PadhAI

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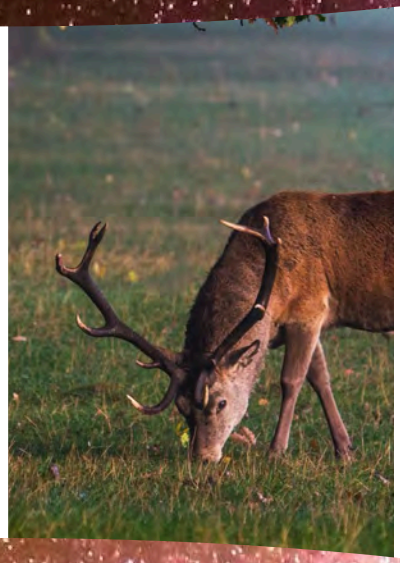


Down to *Earth*

SUMMARY FOR UPSC — MAGAZINE

1-15 APRIL 2026

Welcome to PadhAI–

Down to Earth Magazine Coverage

You're here because you understand a core truth of UPSC preparation—success doesn't come from reading everything, but from reading what actually matters.

Down to Earth is one of the most valuable sources for environment, ecology, and sustainable development. However, reading it cover to cover can be time-consuming and often difficult to align directly with exam demands. PadhAI's Down to Earth coverage is designed to simplify that process—by filtering, structuring, and converting important content into exam-ready insights.

Why PadhAI's Down to Earth Coverage

Many aspirants struggle with Down to Earth because of:

- Detailed and lengthy articles
- Indirect linkage with Prelims and Mains
- Difficulty in extracting core concepts and usable points

At PadhAI, we focus only on what is relevant. We identify key themes, connect them with syllabus requirements, and align them with PYQs to ensure conceptual clarity and answer-writing utility.

Every topic included:

- Has clear relevance to GS (especially GS-3: Environment) or Essay
- Is linked directly or indirectly with previous year questions
- Enhances your understanding of environmental issues, policies, and analysis

Nothing is included for the sake of volume. Everything is included for value.

Part of the PadhAI Preparation Ecosystem

This Down to Earth coverage is integrated with a broader system that includes:

- **Fast and concise magazines (published early)**
- **Daily PIB summaries (filtered and exam-focused)**
- **Monthly compliance coverage**
- **Complete Prelims & Mains PYQs with structured answers**
- **News summaries from relevant sources**
- **Personal tutor chat support for continuous guidance**

The goal is simple:
One reliable system instead of multiple scattered sources.

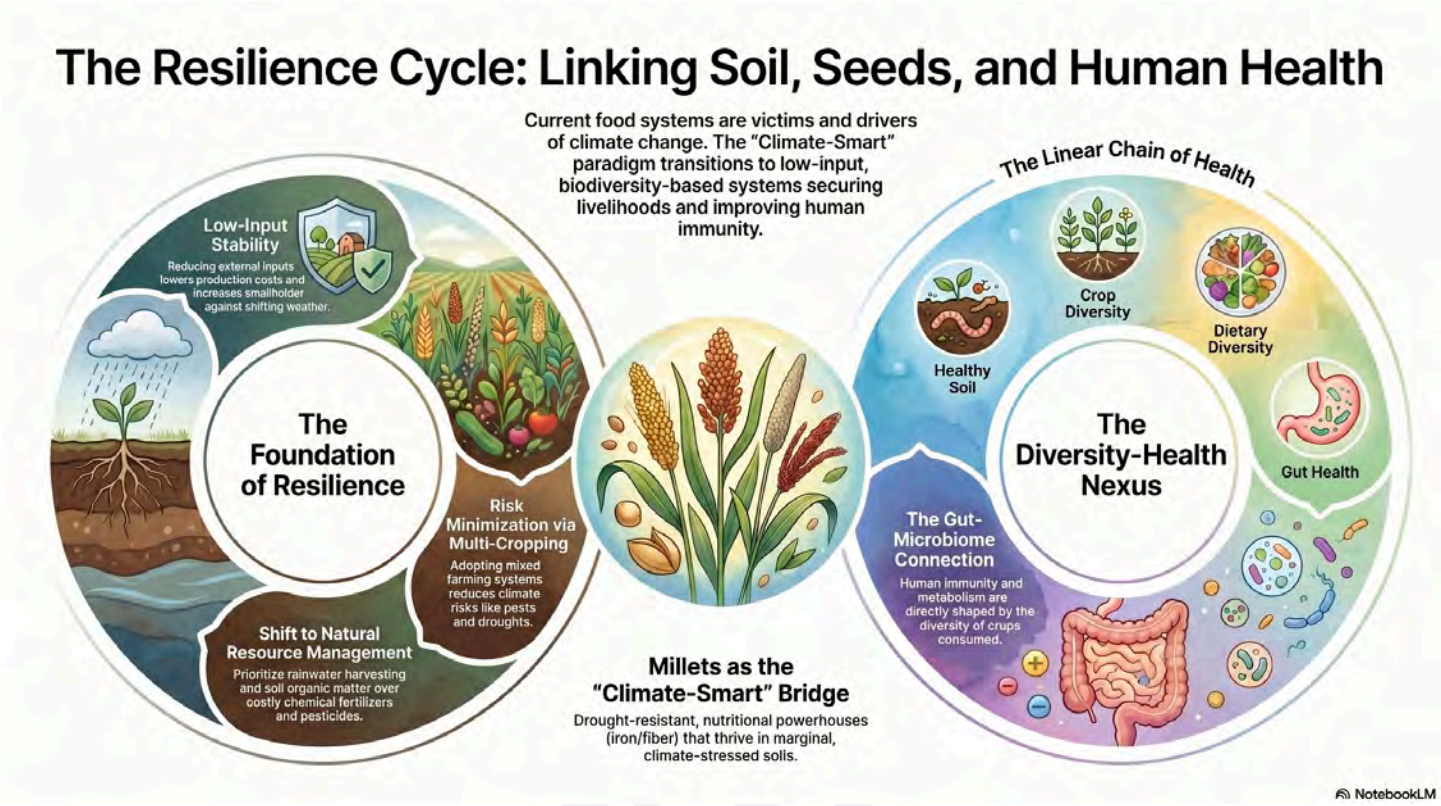
Our Guiding Philosophy

At PadhAI, everything is built on three principles:

- **Learn only what matters**
- **Learn it the right way**
- **Learn it at the right time**

That's how preparation becomes focused, efficient, and effective.

Topic 1: Food in the Age of Climate Change



Summary: Food systems are currently at a critical intersection where they act as both **victims and drivers of climate change**. The emerging global paradigm is **climate-smart agriculture**, which seeks to simultaneously ensure livelihood security, nutritional adequacy, and ecological sustainability.

Background: Modern high-input agriculture contributes significantly to greenhouse gas emissions while being increasingly threatened by shifting weather patterns. This necessitated a shift toward **low-input systems** that reduce farmer vulnerability and protect natural resources.

Key Points:

- **Low-Input Resilience:** Reducing dependence on costly fertilisers and pesticides to lower production costs and increase the resilience of smallholders.
- **Resource Management:** Shifting focus to **rainwater harvesting** and improving soil organic matter as the core "inputs" for productivity.
- **Diversification and Millets:** Adopting multi-cropping systems and promoting **drought-resistant millets** as bridges between climate adaptation and nutrition.

Prelims Facts (One Liners):

- Millets are highly nutritional, providing high levels of **iron and fibre**.
- The human gut microbiome, critical for immunity, is directly influenced by **dietary and crop diversity**.

MCQ Practice: Q. In the context of climate-smart agriculture, why are millets considered a strategic crop choice? A) They require high chemical inputs B) They are drought-resistant and suitable for marginal soils C) They decrease gut microbial diversity D) They have low nutritional value **Answer: B** ()

Topic 2: Sanitary Waste Management in India

Summary: Sanitary waste, including used pads and diapers, is an under-recognized but critical component of India's **solid waste management system**. Despite being a small fraction of total waste, its environmental, financial, and social impacts are disproportionately high, often leading to health risks for sanitation workers.

