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DAILY CURRENT AFFAIRS

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GS 2: POLITY, GOVERNANCE, SOCIAL JUSTICE, INTERNATIONAL RELATIONS/INSTITUTIONS

1. Securing The New Oil

Context: A resolution of the Russia-Ukraine war seems imminent. The contours of the peace may depend on Volodymyr Zelenskyy's final offer of American access to his country's considerable critical mineral resources. Not long ago, America's involvement in foreign wars or conflicts centred around the geoeconomics of oil. The technologies of the "future" — electric vehicles, renewable energy, high-tech semiconductors, etc are critical-mineral-intensive. Critical minerals — copper, lithium, cobalt, graphite, nickel, rare earths among others are the new oil with great influence on not just economics but over war and peace.

Key points

- **Current Challenges:** *Import Dependence* - Critical mineral imports exceed oil imports. Reliant on foreign supplies for batteries, solar/wind components.
  Domestic Gaps - Under-explored Reserves are rich geology but insufficient exploration. Restrictive regulations hinder private-sector mining.
- **Strategic Imperatives:** *Domestic Production* - Allowing private players to monetize discoveries (global best practice). Invest in mining tech and recycling to reduce import reliance.
  Global Partnerships - Secure overseas assets and supply agreements (e.g. Australia, Africa). Avoid over-reliance on China-dominated supply chains.
- **Make in India Goals:** EVs, renewables, and tech manufacturing require mineral security. A Vulnerability-Free Future suggest that domestic mineral autonomy is key to strategic and economic resilience.
- **Way ahead:** *Policy Reforms* - Fully liberalize mineral exploration and incentivize private investment. Streamline approvals for mining projects.
  Public-Private Partnerships - Collaborate on tech development for mineral extraction and recycling.
  International Diplomacy - Strengthen ties with mineral-rich nations (e.g. Africa, Latin America).
  Strategic Stockpiling - Build reserves of critical minerals to buffer supply shocks.
- **Conclusion:** India has a very rich geology but there is insufficient exploration. It is time to completely liberalise exploration and let those who make discoveries monetise their find. That is the global practice. That is the path to a vulnerability-free future.

Q. Consider the following minerals: (2020)

1. Bentonite

2. Chromite

3. Kyanite

4. Sillimanite

In India, which of the above is/are officially designated as major minerals?

(A) 1 and 2 only

(B) 4 only

(C) 1 and 3 only

(D) 2, 3 and 4 only

Ans: D

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2. Nation-building through elite educators

Context: Education continues to be one of the most overlooked sectors in India. India allocates only 3.5% of its GDP to education, trailing behind countries like Finland (7%) and South Korea (4.3%). UNESCO reports that merely 25% of Grade 5 students in India can read a Grade 2 text, underscoring the pressing need for intervention. Indian universities also struggle to gain worldwide recognition, with only three institutions in the top 200 of the QS World University Rankings 2024.

Key points

- **School Education System'(SES) report:** It was recently released by the Confederation of Indian Industry (CII). The report compares SES of India with countries such as the USA, UK, China, Sweden, Australia etc focusing on their structures, methods, funding, assessments, and equity measures.
- **Constitutional provisions on education in India:** *Fundamental Rights* – Article 21 A, Article 28, Article 30.
  Directive Principles of State Policy – Article 41, Article 45.
  Fundamental Duties – Article 51A.
- **Features of the educational landscape in India:** *Multi-level structure* - The Indian education system consists of different levels, such as primary, secondary, and higher education. Generally, central and state boards follow the "10+2" education system pattern in school education.
  Public and private institutions - Central and state governments share the legal responsibility for funding and management of education. India also has a large private school system complementing the government run schools. The government and private schools managed in the ratio 73:27 at the age 1 to 8.
  Examination-oriented - The Indian education system places a strong emphasis on exams and standardized testing, with exams such as the CBSE, ICSE, and various state board exams determining student performance and progression.
  Focus on rote learning - Carrying forward the Macaulayan legacy, the Indian education system still tends to focus on rote learning, with less emphasis on critical thinking and practical skills, a system criticized by education experts for not promoting creativity and innovation.
- **Challenges in India's education System:** Regional disparities, gender gaps, persistent infrastructure deficits and stark rural-urban inequalities, limited holistic education hinders equitable learning, lack of 21st-century skills hampers employability.
- **Way ahead:** *Increase Education Budget* - Aim for 6% of GDP to enhance skills, infrastructure, and innovative learning ecosystems.
  Digital Education - Bridge digital gaps, create localized content, and boost teacher digital literacy.
  Implement NEP 2020 - Focus on teacher training, flexible curriculums, and technology to support skill-based education.
  Curriculum Framework - Develop an adaptive curriculum that embraces regional diversity and prioritizes skill-based learning.
  Address Inequities - Focus on rural infrastructure, inclusive curricula, and strategic teacher deployment, drawing from models like Sweden's disability-inclusive frameworks.

