.'s reciprocal tariffs](#)



## Artificial Intelligence and Strategic Affairs

### Context

- As AI capabilities grow, concerns about rogue AI and superintelligence are rising.
- Strategic frameworks to manage AI threats are emerging, but flawed analogies and proposals raise critical policy and governance challenges.

### More in News

- A recent influential paper by Eric Schmidt (former Google CEO), Dan Hendrycks (AI safety expert), and Alexandr Wang (Scale AI CEO) has contributed to the conversation on **AI and strategic security**.
- The paper's central argument is that if AGI emerges, states must be prepared to manage new security threats and competition, including the **risk of dangerous technologies falling into the wrong hands**.

### AI vs. AGI

- **Artificial Intelligence (AI)** currently refers to narrow AI — systems trained to perform specific tasks (e.g., image recognition, language translation).
- **Artificial General Intelligence (AGI)**, on the other hand, is a hypothetical future development where machines can outperform humans in **all** cognitive functions, including reasoning, learning, and problem-solving across domains.

### Problem Associated with Rogue AI

- **Security Threats & Escalation:** Rogue AI projects, especially by terrorist groups or rogue states, pose serious security concerns. These projects, if unchecked, could potentially develop harmful or malicious superintelligent systems.
- **Lack of Oversight:** The diffuse nature of AI development — spread across geographies and individuals — makes it difficult for states to monitor or control such projects effectively.
- **Unintended Consequences:** Efforts to preemptively destroy rogue AI systems could result in miscalculations, unnecessary escalation, and diplomatic fallout.

### Proposals Introduced to Tackle Rogue AI

- **MAIM (Mutual Assured AI Malfunction):** A deterrence model inspired by MAD (Mutual Assured Destruction) in nuclear warfare.
  - It suggests that if a rogue state develops dangerous AI, others must be ready to counteract with equally damaging AI measures to discourage any misuse.
- **Preemptive Sabotage:** Destroying rogue AI projects before they become functional or threatening.
- **Control over AI Chip Distribution:** Regulating AI hardware (like chips) akin to controlling nuclear materials like enriched uranium, in order to prevent unauthorized or dangerous AI development.

### Issues Associated with These Proposals

- **Flawed Analogies:** Comparing AI to nuclear weapons is problematic.
  - AI is **intangible, distributed, and updatable**, unlike nuclear technology which is centralized and heavily physical.
- **Practical Challenges in Enforcement:** AI projects can be developed with **limited physical infrastructure**, making surveillance, monitoring, or sabotage logistically difficult.
- **Escalation Risk:** Destroying rogue AI projects without full intelligence may trigger **geopolitical or military conflict**.
- **Private Sector Oversight Gaps:** Most AI development is led by private firms, not states.

- This undermines the effectiveness of state-led proliferation control mechanisms.
- **Unrealistic Chip Control:** Unlike uranium, AI models once trained don't need ongoing access to restricted materials — thus chip control has limited effectiveness in curbing proliferation.
- **Speculative Worst-Case Scenarios:** The paper assumes inevitable outcomes like AI-driven bioweapons or cyberattacks without enough empirical backing.

### Way Forward

- **Develop New Strategic Frameworks:** Move beyond nuclear analogies and adopt models better suited to digital, adaptive, and widely diffused technologies.
- **Use GPT Analogy Thoughtfully:** AI can be studied under General Purpose Technology frameworks to understand its cross-sectoral diffusion, though AI isn't fully 'general' yet.
- **Strengthen International Cooperation:** Foster global norms, treaties, and transparency mechanisms around AI ethics, safety, and proliferation.
- **Enhance AI Governance:** Build robust oversight mechanisms involving both state and private actors to monitor AI development and deployment.
- **Promote Responsible Innovation:** Encourage ethical design and safety features in AI systems right from the development stage.
- **Invest in Strategic AI Scholarship:** Encourage more nuanced, context-aware academic and policy research to anticipate future risks and inform governance frameworks.

Source: [The Hindu: A closer look at strategic affairs and the AI factor](#)