Background: Traditional disposal methods like open dumping or flushing lead to soil and water contamination. A case study in **Dehradun** reveals that improper management creates a monthly economic burden of approximately **₹1.86 crore** for the city.

Key Points:

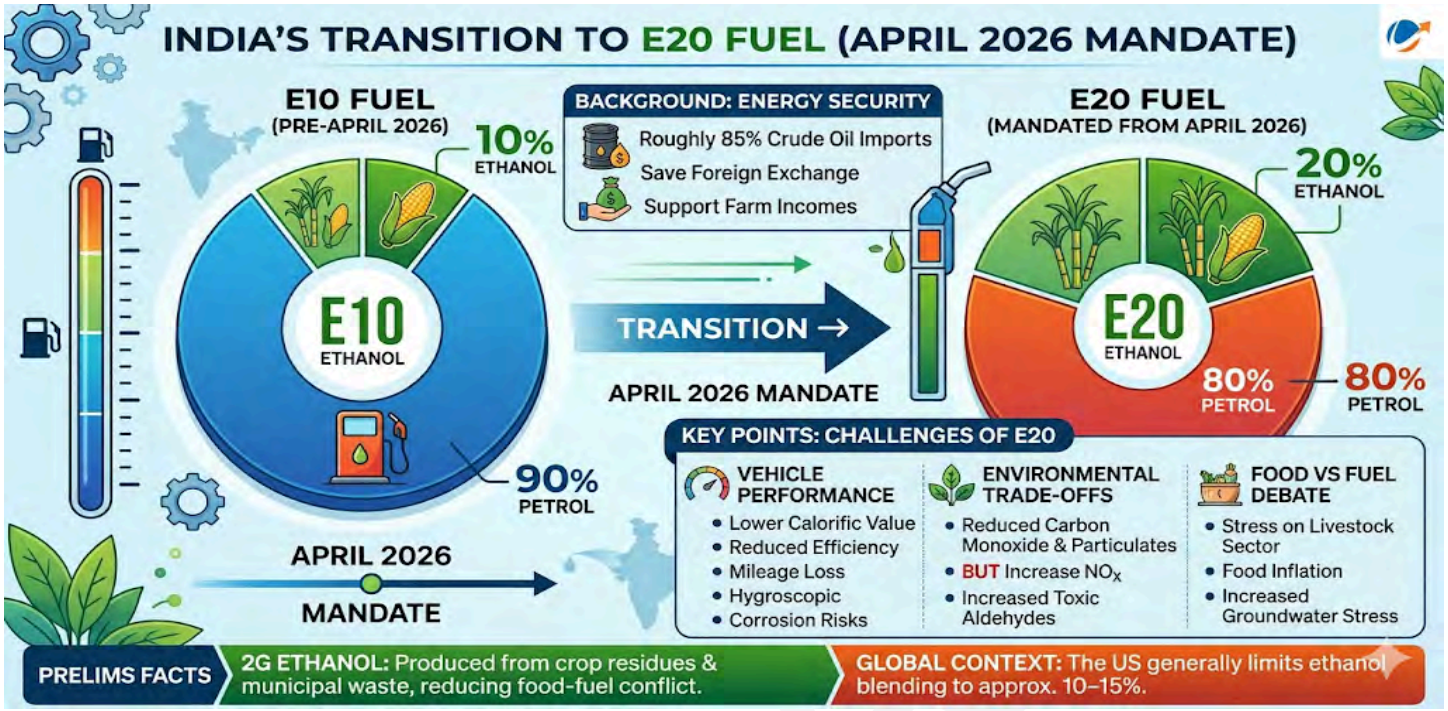
- **Environmental Impact:** Over **90% of sanitary pads contain plastic**, making them non-biodegradable and a major source of pollution.
- **Reusable Alternatives:** The **Waste Warriors Initiative** in Uttarakhand and Himachal Pradesh promotes reusable cloth pads and menstrual cups to reduce the waste burden.
- **Policy and Infrastructure:** Challenges include the lack of source segregation and the high cost and pollution associated with **incineration**.

Prelims Facts (One Liners):

- Incineration of 10 tonnes of sanitary waste costs approximately **₹1.75 lakh per month**.
- The **Solid Waste Management Rules, 2016** provide the framework for managing such waste, though implementation remains limited.

MCQ Practice: Q. What is a primary environmental concern associated with conventional sanitary pads? A) They are 100% biodegradable B) Over 90% of them contain plastic C) They reduce soil contamination D) They are cost-effective for municipal systems **Answer: B** ()

Topic 3: E20 Ethanol Blending in India



Summary: India has mandated **20% ethanol blending (E20)** starting April 2026 to enhance energy security and reduce crude oil imports. However, it is increasingly viewed as a **transitional solution** due to emerging concerns regarding its long-term environmental and agricultural sustainability.

Background: India imports roughly **85% of its crude oil**. Ethanol blending, derived from crops like sugarcane and corn, is used to save foreign exchange and support farm incomes.

Key Points:

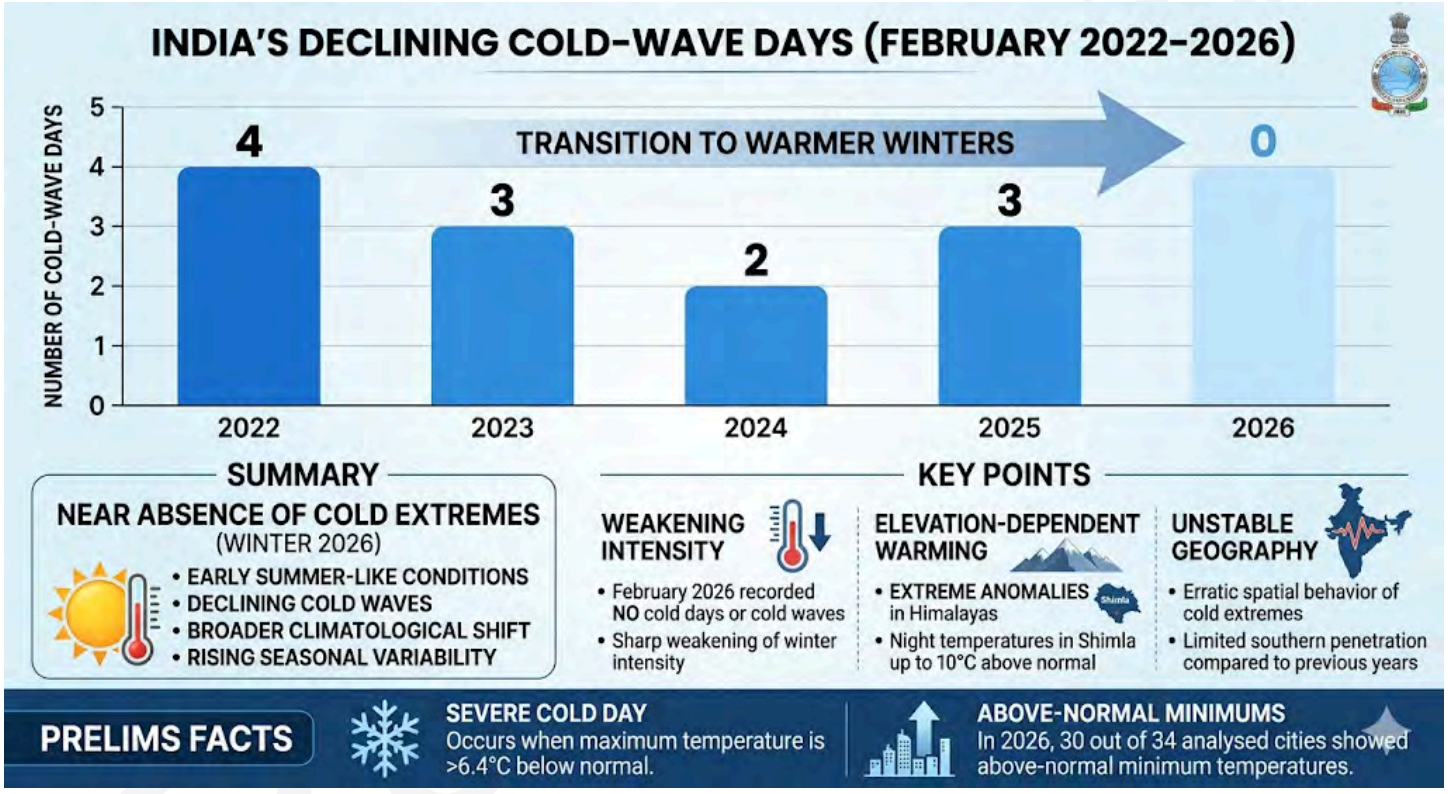
- **Vehicle Performance:** Ethanol has a **lower calorific value**, which reduces fuel efficiency and mileage; it is also **hygroscopic (absorbs water)**, posing corrosion risks for older vehicles.
- **Environmental Trade-offs:** While it reduces carbon monoxide and particulate emissions, E20 can increase **Nitrogen Oxides (NOx)** and toxic **aldehyde emissions**.
- **Food vs Fuel Debate:** Rising demand for ethanol puts stress on the livestock sector and can lead to **food inflation** and increased groundwater stress.