GS 3: ECONOMY, ECOLOGY, SCIENCE & TECHNOLOGY, DEFENCE, SECURITY AND DISASTER MANAGEMENT

3. The bigger tragedy is the Railways and its systemic inertia

Context: In the cacophony of religious fervour for a holy dip at the Kumbh, amidst bustling railway stations, jostling crowds, and ceaseless proclamations by Indian Railways about the number of train services and the passengers ferried to Prayagraj, lies an inconvenient truth: the approach to passenger safety and convenience is at best tragically outdated, and at worst, a harbinger of disaster. It is a bitter pill to swallow, but swallow it we must, for the recent tragedy — the stampede at New Delhi railway station on February 15 — has once again exposed the chinks in the armour of the Indian Railways. It has laid bare systemic failures born not of resource constraints but of an indifference to basic needs.

Key points

- **Overview:** The recent stampede at New Delhi railway station on February 15 highlights systemic failures that are not due to a lack of resources but rather negligence.
- **Systemic Issues in Indian Railways:** *Lack of Proactive Planning* – Passenger surges during festivals and special occasions are predictable, yet Railways fails to implement pre-emptive crowd control measures.
  Information Dissemination Failure - Ineffective methods of conveying critical information to passengers regarding platform changes, delays, or crowd flow.
  Weak Crowd Management – No effective mechanisms such as separate entry and exit routes, controlled access points, or real-time monitoring exist to regulate large crowds.
  Inadequate Security and Personnel – Insufficient deployment of Railway Protection Force (RPF) personnel and lack of coordination among railway staff during peak travel times.
  Overburdened Staff - Insufficient staffing to handle the volume of passengers, leading to fatigue and reduced vigilance.
  Overcrowding in Unreserved Coaches – High demand for unreserved travel without structured ticketing limits creates excessive rush and safety hazards.
  Lack of Independent Accountability – Investigations are conducted by railway officials instead of independent safety bodies, leading to minimal corrective actions.
- **Measures to Prevent Future Incidents:** *Pre-emptive Planning for Crowds* – Special arrangements, including crowd control zones and staggered train schedules, should be made in advance during festivals.
  Effective Communication Strategies - Utilizing public address systems, digital displays, and mobile alerts to provide timely information.
  Enhanced Crowd Control Mechanisms – Implement separate entry and exit points, unidirectional movement policies, and holding areas to avoid congestion.
  Increased Security Personnel Deployment – More RPF personnel and trained staff should be stationed at high-risk stations during peak hours.
  Regulated Ticketing System – Introduce online pre-booking for unreserved coaches to limit excessive crowds.
- **Conclusion:** Ensuring passenger safety requires proactive planning, better infrastructure, and independent accountability in Indian Railways. Without systemic reforms, such tragedies will continue to recur, endangering countless lives.

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4. The impact of ethanol on the environment

Context: Concerns about the Ethanol Blended Petrol (EBP) programme refuse to die down in Andhra Pradesh, with scientists and farmers saying water resources are depleting and emissions from factories are polluting the air, water, and soil. Although the EBP programme reduces oil imports and benefits farmers – issues regarding environmental pollution and water contamination from ethanol factories must be addressed.

Key points

- **EBP Programme:** The Ethanol Blended Petrol (EBP) programme was introduced in India as a pilot project in 2001. In 2020, the government decided to advance the target of 20% ethanol blending in petrol from 2030 to 2025.
  Aim - The programme aims to reduce energy consumption, lower oil imports, and decrease carbon emissions from vehicles. Ethanol is produced using grains like broken rice and corn, which is expected to benefit farmers financially.
- **Current Status & Requirements:** As of 2024, India achieved a 15% ethanol blend in petrol. To meet the 20% target by 2025-26, the country would need 1,016 crore litres of ethanol. States like Andhra Pradesh, Maharashtra, Haryana, and Punjab have the highest number of ethanol factories.
- **Environmental and Social Concerns:** Villages in Andhra Pradesh have seen continuous protests the EBP programme since 2024. Many ethanol factories are located near rivers and canals, which are primary sources of drinking and irrigation water. Reports indicate that some factories have been discharging harmful effluents into water bodies, affecting farmers.
- **Lack of Transparency in Environmental Clearances:** Scientists warn that ethanol plants release hazardous chemicals like acetaldehyde, formaldehyde, and acrolein. Despite falling under the 'red category' (pollution score of 60 or more), ethanol plants were exempted from public hearings for faster approvals.
- **Water Consumption and Agricultural Impact:** A grain-based ethanol factory requires 8-12 litres of water per litre of ethanol. With declining water levels in major rivers like Krishna, factories rely on groundwater, which is against regulations.
- **Balancing Environmental and Industrial Goals:** A report suggests that a 20% ethanol blend reduces carbon monoxide emissions by 30% in four-wheelers and 50% in two-wheelers. Environmentalists argue that pollution from ethanol production offsets these benefits.
- **Conclusion:** Governments must address pollution, water scarcity, and health risks while ensuring sustainable ethanol production. A greener future should not come at the cost of agriculture, health, and people's rights to natural resources.

