



CSB IAS ACADEMY

THE ROAD MAP TO MUSSORRIE...

PRELIMS EDGE – 2025 – 02/02/2025

CRITICAL MINERALS

Context: The National Critical Mineral Mission, under the Ministry of Mines, has received an increased outlay of Rs. 410 crore in the 2025 Union Budget.

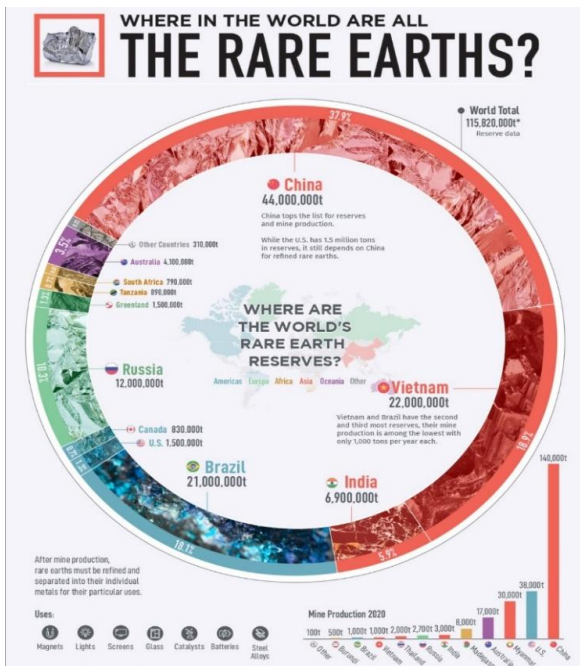
About Critical Minerals:

- They are elements that are **crucial to modern-day technologies and are at risk of supply chain disruptions.**
 - They are used in making mobile phones, computers, batteries, electric vehicles, and green technologies like solar panels and wind turbines.
 - **Example:** Graphite, Lithium, Cobalt, Silicon, Germanium, etc.
 - In 2023, an Expert Committee under **Ministry of Mines identified a set of 30 critical minerals for India.**
 - These are Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, Platinum Group Elements (PGE), Phosphorous, Potash, Rare Earth Elements (REE), Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.
- ### Significance of Critical Minerals for India
- **Economic Development:** High-tech electronics, smart transport telecommunications, clean/green technologies, etc.
 - **National Security:** Vital for defense, aerospace, nuclear, and space applications.
 - **Environmental Sustainability:** Integral to the transition toward clean energy and a low-carbon economy.
 - Indium, gallium, Tellurium (solar PV technology), REEs (wind turbines).
 - **Foreign Policy and Self Reliance:** Enable India to diversify imports and reduce dependency on China. Energy security and reducing fossil fuel imports can have positive impacts on our trade balance & energy autonomy.
 - **Space Exploration and Satellite Technology:** India's ambitious space program, including missions like Gaganyaan, relies heavily on critical minerals - for making high-performance magnets, specialized alloys, and advanced electronics used in satellites and spacecraft.
 - **Digital Economy:** As India's Digital Economy expects to reach 1 trillion Dollar by 2025, the success of Digital India and the rollout of 5G networks heavily depends on minerals such as gallium, indium, and tantalum.
 - **Semiconductors:** Semiconductors, the brains of modern electronics, heavily rely on critical minerals. Silicon, germanium, and gallium are key to semiconductor production.

- **Geopolitical Influence:** Securing critical minerals enhances India's geopolitical standing and bargaining power.

About Rare Earth Elements (REEs):

- Set of **17 metallic elements**. These include the **15 lanthanides on the periodic table in addition to scandium and yttrium** that show similar physical and chemical properties to lanthanides.
- Have **unique magnetic, luminescent, and electrochemical properties** and thus are used in many modern technologies, including consumer electronics, computers and networks, communications, health care, national defense, clean energy, etc.



Govt. Initiatives:

- ✓ Dept. of Science and Technology drafted Critical Minerals Strategy for India in 2016, with a focus on requirements till 2030.