Prelims Facts (One Liners):

- **2G Ethanol** is produced from crop residues and municipal waste, reducing the food-fuel conflict.
- The US generally limits ethanol blending to approximately **10–15%**.

MCQ Practice: Q. What is a significant technical challenge of using E20 fuel in older vehicles? A) Increased energy efficiency B) Its hygroscopic nature leads to corrosion risks C) Absence of NOx emissions D) Reduced fuel consumption **Answer: B** ()

Topic 4: A Warmer, Shorter Winter in India



Summary: The winter of 2026 in India was marked by a **near absence of cold extremes** and an early transition to summer-like conditions. This reflects a broader climatological shift characterized by declining cold waves and rising seasonal variability.

Background: The India Meteorological Department (IMD) classifies a **Cold Wave** when minimum temperatures are 4.5°C–6.4°C below normal. Data shows that 2026 had the second-lowest number of seasonal cold events in five years.

Key Points:

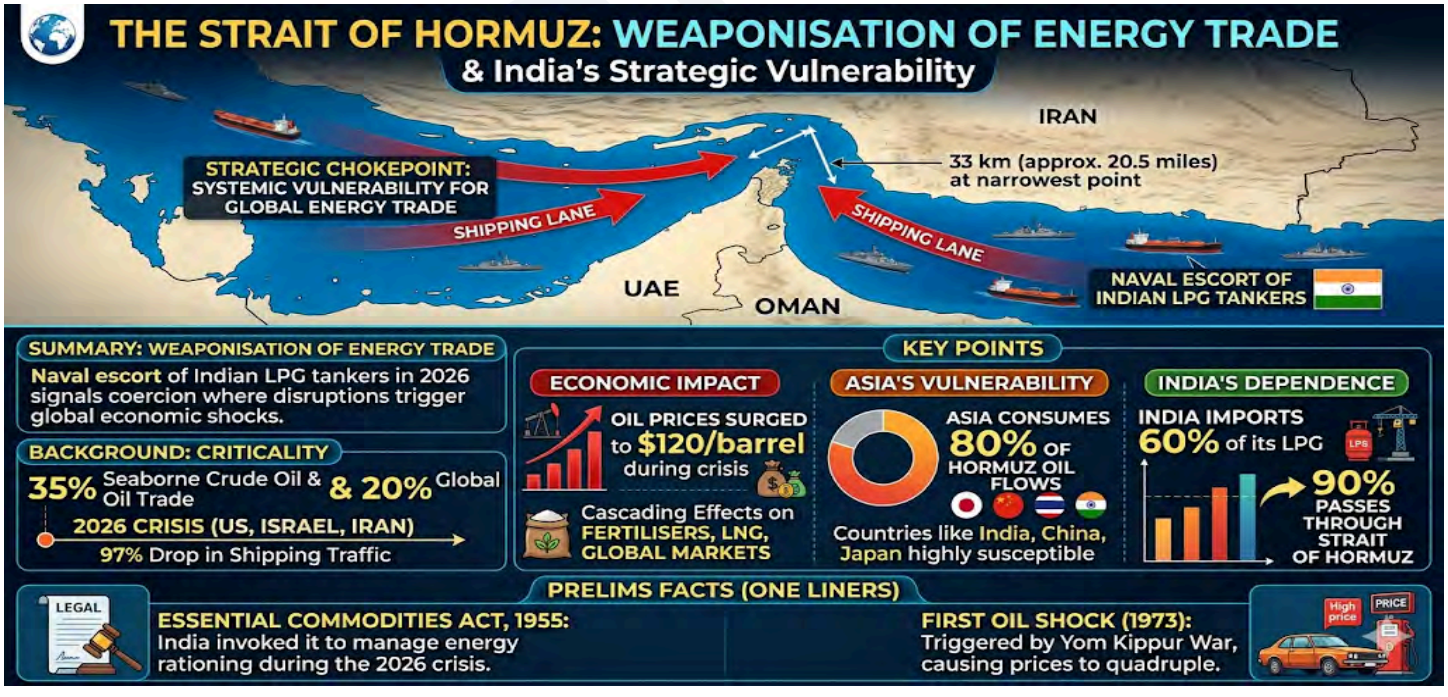
- **Weakening Intensity:** February 2026 recorded **no cold days or cold waves**, signaling a sharp weakening of winter intensity.
- **Elevation-Dependent Warming:** The Himalayas showed extreme anomalies, with night temperatures in **Shimla** rising up to **10°C above normal**.
- **Unstable Geography:** Cold extremes are showing erratic spatial behavior, with limited southern penetration compared to previous years.

Prelims Facts (One Liners):

- A **Severe Cold Day** occurs when the maximum temperature is more than 6.4°C below normal.
- In 2026, **30 out of 34 analysed cities** showed above-normal minimum temperatures.

MCQ Practice: Q. What does "elevation-dependent warming" in the Himalayas primarily refer to in the context of the 2026 winter? A) Cooling at higher altitudes B) Warmer nights than days relative to normal C) Increased snowfall D) Stable southern penetration of cold waves **Answer: B** ()

Topic 5: Energy Warfare in the Strait of Hormuz



Summary: The naval escort of Indian LPG tankers through the **Strait of Hormuz** in 2026 signals the **weaponisation of energy trade**. This critical maritime chokepoint has become a tool of coercion, where disruptions trigger global economic shocks.

Background: The Strait handles approximately **35% of seaborne crude oil** and 20% of global oil trade. A 2026 crisis involving US, Israel, and Iran led to a **97% drop in shipping traffic** through the chokepoint.

Key Points:

