

CURRENT AFFAIRS

WEEKLY



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- ❑ RISING INFERTILITY IN INDIA
- ❑ INCREASING EVENTS OF LANDSLIDES IN INDIA

GS-II

- ❑ ISRAEL-IRAN CONFLICT
- ❑ DHAKA CRISIS AND IMPACT ON INDIA-BANGLADESH TIES
- ❑ THE COST OF CANCER THERAPY IN INDIA
- ❑ SUPREME COURT PROPOSES 'CREAMY LAYER' FOR SC/ST QUOTAS
- ❑ PM KUSUM AND TARGET BENEFICIARIES IN INDIA
- ❑ DISASTER MANAGEMENT (AMENDMENT) BILL, 2024
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- ❑ Breach of Privilege Notices

ECONOMY

- ❑ Banks may offer small loans on UPI against FDs
- ❑ Direct Seeding Method

ENVIRONMENT

- ❑ Tiger Deaths in Madhya Pradesh
- ❑ Artificial Light Pollution
- ❑ Pumped Storage Technology

SCIENCE & TECHNOLOGY

- ❑ Lyme disease
- ❑ Remote Sensing Technologies
- ❑ Higgs Boson
- ❑ Sickle Cell Anaemia
- ❑ Rashtriya Vigyan Puraskar

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The current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

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I am grateful to GS SCORE for providing guidance to me and many more aspirants. I practiced a lot with GS SCORE.

AISHWARYAM PRAJAPATI (AIR-10, CSE 2023)



I am truly grateful to GS SCORE for their guidance. They offered genuine mentorship.

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SECTION -A

MAINS ISSUES

RISING INFERTILITY IN INDIA

CONTEXT

According to the Directorate General of Health Services, the incidence of **infertility in eligible couples** is approximately 14 per cent-16 percent.

What is Total Fertility rate?

- Total fertility rate (TFR) in simple terms refers to the total number of children born or likely to be born to a woman in her lifetime if she were subject to the prevailing rate of age-specific fertility in the population.
- TFR of about 2.1 children per woman is called Replacement-level fertility. TFR lower than 2.1 children per woman — indicates that a generation is not producing enough children to replace itself, eventually leading to an outright reduction in population.

Types of Infertility:

- **Primary infertility** – where someone who's never conceived a child in the past has difficulty conceiving.
- **Secondary infertility** – where someone has had 1 or more pregnancies in the past, but is having difficulty conceiving again.

Health Issues Overburdening in India:

- As per the National Health Policy, 2017, public investment in health is expected to reach 2.5 per cent of gross domestic product (GDP) by 2025.
- As per latest economic survey 2023-24, the Government Health Expenditure (GHE) for the last three years i.e. 2021-22, 2022-23 (RE) and 2023-24 (BE) is 1.9 per cent of GDP.

- The government told the House that the Department of Health and Family Welfare (DoHFW) has made efforts to increase allocation in the health budget.

Reasons for rising Infertility:

• Impact of Climate Change on Women and Children:

- ▶ Climatic changes may also spur shifts in fertility by decreasing children's health and survival, which may lead women to have additional children in anticipation of increased mortality risks ("insurance effects") or in response to an actual child death.
- ▶ **Rise in use of Intoxicants:** Fertility is affected by unhealthy coping mechanisms such as tobacco and alcohol overuse.
- ▶ **Contraceptives:** Also, there has been a significant increase in current use of any modern contraceptive method. Contraceptive Prevalence Rate has increased substantially from 54% to 67% at the all-India level.
- ▶ **Reversible Spacing:** Introduction of new reversible spacing (gaps between children) methods, wage compensation systems to undergo sterilisation, and the promotion of small family norms also worked well over the years.

Challenges:

- **Lack of Data:** The Union Ministry of Women and Child Development has not conducted an audit regarding the impact of climate change on women and children.
- **Declining Sex Ratio:** India needs to give huge stress on declining sex ratios and the discrimination towards girls so that people don't have a high number of children in the hope of having a boy.