Q. Examine the environmental and socio-economic challenges posed by the Ethanol Blended Petrol (EBP) programme in India. How can policy interventions ensure a balance between sustainability and energy security? (ভাৰতত ইথানল মিশ্রিত পেট্র "ল (ই. বি. পি.) কার্যসূচীৰ দ্বাৰা উদ্ভৱ হোৱা পৰিৱেশগত আৰু আর্থ-সামাজিক প্রত্যাহ্বানসমূহ পৰীক্ষা কৰা। নীতিগত হস্তক্ষেপে কেনেকৈ স্থায়িত্ব আৰু শক্তি সুৰক্ষাৰ মাজত ভাৰসাম্য নিশ্চিত কৰিব পাৰে?)

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5. The power of new nuclear

Context: The government has realised the inevitable role of nuclear energy in the realisation of Viksit Bharat. Setting up 100 GWe of nuclear capacity by 2047 may seem like a tall order, especially with little clarity on how it will be accomplished. Yet, it is a minimum mission statement for the long road to Viksit Bharat. Recycling Uranium and more importantly thorium would bring down the need for mined Uranium by an order of magnitude.

Key points

- **Overview:** Achieve 100 GWe nuclear capacity by 2047 as part of the Viksit Bharat initiative.
  Current Status - India's nuclear program is transitioning from uranium-based reactors to advanced fuel cycles involving thorium and recycled uranium. Prototype Fast Breeder Reactor (PFBR) and Pressurised Heavy-Water Reactors (PHWRs) form the backbone of current infrastructure.
- **Uranium Supply Constraints:** 100 GWe capacity would require 18,000 tons of uranium annually, equivalent to 1/3 of global production today.
  Supply Risks - Limited access to global uranium markets due to geopolitical and production constraints. Domestic uranium reserves are insufficient to meet projected demand.
- **Capacity Expansion Hurdles:** By 2033, uranium demand at 25 GWe would consume 8–10% of global production, risking supply bottlenecks. Delays in Fast Breeder Reactor (FBR) deployment threaten to stall capacity growth.
- **Thorium:** Thorium is a radioactive element that is important for India's nuclear energy program. It is a fertile material that can be used to produce uranium-233, which can then be used as a fuel in nuclear reactors. Thorium is a chemical element with the symbol Th and atomic number 90.
- **Advantages of Thorium-Based Fuel:** *Improved reactor operation and safety* – Thorium-based fuel enhances reactor performance and reduces risks.
  Lower uranium consumption – Reducing the need for mined uranium, making India less dependent on external suppliers.
  Reduced fuel bundle requirements – Less spent fuel to manage, leading to cost savings and lower nuclear waste.
- **Fast Breeder Reactors (FBRs):** *PFBR Progress* - Prototype reactor operational but needs large-scale deployment to breed fuel.
  Challenge - Delays in FBR rollout risk derailing mid-term capacity goals.
- **Small Modular Reactors (SMRs)**: *India's Edge* - Leverage 220 MWe PHWR experience over foreign SMR designs. Retiring coal plant sites could host SMRs with no exclusion zone requirements.
  Global Trends - SMRs are popular but untested at scale.
  Missed Opportunity - AHWR-300-LEU (thorium-based, proliferation-resistant) was developed but shelved.
- *Bharat Small Reactors (BSR)* - Proposed BSR initiative could supplement PHWRs but must prioritize domestic manufacturing and safety.
- **Way ahead:** *Role of Government Labs* - BARC and IGCAR lead R&D for fuel cycles, MSRs, and spallation integration. Ensuring timely delivery of advanced reactor technologies.
  Private Sector Engagement - Private players should support scaling production but not drive R&D. But over-reliance on foreign vendors or private entities could compromise strategic goals.