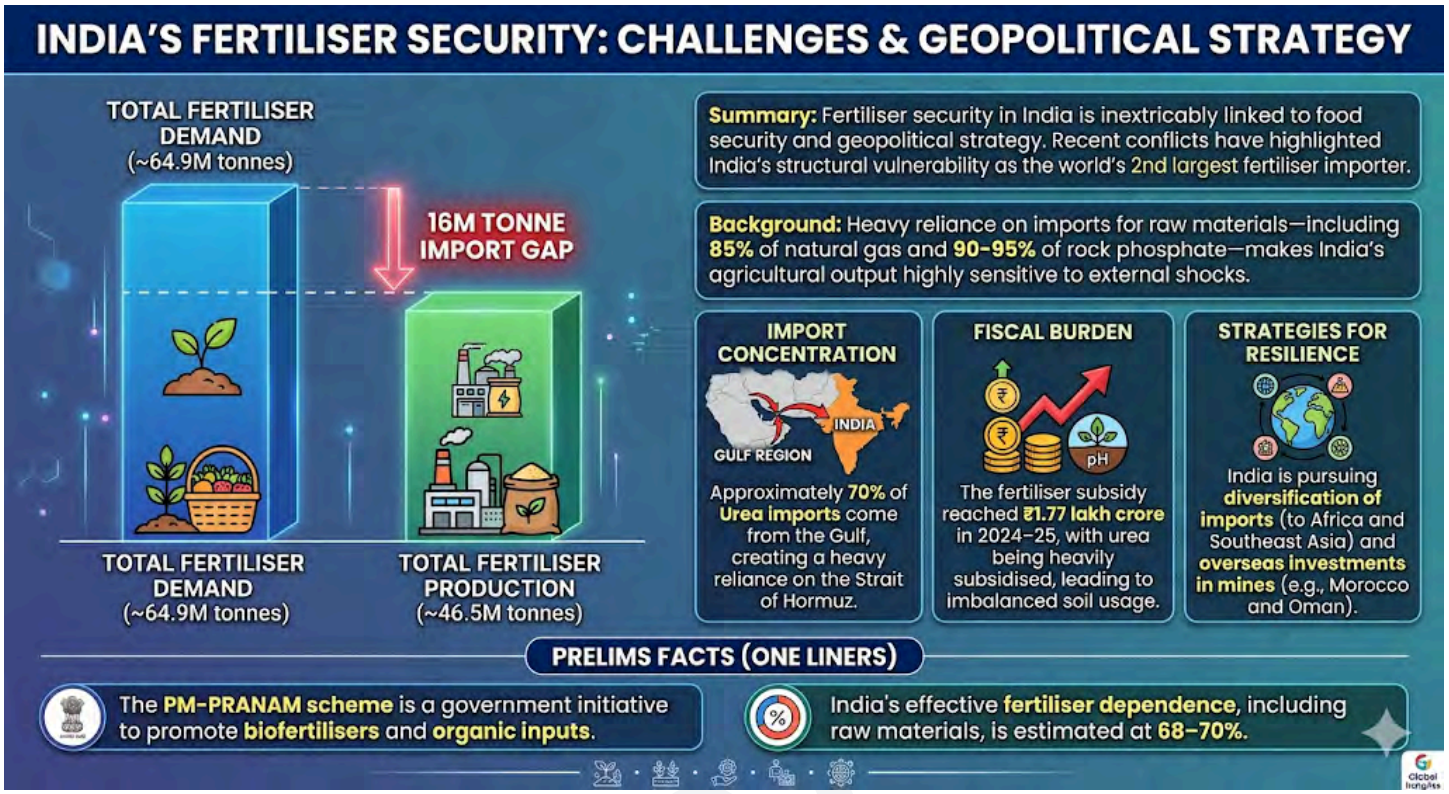
- **Economic Impact:** Oil prices surged to **$120/barrel** during the crisis, causing cascading effects across sectors like fertilisers and LNG.
- **Asia's Vulnerability:** Asia consumes **80% of Hormuz oil flows**, making countries like India, China, and Japan highly susceptible to disruptions.
- **India's Dependence:** India imports **60% of its LPG**, with 90% of those imports passing through the Strait of Hormuz.

Prelims Facts (One Liners):

- India invoked the **Essential Commodities Act, 1955** to manage energy rationing during the 2026 crisis.
- The first oil shock in **1973** was triggered by the Yom Kippur War, causing prices to quadruple.

MCQ Practice: Q. Why is the Strait of Hormuz considered a "systemic vulnerability" for India's energy security? A) It is where most of India's solar power is generated B) 90% of India's LPG imports pass through it C) It is a major source of domestic coal D) It is located in the South China Sea **Answer: B** ()

Topic 6: India's Fertiliser Dependence



Summary: Fertiliser security in India is inextricably linked to **food security and geopolitical strategy**. Recent conflicts have highlighted India's structural vulnerability as the world's **2nd largest fertiliser importer**.

Background: Heavy reliance on imports for raw materials—including **85% of natural gas** and 90-95% of rock phosphate—makes India's agricultural output highly sensitive to external shocks.

Key Points:

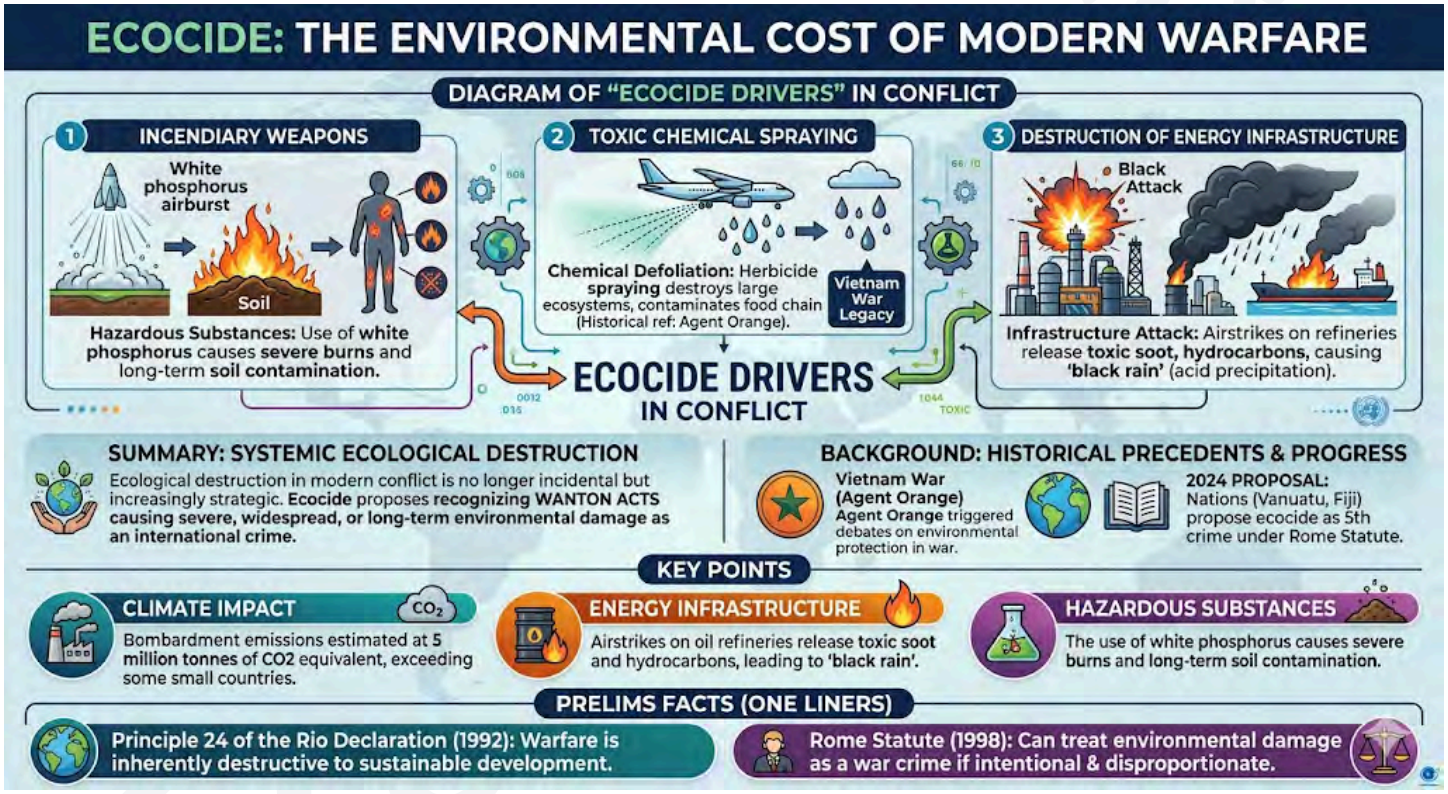
- **Import Concentration:** Approximately **70% of Urea imports** come from the Gulf, creating a heavy reliance on the Strait of Hormuz.
- **Fiscal Burden:** The fertiliser subsidy reached **₹1.77 lakh crore** in 2024–25, with urea being heavily subsidised, leading to imbalanced soil usage.
- **Strategies for Resilience:** India is pursuing diversification of imports (to Africa and Southeast Asia) and overseas investments in mines (e.g., Morocco and Oman).

Prelims Facts (One Liners):

- The **PM-PRANAM scheme** is a government initiative to promote biofertilisers and organic inputs.
- India's effective fertiliser dependence, including raw materials, is estimated at **68–70%**.