- ✓ Govt. estd Khanij Bidesh India Ltd. (KABIL) in 2019 to secure supplies for the domestic market.
- ✓ India-Australia Critical Minerals Investment Partnership.
- ✓ Creation of Indian Rare Earths Ltd. under Dept. of Atomic Energy.
- ✓ Union Govt. approved royalty rates of 3% each for lithium and 1% for REEs to attract private sector participation through auctions.
- ✓ In Dec 2023, India had its first-ever auction of critical minerals, offering 20 blocks for sale to private sectors.

International Initiatives:

- ✓ USA has ordered a review of vulnerabilities in its critical minerals supply chains.
- ✓ Australia has established a Critical Minerals Facilitation Office (CMFO).
- ✓ UK unveiled a Critical Minerals Intelligence Centre to study future demand and supply.

92% by value and 97% by quantity of Indian imports of critical minerals and rare earth elements are from China, as of October 2023.

Source: Fresh boost for quest towards clean energy (The Hindu)

NUCLEAR POWER IN INDIA

Context: In her budget speech, the Finance Minister announced a 'Nuclear Energy Mission', aimed at developing small modular reactors.

Nuclear Power in India:

- It's the **6th largest source** of electricity in India, contributing about **2% of India's**



total electricity generation. India currently has 22 nuclear reactors in 7 power plants, which together produce **6.78 GW of power.**

- Of these reactors, **18 are Pressurized Heavy Water Reactors (PHWRs) and 4 are Light Water Reactors (LWRs).**
- In January 2021, the Kakrapar Atomic Power Project (KAPP-3), India's first 700 MWe unit and the biggest indigenously developed variant of the PHWR, was connected to the grid.
- Union govt has allowed joint ventures between **Nuclear Power Corp. of India Ltd. (NPCIL) and PSUs.** NPCIL has joint ventures with National Thermal Power Corp. (NTPC) and Indian Oil Corp. Ltd. (IOCL).
- Govt is **aiding expansion of nuclear installations to new parts** of the country. For example, an upcoming plant in Gorakhpur (Haryana).
- India is also working on an entirely **indigenous thorium-based nuclear plant, "Bhavni,"** which will be the first of its kind using Uranium-233.
- **Experimental thorium plant 'Kamini'** already exists in Kalpakkam.
- The **upcoming nuclear power plant in Jaitapur (Maharashtra) would be world's most powerful nuclear power**

plant with 6 state-of-the-art Evolutionary Power Reactors (EPRs).

- India aims to increase nuclear power capacity from to **22.4 GW by 2031.**
- Functioning of all nuclear power related facilities in India is governed by the **Atomic Energy Act of 1961.**

Bharat Small Reactors:

- In the 2024 Union Budget, the govt. announced that it will **partner with the private sector to develop Bharat Small Reactors (BSRs).**
- BSRs are a **type of Small Modular Reactor (SMR)** designed for India's energy needs. These reactors are compact, factory-built reactors with a **power capacity of up to 300 MW.**
- They aim to provide a safe, cost-effective, and low-carbon energy source, particularly suitable for locations that cannot accommodate larger nuclear plants.
- Development of BSRs involves collaboration of Union Govt and the private sector. This marks a historic shift in India's nuclear policy, as **Atomic Energy Act, 1962 previously barred private sector participation.**
- BSRs, aligned with global trends in SMRs, are based on India's existing PHWR technology.

About Nuclear Energy:

- ✓ It is the energy released from the nucleus, or core, of atoms. It has a high energy density, meaning that a small amount of nuclear fuel can produce a large amount of energy.
- ✓ There are two primary methods of harnessing nuclear energy:

- **Nuclear Fission:** Process of splitting the nucleus of an atom into two smaller nuclei, releasing a large amount of energy in the process.
- **Nuclear Fusion:** Process of combining the nuclei of two light atoms to form a heavier nucleus. This process powers the sun and other stars.



Nuclear and hydrogen energy, were identified as key to India's Long Term Low Carbon Development Strategy (LT-LCDS) which was presented at COP 27 in Egypt (2022).