- **Concerns of Lower TFR:** TFR lower than 2.1 children per woman — indicates that a generation is not producing enough children to replace itself, eventually leading to an outright reduction in population.
 - Thus, TFR lower than 2 (as it is the case in urban areas in India) has its own set of problems. For example, Declining population.

Government Policies for Better health strategies:

- Food Safety and Standards Authority of India (FSSAI) has already made regulations to ensure that cancer causing used cooking oil does not enter in the food chain.
 - FSSAI has also launched **Repurpose Used Cooking Oil (RUCO) initiative** to enable the collection and conversion of UCO to biodiesel and/or soap.

INCREASING EVENTS OF LANDSLIDES IN INDIA

CONTEXT

Recently, over 360 people have died and more than 200 have been injured so far due to the catastrophic landslides in Wayanad, Kerala. Such deadly landslides are being reported from the Himalayas to the Deccan Plateau increasingly.

What are Landslides and how do they occur?

- Landslides are the movement of rock, earth, or debris down a slope. They can vary in size and type, but all involve the force of gravity acting on weakened materials that make up the slope.
- Landslides can be categorized into various types, including rock falls, slides, flows, and topples, each defined by the material involved and the manner of movement.
- Landslides often occur due to natural factors such as heavy rainfall, snowmelt, volcanic activity, earthquakes, and erosion. These factors can weaken the slope material or increase the downward force on the slope.
- Human activities like deforestation, construction, mining, and poor land management can destabilize slopes, making them more susceptible to landslides.

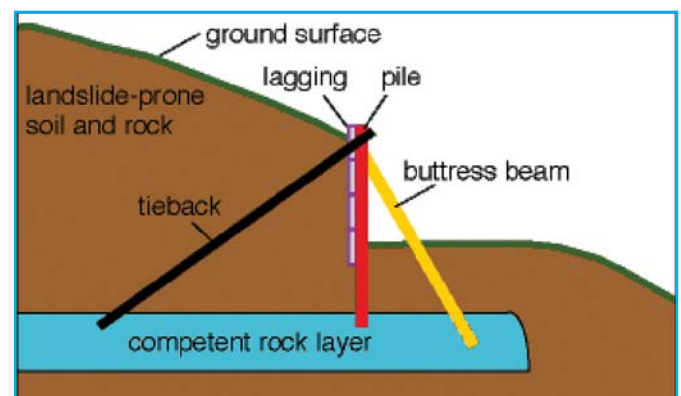
Reasons for increasing events of landslides:

- **Altitude:** High altitude is the most important factor in the occurrence of landslides, be it the Himalayan region or southern India.
 - For example, even in Wayanad, tourism, human activities and construction in areas with a height of at least 2,000 metres have become factors for increasing landslides.
 - Apart from this, extreme weather events are also playing a big role.

- **Soil profile:** The soil in the Himalayan region is made up of sedimentary rock and is loose. The soil of the Deccan Plateau is made of lava and magma, which is also loose.
- **Rock system:** The parent rock of the Deccan Plateau is much more solid compared to the Himalayas
 - If there is height and lack of vegetation and the soil is loose, it creates a scenario for landslides at both places.

How we can control landslides?

- **Improving surface and subsurface drainage:** Because water is a main factor in landslides, improving surface and subsurface drainage at the site can increase the stability of a landslide-prone slope. Surface water should be diverted away from the landslide-prone region by channeling water in a lined drainage ditch or sewer pipe to the base of the slope. The water should be diverted in such a way as to avoid triggering a landslide adjacent to the site. Surface water should not be allowed to pond on the landslide-prone slope.
- Ground water can be drained from the soil using trenches filled with gravel and perforated pipes or pumped water wells.
- **Excavating the head:** Removing the soil and rock at the head of the landslide decreases the driving pressure and can slow or stop a landslide. Additional soil and rock above the landslide will need to be removed to prevent a new landslide from forming upslope. Flattening the slope angle at the top of the hill can help stabilize landslide-prone slopes.
- **Buttressing the toe:** If the toe of the landslide is at the base of the slope, fill can be placed over the toe and along the base of the slope. The fill increases the resisting forces along the failure surface in the toe area. This, in turn, blocks the material in the head from moving toward the toe. However, if the toe is higher on the slope, adding fill would overload the soil and rock below the toe, thus causing a landslide to form downslope of the fill.
- **Constructing piles and retaining walls:** Piles are metal beams that are either driven into the soil or placed in drill holes. Properly placed piles should extend into a competent rock layer below the landslide. Wooden beams and telephone poles are not recommended for use as piles because they lack strength and can rot.