MCQ Practice: Q. What is a major "hidden dependence" in India's domestic urea production? A) 100% domestic feedstock B) 85% dependence on imported natural gas C) Lack of labour D) High export of urea **Answer: B** ()

Topic 7: Ecocide: Environmental Harm in Warfare



Summary: Modern conflicts increasingly demonstrate that **ecological destruction** is no longer incidental but increasingly systemic and strategic. The concept of **Ecocide** has been proposed to recognize wanton acts that cause severe, widespread, or long-term environmental damage as an international crime.

Background: Historical precedents like the use of **Agent Orange** in the Vietnam War triggered global debates on environmental protection during warfare. In 2024, nations like **Vanuatu and Fiji** proposed including ecocide as the 5th crime under the Rome Statute.

Key Points:

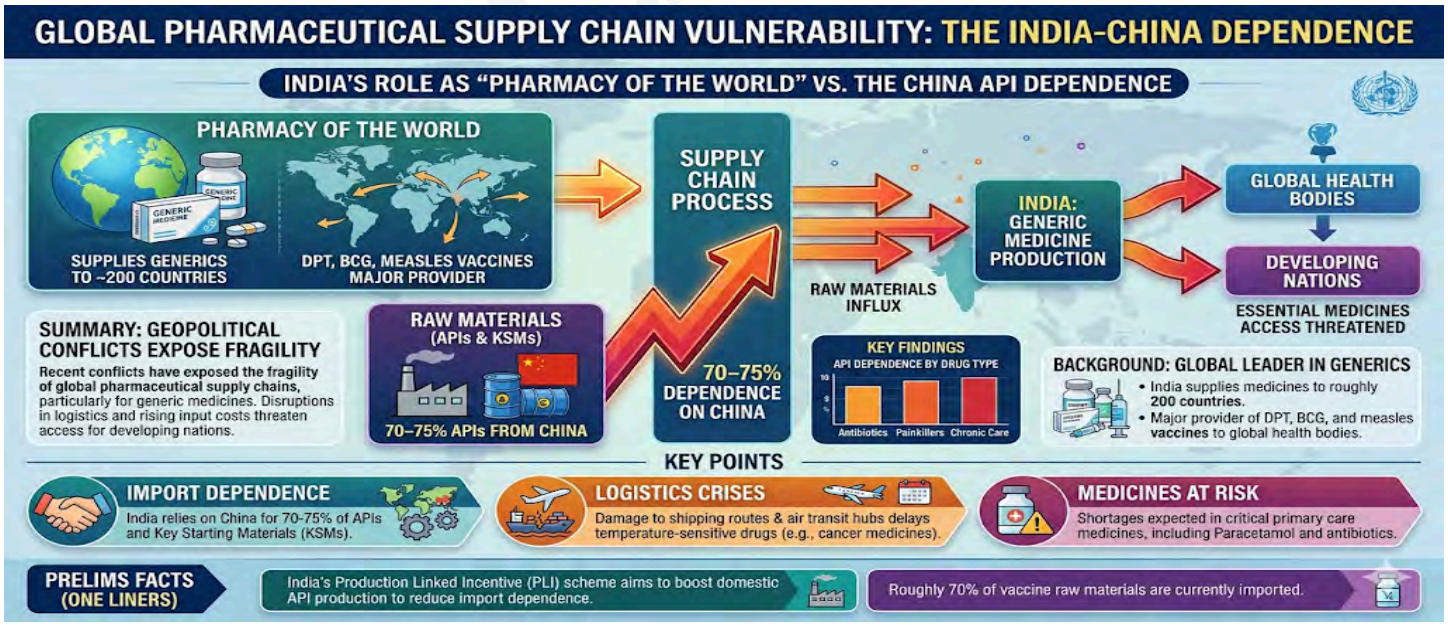
- **Hazardous Substances:** The use of **white phosphorus** causes severe burns and long-term soil contamination.
- **Energy Infrastructure:** Airstrikes on oil refineries release toxic soot and hydrocarbons, leading to **'black rain'** (acid precipitation).
- **Climate Impact:** Bombardment emissions in recent conflicts have been estimated at **5 million tonnes of CO2 equivalent**, exceeding the annual emissions of some small countries.

Prelims Facts (One Liners):

- **Principle 24 of the Rio Declaration (1992)** states that warfare is inherently destructive to sustainable development.
- The **Rome Statute (1998)** can treat environmental damage as a war crime if it is intentional and disproportionate to military advantage.

MCQ Practice: Q. What is the defining characteristic of "Ecocide" as proposed in international law? A) Accidental pollution B) Unlawful acts committed with knowledge of causing severe and long-term environmental damage C) Natural forest fires D) Sustainable military mobilisation
Answer: B ()

Topic 8: West Asia War: Impact on India's Pharmaceuticals Sector



Summary: Recent geopolitical conflicts have exposed the fragility of global pharmaceutical supply chains, particularly for generic medicines. Disruptions in logistics and rising input costs threaten access to essential medicines for **developing nations** dependent on India.

Background: India supplies generic medicines to roughly **200 countries** and is a major provider of DPT, BCG, and measles vaccines to global health bodies.

Key Points:

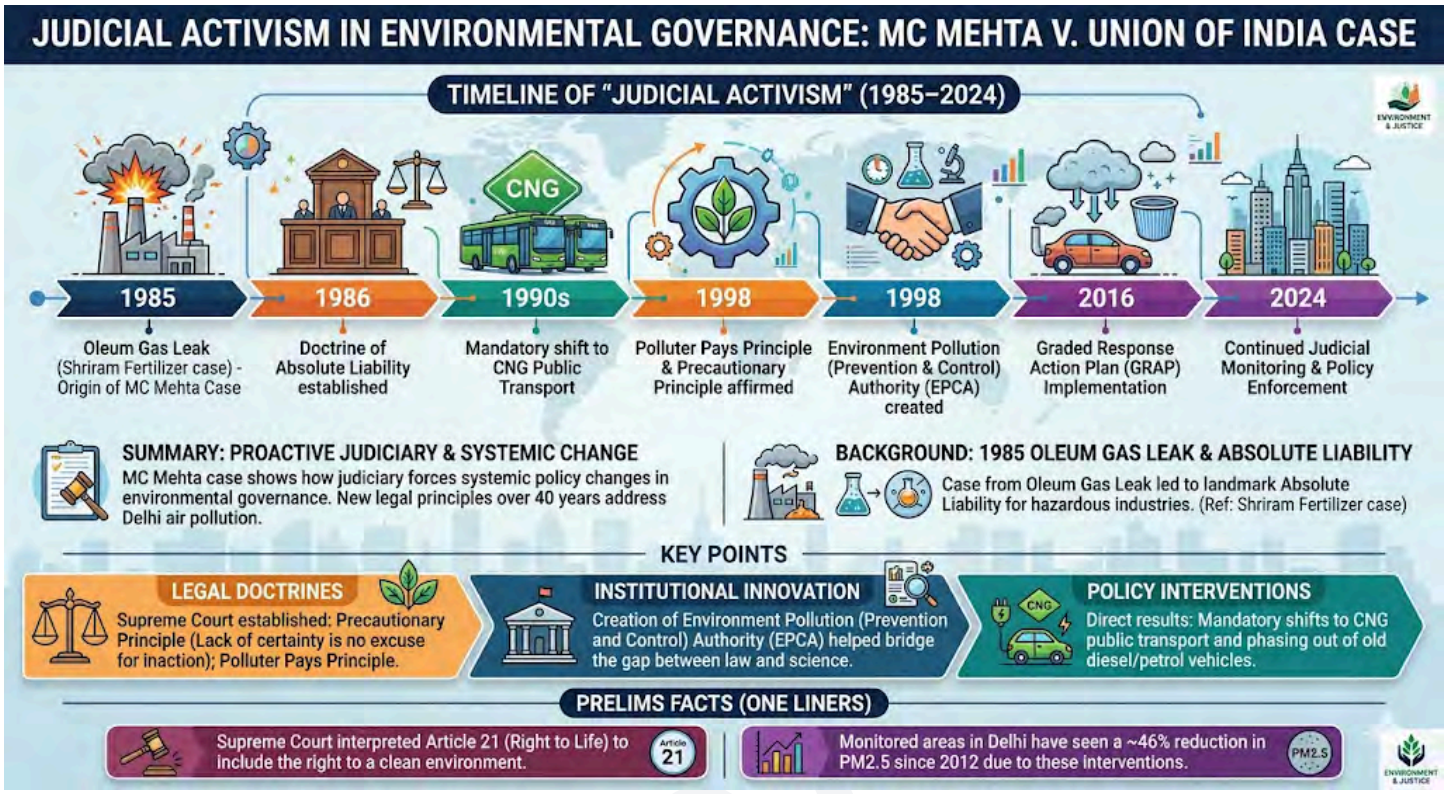
- **Import Dependence:** India relies on China for **70–75% of its Active Pharmaceutical Ingredients (APIs)** and Key Starting Materials (KSMs).
- **Logistics Crises:** Damage to shipping routes and air transit hubs delays **temperature-sensitive drugs**, such as those for cancer.
- **Medicines at Risk:** Shortages are expected in critical primary care medicines, including **Paracetamol and antibiotics**.