Source: Reactor plan not enriched with funds (The Hindu)

AYUSHMAN BHARAT - PM JAN AAROGYA YOJANA

Context: In the 2025 Union Budget, the Finance Minister announced that the PMJAY has been expanded to cover gig economy workers.



About Ayushman Bharat – PM Jan Aarogya Yojana (AB-PMJAY):

- It is the **world's largest health insurance scheme** fully financed by the govt.
- Launched in 2018, it offers a sum insured of **Rs.5 lakh per family** for secondary care and tertiary care. It covers surgery, medical and day care treatments, cost of medicines and diagnostics.
- Covers medical & surgical procedures for almost all health conditions through a **comprehensive list of 1,949 packages**. It features **packaged rates** (each product/service during treatment cannot be charged separately).
- Beneficiary card for AB-PMJAY can be used to **avail benefits for any existing state health insurance schemes**.
- In the 2024 Interim Budget, the union govt. decided to extend health **coverage under the scheme to Accredited Social Health Activists (ASHAs) and Anganwadi workers**.
- **No restrictions on family size, age or gender for inclusion and all pre-existing conditions are covered**.
- It covers up to **3 days of pre-hospitalization and 15 days post-hospitalization** and **benefits of the scheme are portable across India**.
- Scheme has a **dedicated workforce of PM Arogya Mitras (PMAMs)** who guide and assist beneficiaries.
- PMAMs also make **calls to every beneficiary who availed treatment within 48 hrs of discharge** to verify quality of treatment.
- Scheme has a **National Anti-Fraud Unit (NAFU)** to design, implement, and oversee anti-fraud initiatives. There are also **Anti-Fraud Units at the state level**.

Identification of Beneficiaries:

- It targets the beneficiaries as identified by latest **Socio-Economic Caste Census (SECC)** data.
- National Health Authority (NHA) has **provided flexibility to States & UTs to use non-SECC beneficiary databases** with similar socio-economic profiles for tagging leftover families.

Funding:

- Funding is **shared – 60:40 for all states and UTs with a legislature**, 90:10 in Northeast and Himalayan states, and 100% Central funding for other UTs.


Nodal Agency:

- **National Health Authority (NHA)** has been constituted as an autonomous entity **under the Society Registration Act, 1860** for implementation of PM-JAY.
- The **State Health Agency (SHA)** is responsible for the implementation of AB-PMJAY in individual states.

Achievements of AB-PMJAY:

- It has covered over **15.5 crore families (55 crore beneficiaries)**.
- **11 states/UTs have pushed for 100% coverage** of their population.
- Approx. **28.45 Crore Ayushman Cards have been created since 2018**, out of which **9.38 crore were created in 2023**.
- **26,901 hospitals including 11,813 private hospitals** have been empanelled under AB PM-JAY.
- Catered to more than **6.11 crore hospital admission worth Rs 78,188 crore** in since 2019.
 - 1.7 crore hospitals admissions worth over ₹25,000 crores were authorised during 2023.

- It has **reduced out of pocket expenditure (OOPE) of beneficiaries by 60 %** and **increased access to tertiary care by 65 %**.

 Women account for approx. 49% of total Ayushman cards created and approx. 48% of total authorized hospital admissions. Recently, the Union Govt. extended the coverage of AB-PMJAY to all senior citizens aged above 70.

Source: In a big boost, PMJAY to now provide health cover for gig workers (The Hindu)

JAL JEEVAN MISSION SCHEME

Context: The Union Budget has extended the Jal Jeevan Mission (JJM) 2028, with an increased outlay for JJM (Rural).



About Jal Jeevan Mission (JJM):

- **Launched in 2019** to supply **55 litres of water per person per day to every rural household** through Functional Household Tap Connections (FHTC) **by 2024**. It is implemented by the **Ministry of Jal Shakti**.

Aims of JJM:

- Ensuring functionality of existing water supply systems and water connections, quality monitoring and testing, and sustainable agriculture.
- Ensure conjunctive use of conserved water; drinking water source augmentation, grey water treatment.
- JJM focuses on **integrated demand and supply-side management** of water at the local level and **creation of local infra** for sustainability of supply.