Early Warning System in India:

- LEWSs at the regional scale are used to assess the probability of landslide occurrence over a priori-defined warning zones, typically through forecasting and monitoring of meteorological variables, to give generalized warnings to communities and institutions working with hazard mitigation measures.
- Geological Survey of India (GSI), Ministry of Mines in collaboration with the British Geological Survey (BGS) under the National Environmental Research Council (NERC), UK funded, multi-consortium LANDSLIP project (www.landslip.org) has developed a prototype regional Landslide Early Warning System (LEWS) for India, and the same is currently being evaluated and tested by GSI in two pilot areas in India (Darjeeling district).
- GSI through the LANDSLIP project (www.landslip.org) is engaged in developing an experimental regional Landslide Early Warning System (LEWS) based on rainfall thresholds since 2017.
- The LANDSLIP research has developed a prototype model in 2020 based on the terrain-specific rainfall thresholds for two test areas (Darjeeling district, West Bengal, and the Nilgiris district, Tamil Nadu).

- The religious and ideological differences between the two countries have contributed to mutual suspicion and animosity.
- Israeli-Palestinian Conflict:** Iran has been a staunch supporter of Palestinian causes, including backing militant groups like Hamas and Hezbollah, which are considered terrorist organisations by Israel.
- Iran’s support for these groups and its calls for the destruction of Israel have heightened tensions.
- Geopolitical Rivalry:** Iran and Israel are regional rivals vying for influence in the Middle East. They have conflicting interests in various regional conflicts, including the civil wars in Syria and Yemen.
- Where Iran supports the Assad regime and Houthi rebels, respectively, while Israel opposes Iranian influence in these countries.

ISRAEL-IRAN CONFLICT

CONTEXT

Recently, Israel carried out a massive air strike on Hodeidah, the Red Sea port city in Yemen, that is controlled by the Houthi militia, in response to a drone attack by the Houthis that had hit Tel Aviv. The attack reportedly caused losses worth millions, besides killing at least three and wounding over 80 others.

What is the issue?

- The conflict between Israel and Iran has created a situation of turmoil affecting the security of the large Indian diaspora based in the Gulf region.
- Iran has launched significant attacks on Israel, deploying over 300 projectiles, including drones, cruise missiles, and ballistic missiles. This action was widely seen as retaliation for a deadly strike on Iran’s consulate in Damascus, Syria.
- This has created the additional risk of piracy and hostage-taking in the Gulf region.

Reasons for Israel-Iran Conflict:

- Historical context Iran and Israel have had a tumultuous relationship since the Iranian Revolution of 1979, which transformed Iran from a close ally of Israel under the rule of the Shah to an Islamic Republic openly hostile towards Israel.
- Religious and Ideological Differences:** Iran is an Islamic republic governed by Shia Islam, while Israel is a predominantly Jewish state.



Impact on India:

- Conflict between Israel and oil-rich Iran could disrupt oil supply from the region, leading to a rise in oil prices globally.
- India imports around 2 million barrels of crude oil daily through the strategic Strait of Hormuz located at the mouth of the Persian Gulf. Any conflict or instability in the region would lead to supply shortages and increasing energy costs leading to inflation and constraining Economic Growth in India.
- The strategic connectivity interests of India might be affected. This includes the port of Chabahar in Iran, linking India to Afghanistan and Central Asia.
- Shipping disruption in the Red Sea would affect the trade in the region.
- A disturbance here could lead to delays, increased shipping costs, and instability in global trade.