Prelims Facts (One Liners):

- India's **Production Linked Incentive (PLI) scheme** aims to boost domestic API production to reduce import dependence.
- Roughly **70% of vaccine raw materials** are currently imported.

MCQ Practice: Q. Why is India's dominance in generic medicines considered structurally vulnerable? A) It lacks global demand B) It has a 70–75% dependence on China for raw materials C) It does not supply vaccines D) It has zero logistics costs **Answer: B** ()

Topic 9: MC Mehta Case & Delhi's Air Pollution Governance



Summary: The **MC Mehta v Union of India** case demonstrates how proactive judiciary can force systemic policy changes in environmental governance. Over four decades, the Supreme Court has established new legal principles to address Delhi's air pollution.

Background: The case originated from the **1985 Oleum Gas Leak**, which led to the landmark doctrine of **Absolute Liability** for hazardous industries.

Key Points:

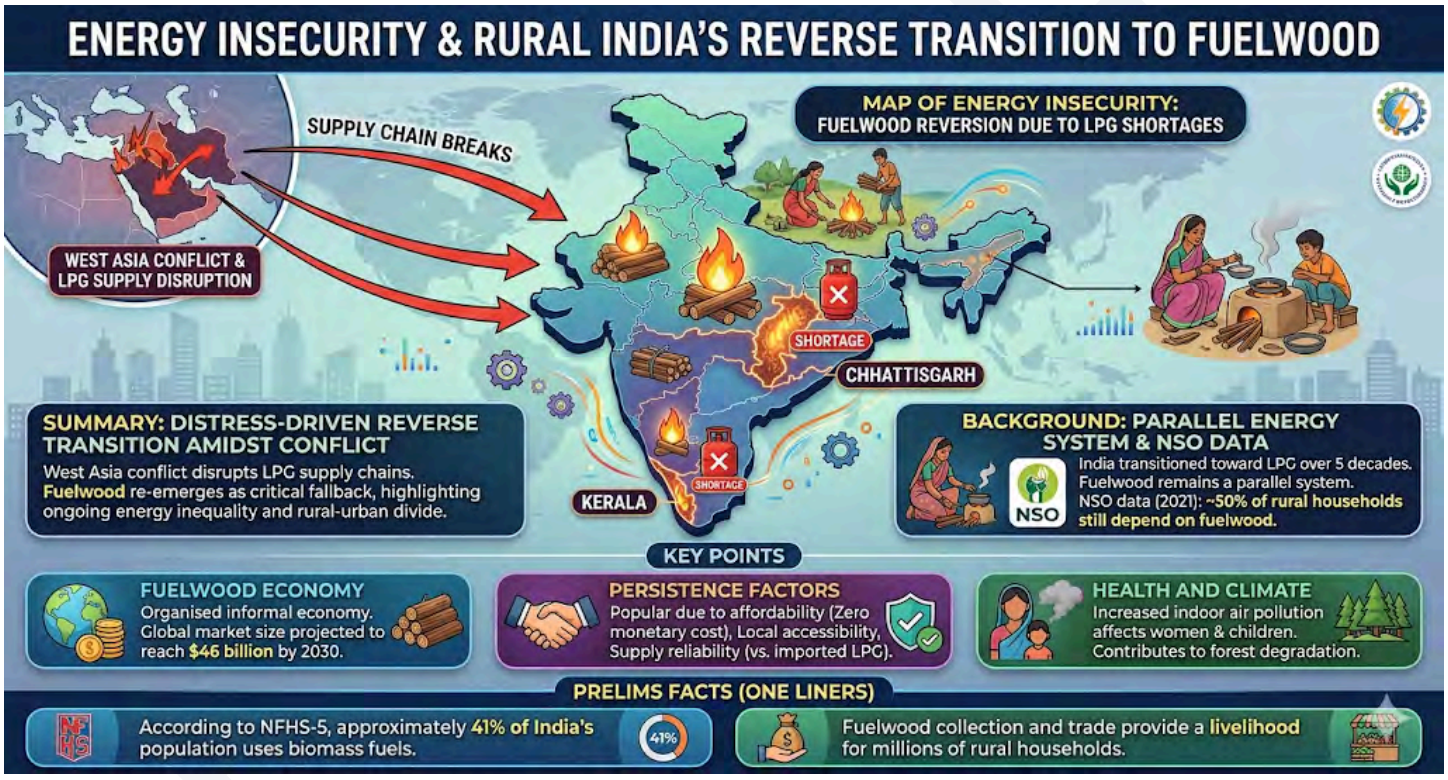
- **Legal Doctrines:** The Court established the **Precautionary Principle** (lack of certainty is no excuse for inaction) and the **Polluter Pays Principle**.
- **Institutional Innovation:** The creation of the **Environment Pollution (Prevention and Control) Authority (EPCA)** helped bridge the gap between law and science.
- **Policy Interventions:** Mandatory shifts to **CNG-based public transport** and the phasing out of old diesel and petrol vehicles were direct results of judicial intervention.

Prelims Facts (One Liners):

- The Supreme Court interpreted **Article 21 (Right to Life)** to include the right to a clean environment.
- Monitored areas in Delhi have seen a **~46% reduction in PM2.5** since 2012 due to these interventions.

MCQ Practice: Q. Which legal principle established that a polluter must bear the cost of environmental damage and mitigation? A) Absolute Liability B) Precautionary Principle C) Polluter Pays Principle D) Right to Information **Answer: C** ()

Topic 10: Fuelwood Resurgence Amid LPG Crisis



Summary: Amidst the West Asia conflict, **fuelwood has re-emerged** as a critical fallback energy source due to disruptions in LPG supply chains. This "distress-driven reverse transition" highlights the ongoing energy inequality and the rural-urban divide in India.

Background: While India transitioned toward LPG over five decades, fuelwood continues to function as a **parallel energy system**. NSO data (2021) shows that **~50% of rural households** still depend on fuelwood.