JJM's Performance:

- Currently about **14 crore (72.7%) rural households** have FHTCs, up from 3.23 crore (16.6%) from 2019.
- 5 states (**Gujarat, Telangana, Goa, Haryana, Punjab**) and 3 UTs (**Daman and Diu & Dadra and Nagar Haveli, Andaman & Nicobar Islands, and Puducherry**) have reported 100% coverage.
- Himachal Pradesh (98.8%) & Bihar (96.3%) are poised to achieve 100% saturation.


Jal Jeevan Mission (Urban)

- ✓ Announced in **2021-22 Budget under Ministry of Housing & Urban Affairs** to provide universal coverage of water supply to all households in all statutory towns to achieve SDG- 6.

Objectives of Jal Jeevan Mission (Urban):

- ✓ Bridge the estimated gap of **2.68 crore urban FHTCs**.
- ✓ Provide **2.64 crore sewer connections** and septage in 500 AMRUT cities.
- ✓ **Augment sustainable fresh water supply** and **create green spaces** and sponge cities to reduce floods and

enhance amenity value through an Urban Aquifer Management plan.
 ✓ **Promote circular economy** for each city by focusing on recycling & reuse of treated sewage, rejuvenation of water bodies and water conservation.

 Sponge city is a city that has the capacity to mainstream urban water management into its urban planning policies and designs.

Source: Jal Jeevan Mission extended to 2028 with 'enhanced outlay' (The Hindu)

NATIONAL RESEARCH FOUNDATION (NRF)

Context: The Finance Minister, in her budget speech, stressed on the importance of R&D for India and the role of the NRF in this regard.



About National Research Foundation (NRF):

- NRF is a **proposed entity to replace Science & Engineering Research Board of India (SERB)** and catalyse interdisciplinary research for accelerating India's development agenda, through impactful knowledge creation and translation.
- It will function under the **Ministry of Science and Technology**.

The NRF's Goals:

- **Promote interdisciplinary research** that will address India's most pressing development challenges.
- **Minimize duplication of research.**
- Promote **translation of research into policy and practice.**

Features of NRF:

- **Presided by PM (ex-officio chairman)** and consists of 10 major directorates focusing on science, arts, humanities, entrepreneurship, etc.
- **Union Ministers of Education and of Science and Tech** will be ex-officio Vice Presidents.
- Will have an **18-member board** with eminent Indian and intl. scientists, senior govt functionaries and industry leaders.
- Will be registered as a society and have an **independent secretariat.**

Expectations from NRF:

- Increasing investment in **R&D from 0.7% of GDP to 2% of GDP by 2030**
- **Enhancing India's share of global scientific publications** from about 5% to 7% by 2030
- Create a **pool of talented researchers** across disciplines and sectors
- Developing innovative **solutions for India's development challenges**

Budgetary Updates

- **2021-22 Budget:** Govt announced that for the NRF, it would set aside Rs **50,000 crore over five years.**
 - 28% of it (14,000 crore) coming from govt and **72% (36,000 crore) from private sector.**
- **2022-23 Budget:** NRF was allocated a budget of just Rs 1 lakh.

- **2023-24 Budget:** Allocated Rs 2,000 crore for the NRF, which was then revised to Rs 258.60 crore.
- **2024-25 Budget:** Govt was silent on allocation for the institution or progress made so far.



India's R&D spend is only around 0.64% of its GDP, which is even lower than developing economies such as Brazil (1.16%) and South Africa (0.84%). The contribution of the private sector to India's total R&D spend is only 36.4%.

Source: Science Ministry gets a hefty hike to augment R&D (The Hindu)

PLACES IN NEWS

Palar River



- The British-era **Palar River Anaicut**, a check dam built in 1858, is undergoing a major restoration following severe structural damage caused by flood in 2022.
- Palar River **originates in the Nandi Hills of Karnataka**, at an altitude of 1,400 metres above sea level.
- It flows through **Karnataka, Andhra Pradesh, and Tamil Nadu**, covering a total length of 348 km before emptying

into the **Bay of Bengal** near Vayalur, Tamil Nadu.