DHAKA CRISIS AND IMPACT ON INDIA-BANGLADESH TIES

CONTEXT

The recent downfall of the government in Dhaka and the resignation of Prime Minister Sheikh Hasina will affect growing trade ties, restricting the movement of people and goods, and stalling a potential **free trade agreement (FTA)** between the two countries.

What is the matter behind Bangladesh Protests?

- The student protests, initially focused on abolishing quotas in **civil service jobs**, have now grown into a broader anti-government movement.
- The mass protests in Bangladesh began as student demonstrations demanding reforms to the civil service quota system.
- A Supreme Court ruling against reintroducing job quotas did not fully satisfy the protesters, who continue to demand the abolition of all job reservations for children of "freedom fighters".
- The situation intensified when former army chief General Iqbal Karim Bhuiyan criticized the government's handling of the protests and called for troop withdrawal.

About India-Bangladesh recent developments:

- **In Trade:** In October 2023, India and Bangladesh began discussions on an FTA during a meeting of the Joint Working Group on Trade in Dhaka.
 - ▶ FTA would reduce or eliminate customs duties on goods traded between India and Bangladesh, and ease norms to help promote further trade and investments.
- **Export-Import data:** A 2012 working paper published by the **World Bank** estimated that a full FTA for goods would increase Bangladesh's exports to India by 182%, whereas a partial FTA could lead to a 134% increase.
- **Infrastructure and connectivity:** Infrastructure and connectivity has been a growing part of India-Bangladesh ties, according to the Minister of External Affairs.
 - ▶ India has extended three lines of credit to Bangladesh since 2016 amounting to \$8 billion for the development of road, rail, shipping and port infrastructure.
 - ▶ In November 2023, two joint projects – the **Akhaura-Agartala cross-border rail link and Khulna-Mongla Port rail line** – were inaugurated.
- **Ports and Marine connectivity:** In 2023, the countries had agreed to operationalise the agreement for the usage of the Chittagong and Mongla ports to ease the movement of cargo between mainland India and the Northeast.

India-Bangladesh Trade Relations:

- Bangladesh is India's biggest trade partner in the subcontinent, and India is Bangladesh's second biggest partner in Asia after China.
- Their total bilateral trade amounted to 13 billion dollars in the financial year 2023-24, according to the Union Ministry of Commerce.
- India exports a variety of goods to Bangladesh, **including cotton, machinery and food products, while imports goods like jute and fish.**
- Bangladesh is the biggest export destination for India's cotton, accounting for 34.9% of India's total cotton exports (some \$2.4 billion in FY24).
- Other major Indian exports to Bangladesh are **Petroleum products and cereals.**
- India's top imports from Bangladesh are readymade garments, amounting to \$391 million in FY24. In recent years, Bangladesh has emerged as a major global hub for textiles.

Concerns related to downfall in Bangladesh

- **Long border sharing with North-east India:** A disruption in Indo-Bangladesh ties could thus restrict India's access to the Northeast, which will be connected to mainland India only through the narrow "Chicken's Neck" Between West Bengal and Assam.
- **Trade disruptions:** According to exporters, they are already facing disruptions in exports to Bangladesh due to a shortage of foreign exchange in that country.
 - ▶ India's exports of perishable goods are facing challenges at the border.

Impacts on Global Economy: Bangladesh poses several risks to India's trade, proactive measures and regional cooperation can help mitigate these impacts and ensure continued economic stability and growth.

THE COST OF CANCER THERAPY IN INDIA

CONTEXT

A new cancer drug, promising fewer side effects and better outcomes, is now a ray of hope for cancer patients in India. However, this hope comes at a high price. The cost of drugs curing cancer is too high to access and afford by normal people.

Making Affordable Cancer Treatment in India:

- In her Budget 2024-25 speech, the finance minister announced customs duty (which was earlier ~10%) exemptions on 3 targeted cancer drugs - trastuzumab deruxtecan, osimertinib, and durvalumab.
- The decision is likely to make these drugs more accessible to Indian patients and reduce the overall cost of cancer therapies.