Key Points:

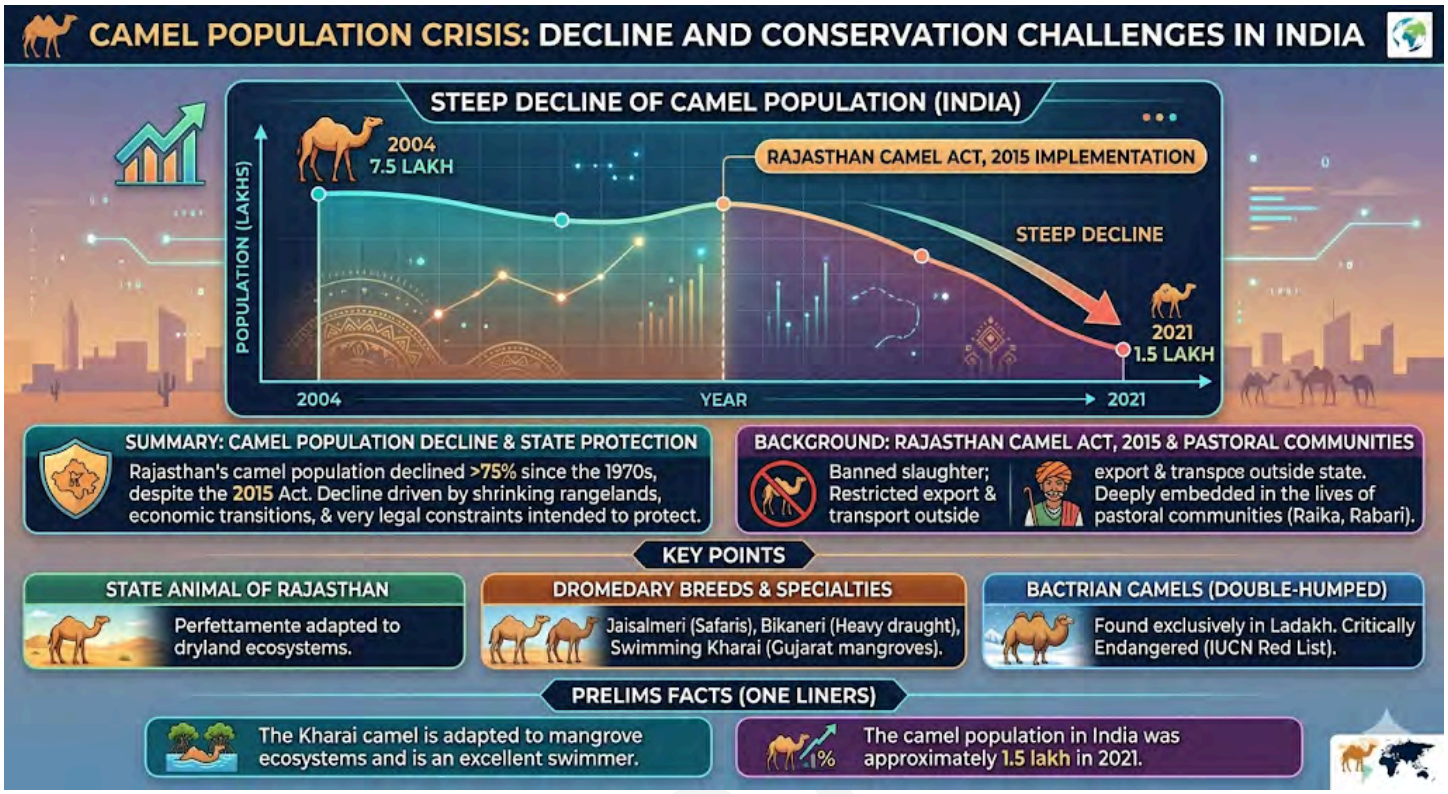
- **Fuelwood Economy:** Far from being just a traditional fuel, it is an **organised informal economy** with a global market size projected to reach $46 billion by 2030.
- **Persistence Factors:** Fuelwood remains popular due to its **affordability (zero monetary cost)**, local accessibility, and supply reliability compared to imported LPG.
- **Health and Climate:** Reverting to biomass fuels increases **indoor air pollution**, disproportionately affecting women and children, and contributes to forest degradation.

Prelims Facts (One Liners):

- According to **NFHS-5**, approximately 41% of India's population uses biomass fuels.
- Fuelwood collection and trade provide a livelihood for millions of rural households.

MCQ Practice: Q. Why is the resurgence of fuelwood use considered a "distress-driven reverse transition"? A) It indicates a voluntary shift to cleaner energy B) It is a response to LPG supply disruptions and high costs C) It shows urban energy dominance D) It has no health impacts **Answer: B** ()

Topic 11: Declining Camel Population in Rajasthan



Summary: Rajasthan's camel population has declined by **more than 75% since the 1970s**, despite the enactment of a state protection law in 2015. The decline is driven by shrinking rangelands, economic transitions, and the very legal constraints intended to protect them.

Background: The **Rajasthan Camel Act, 2015** banned slaughter and restricted the export and transport of camels outside the state. Camels are deeply embedded in the lives of pastoral communities like the **Raika and Rabari**.

Key Points:

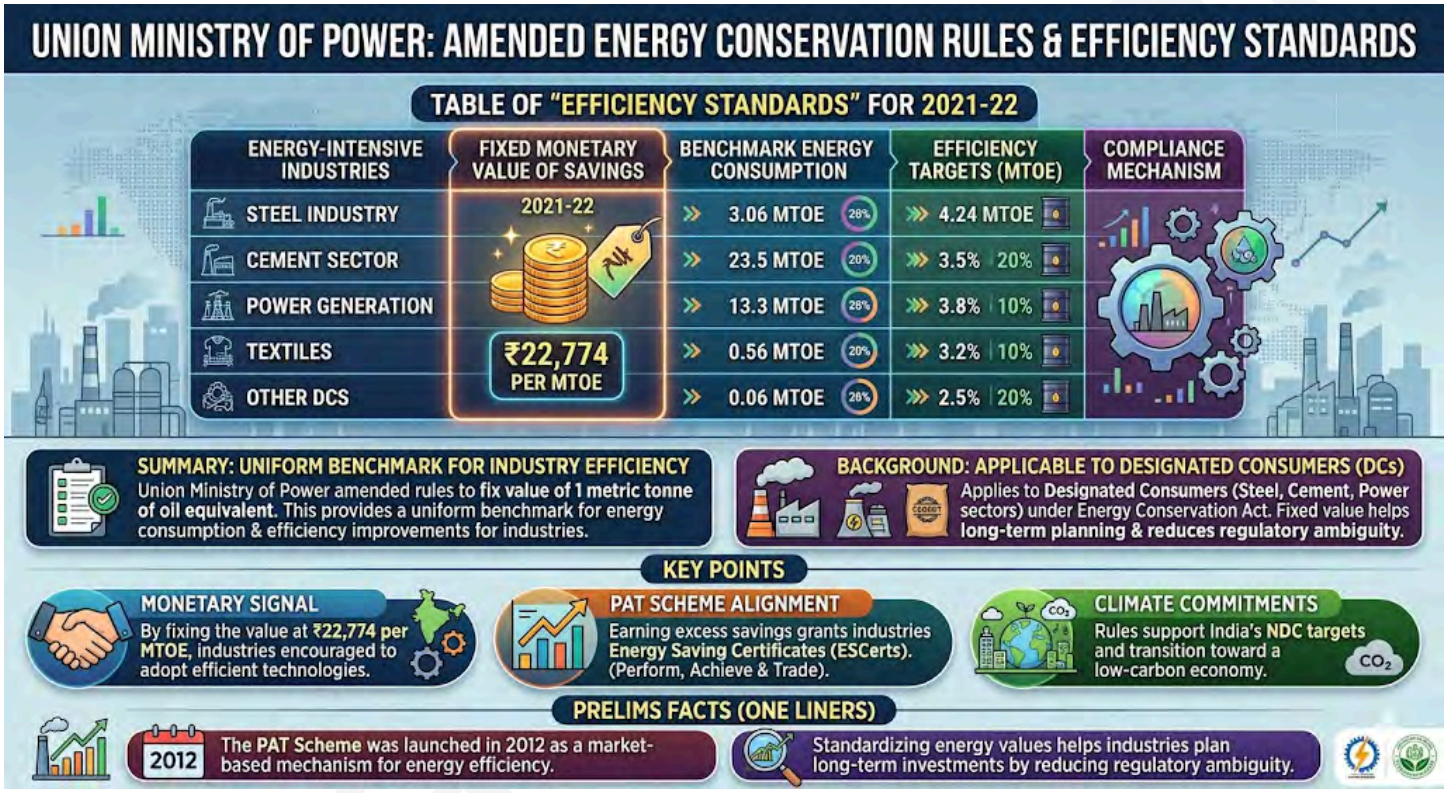
- **State Animal:** The camel is the **State Animal of Rajasthan**, perfectly adapted to dryland ecosystems.
- **Dromedary Breeds:** Key breeds include the **Jaisalmeri** (for safaris), **Bikaneri** (heavy draught), and the swimming **Kharai** camel of Gujarat.
- **Bactrian Camels:** The double-humped camel is found exclusively in **Ladakh** and is listed as **Critically Endangered** on the IUCN Red List.