- Important tributaries include **Cheyyar, Ponnai, Malattar, and Kosasthalaiyar** rivers.
- The river has been a **lifeline for agriculture**, supporting ancient civilizations and irrigation networks in South India. It is **rain-fed, experiencing seasonal variations** - it remains dry for most of the year but carries heavy flows during monsoons.
- Its basin consists of **alluvial, red, and black soil**, supporting sugarcane, paddy, and groundnut cultivation.
- It is **heavily dammed**, leading to reduced flow, sand mining concerns, and groundwater depletion.

TERMS IN NEWS

SwaRail SuperApp




- Indian Railways has launched the **'SwaRail' SuperApp for beta testing**, integrating multiple railway services into a single platform to enhance user convenience and reduce app clutter.
- It is aimed as a **one-stop solution offering comprehensive railway services** – such as ticket booking, PNR enquiries, food ordering, freight and cargo services, etc.
- It has been developed by **Centre for Railway Information Systems (CRIS)**.

- It aims to streamline railway services, improve user experience, and reduce the need for multiple apps.

Features of the App:

- **Single sign-on:** Access all services with one set of credentials.
- **All-in-One App:** Combines reserved and unreserved ticket booking, train schedules, and PNR status.
- **Integrated services:** Provides cohesive information, such as PNR details with train information.
- **Easy onboarding:** Users can log in using existing RailConnect or UTS App credentials.
- **Multiple login options:** Supports m-PIN and biometric authentication for ease of access.

 Beta testing is the final phase of testing where a selected group of real users use the product in real-world conditions to identify bugs, gather feedback, and ensure it meets user expectations before the official launch.

PRACTICE QUESTIONS

Q1. Consider the following statements regarding the use of nuclear power in India:

1. Most of India's nuclear reactors are Light Water Reactors (LWRs).
2. Nuclear power was identified as key to India's Long Term Low Carbon Development Strategy (LT-LCDS) presented at COP 27 in 2022.
3. Bharat Small Reactors, proposed in the 2024 Budget, seek to attract private finance to enhance deployment of nuclear energy.

How many of the above statements are correct ?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q2. Consider the following statements about the PM-Jan Aarogya Yojana (PMJAY) insurance scheme:

1. It offers an insurance of Rs.5 lakh per family for secondary care and tertiary care.
2. Identification of beneficiaries is done on the basis of the Household Consumption Expenditure Survey.
3. The National Health Authority was established for the smooth implementation of PMJAY.

Which of the afore mentioned statements are correct ?

- (a) 1 and 2
- (b) 2 and 3
- (c) 1 and 3
- (d) 1, 2 and 3

Q3. Consider the following statements regarding the proposed National Research Foundation (NRF):

1. It aims to increase India's spend on R&D expenditure as a portion of its GDP.
2. The Union Minister of Science and Technology will act as its ex-officio Chairman.
3. The union govt. aims to share the funding of NRF with the private sector on a 50:50 basis.

How many of the above statements are correct ?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Q4. Consider the following statements regarding the Jal Jeevan Mission (JJM):

1. JJM-Rural aims to provide 55 litres of water per person per day to rural households by 2024.
2. No state has achieved 100% coverage of rural households under the JJM.
3. JJM-Urban covers all statutory towns and all 500 cities covered by the AMRUT Scheme.

Which of the afore mentioned statements are correct ?

- (a) 1 and 2
- (b) 2 and 3
- (c) 1 and 3
- (d) 1, 2 and 3

Q5. Consider the following list of elements and minerals:

1. Uranium
2. Tantalum
3. Titanium
4. Aluminium
5. Cobalt
6. Zirconium
7. Silicon

Which of these are included in the list of 30 Critical Minerals for India, published by the Ministry of Mines?

- (a) 1, 2, 3, 5 and 6

- (b) 2, 4, 5, 6 and 7
- (c) 1, 3, 4, 5 and 7
- (d) 2, 3, 5, 6 and 7

Answers:

1. B
2. C
3. A
4. C
5. D