About Cancer:

- It is a complex and broad term used to describe **a group of diseases characterized by the uncontrolled growth and spread of abnormal cells** in the body.
 - ▶ These **abnormal cells, known as cancer cells**, could invade and **destroy healthy tissues and organs**.
- In a healthy body, cells grow, divide, and die in a regulated manner, allowing for the normal functioning of tissues and organs.
 - ▶ However, in the **case of cancer, certain genetic mutations or abnormalities disrupt this normal cell cycle**, causing cells to divide and grow uncontrollably.

Cancer profile in India:

- **The number of cancer cases in India is on the rise.** According to the National Cancer Registry data,
 - ▶ An estimated **14.6 lakh new cancer cases were detected in 2022**, up from 14.2 lakh in 2021 and 13.9 lakh in 2020.
 - ▶ **The number of deaths** due to cancer increased to

an estimated **8.08 lakh in 2022**, up from 7.9 lakh in 2021 and 7.7 lakh in 2020.

◦ **The incidence of cancer cases in India:**

- ▶ According to the Indian Council of Medical Research (ICMR), **1 in 9 Indians will develop cancer during their lifetime**.
- ▶ **The incidence is higher among women** - 103.6 per 100,000 population in 2020 compared to 94.1 among men.
- ▶ **The most common cancers** among men were of the lung, mouth, prostate, tongue and stomach; **for women**, they were breast, cervix, ovary, uterus and lung.

(figure no. 1)

Regulation of Prices of these Cancer Drugs in India:

- Trastuzumab Injection is a scheduled drug under the National List of Essential Medicines (NLEM) 2022 and the National Pharmaceutical Pricing Authority (NPPA) has fixed the ceiling price (Rs. 54725.21 per vial) of the same.