Prelims Facts (One Liners):

- The **Kharai camel** is adapted to mangrove ecosystems and is an excellent swimmer.
- The camel population in India was approximately **1.5 lakh in 2021**.

MCQ Practice: Q. Which camel breed is uniquely adapted to coastal mangrove ecosystems and capable of swimming across creeks? A) Bikaneri B) Mewari C) Kharai D) Jaisalmeri **Answer: C** ()

Topic 12: Energy Conservation Rules Amendment (2021-22)



Summary: The Union Ministry of Power amended the **Energy Conservation Rules** to fix the value of one metric tonne of oil equivalent. This provides a **uniform benchmark** for energy consumption and efficiency improvements for energy-intensive industries.

Background: The amendment applies to **Designated Consumers (DCs)**, such as the steel, cement, and power sectors, under the Energy Conservation Act.

Key Points:

- **Monetary Signal:** By fixing the value at **₹22,774 per metric tonne of oil equivalent**, the government encourages industries to adopt efficient technologies.

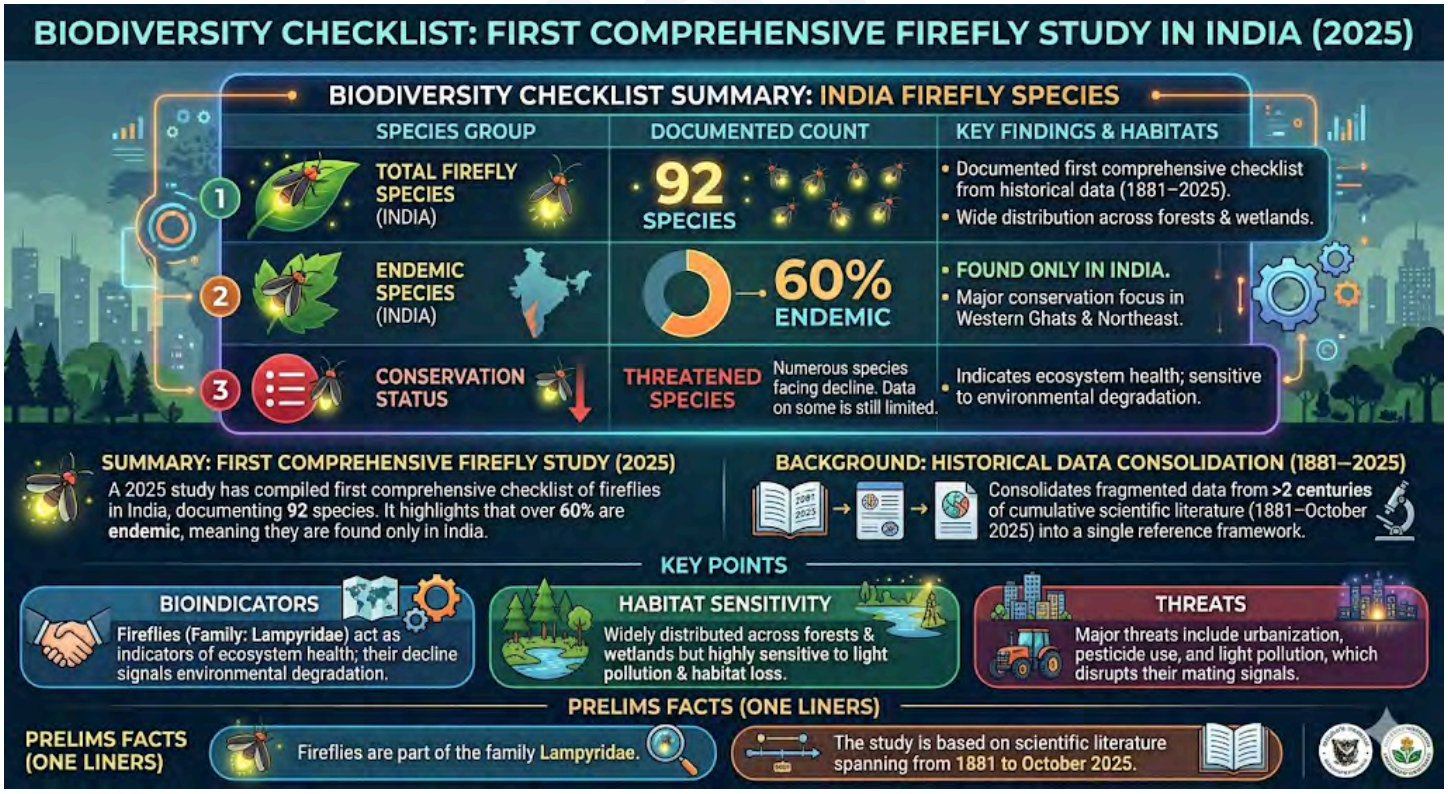
- **PAT Scheme:** This aligns with the **Perform, Achieve and Trade (PAT) Scheme**, where industries earning excess savings receive **Energy Saving Certificates (ESCerts)**.
- **Climate Commitments:** These rules support India's **NDC targets** and help the transition toward a low-carbon economy.

Prelims Facts (One Liners):

- The **PAT Scheme** was launched in 2012 as a market-based mechanism for energy efficiency.
- Standardizing energy values helps industries plan **long-term investments** by reducing regulatory ambiguity.

MCQ Practice: Q. What is the primary significance of fixing a monetary value for metric tonnes of oil equivalent? A) It increases industrial pollution B) It provides an economic signal for energy efficiency C) It eliminates the PAT scheme D) It only applies to households **Answer: B** ()

Topic 13: Firefly Diversity in India



Summary: A 2025 study has compiled the **first comprehensive checklist of fireflies in India**, documenting 92 species. The study highlights that over **60% of these species are endemic**, meaning they are found only in India.

Background: The research consolidates fragmented data from over two centuries of cumulative scientific literature (1881–2025) into a single reference framework.

Key Points:

- **Bioindicators:** Fireflies (Family: **Lampyridae**) act as indicators of ecosystem health; their decline signals environmental degradation.
- **Habitat Sensitivity:** They are widely distributed across forests and wetlands but are highly sensitive to **light pollution and habitat loss**.
- **Threats:** Major threats include urbanization, **pesticide use**, and light pollution, which disrupts their mating signals.

Prelims Facts (One Liners):

- Fireflies are part of the family **Lampyridae**.
- The study is based on scientific literature spanning from **1881 to October 2025**.

MCQ Practice: Q. Why are fireflies considered "indicator species"? A) They produce high amounts of light for cities B) Their population decline signals environmental degradation C) They are used to kill pests D) They indicate the presence of oil **Answer: B** ()

Topic 14: Cattle Disease Emergency in Russia

Summary: Russia has reported a livestock disease emergency involving **pasteurellosis or rabies**. While pasteurellosis is a treatable bacterial infection, rabies is a fatal viral disease, raising concerns about international spread near the **China border**.

Background: Global zoonotic disease monitoring faces challenges due to **inconsistent reporting standards** and limited surveillance.

Key Points:

- **Pasteurellosis:** Caused by the bacterium **Pasteurella multocida**, it spreads in poor sanitary conditions but is treatable with antibiotics.
- **Rabies:** A viral zoonotic disease that is **almost always fatal** once symptoms appear in mammals.
- **Transparency Gaps:** Pasteurellosis is not mandatorily reportable to the WHO, which reduces global transparency regarding its spread.

Prelims Facts (One Liners):

- **Rabies** is transmitted through the bites or saliva of infected mammals.
- **Pasteurellosis** primarily affects cattle, sheep, and poultry.

MCQ Practice: Q. What is a key difference between Pasteurellosis and Rabies as described in the livestock emergency? A) Pasteurellosis is viral B) Rabies is bacterial C) Pasteurellosis is treatable with antibiotics D) Rabies is not fatal **Answer: C** ()