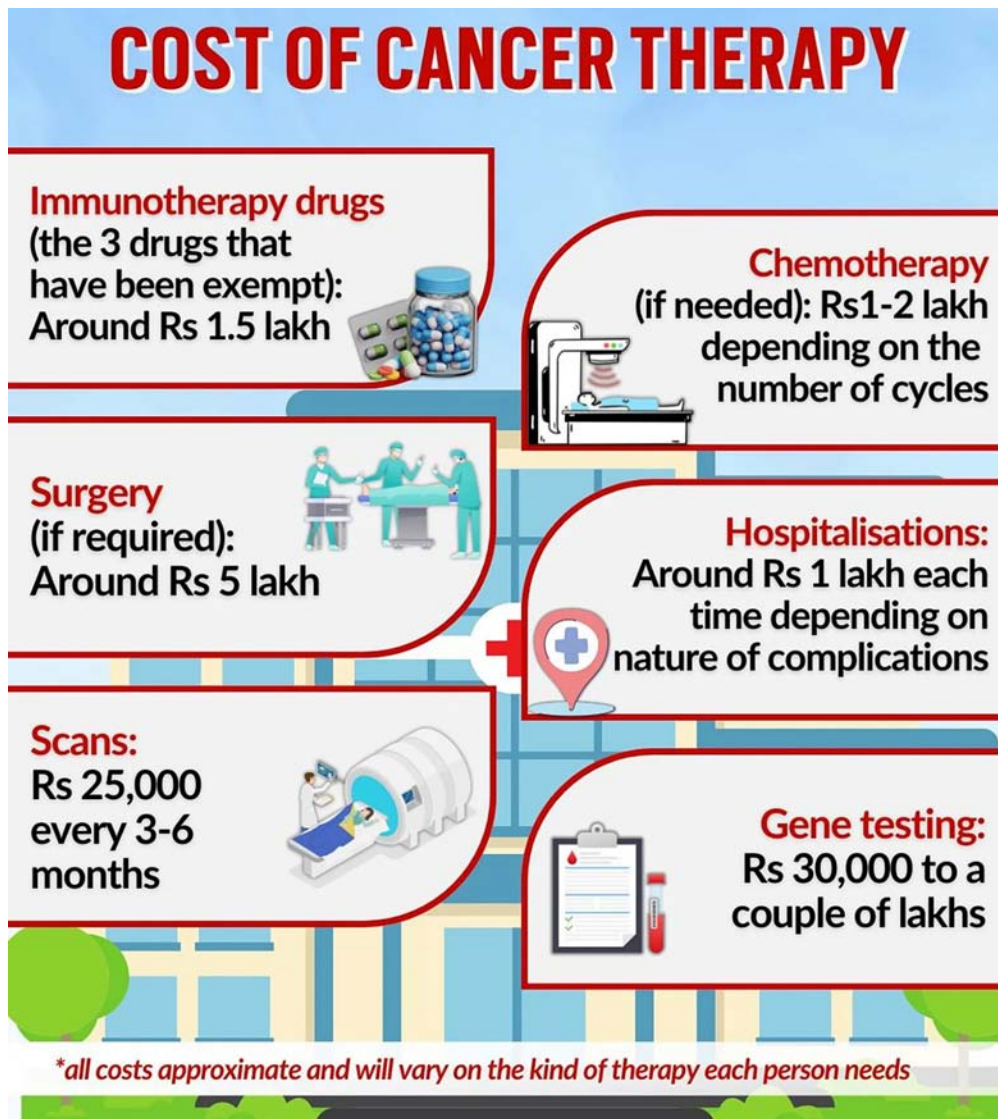


FIGURE: 01

- The other two medicines i.e., Osimertinib and Durvalumab are non-scheduled medicines under **Drug Prices Control Order (DPCO), 2013**.

Hence, NPPA monitors the maximum retail price (MRP) of the non-scheduled formulation to ensure that the same does not increase by more than 10% of MRP during the preceding 12 months.

SUPREME COURT PROPOSES 'CREAMY LAYER' FOR SC/ST QUOTAS

CONTEXT

The Supreme Court of India has made a landmark decision allowing the sub-categorization of Scheduled Castes (SCs) in reservations. This decision came from a 6:1 verdict by a seven-judge Constitution bench. The ruling permits states to provide more nuanced protection to underrepresented groups within the broader SC category, acknowledging that SCs are not a homogeneous group.

Key Highlights

- The Supreme Court allowed the sub-categorization of Scheduled Castes for reservation purposes. It allowed the sub-categorization, providing a legal basis for states to address disparities within the SC community.
- Sub-classification does not violate the principle of equality enshrined under Article 14 of the Constitution.
- **Creamy Layer:** The court emphasised the necessity to exclude the 'creamy layer' within the Scheduled Castes from reservation benefits intended for SC categories.
- Currently, this concept is **only applied to reservations for Other Backward Classes (OBCs)**.
 - ▶ The current ruling overturns the **2004 decision (EV Chinniah vs State of Andhra Pradesh)**, allowing states to provide differentiated reservations within the SC category.
 - ▶ The 2004 judgment in EV Chinniah vs State of Andhra Pradesh held that SCs were a homogeneous group, and any sub-classification was impermissible.
 - ▶ Implications: The ruling is significant for states wanting to give greater protection to underrepresented castes within the SC category, addressing disparities among different SC communities.

Need for Sub-Categorization

- **Addressing Inequality:** The sub-categorization aims to address inequalities within the SC category, where some castes benefit more from reservations than others.
- **Better Representation:** It ensures that the most disadvantaged groups within the SC category receive adequate representation and benefits.
- **Historical and Empirical Evidence:** The decision is based on evidence that shows SCs are not a homogeneous group, and some sub-castes are more underrepresented and disadvantaged.

Impact

- **State Policies:** States can now create policies that provide targeted benefits to the most disadvantaged SC sub-castes.
- **Reservations:** The ruling impacts reservation policies in education and public employment, ensuring a more equitable distribution of opportunities.
- **Wider Protection:** Underrepresented castes within the SC category will receive wider protection and support, addressing historical inequalities.
- **Future Legislation:** The ruling sets a precedent for future legislation and policies related to reservations and affirmative action in India.



FACT BOX

The concept of 'Creamy Layer'

- In India, the 'creamy layer' refers to the relatively affluent and better-educated members of the OBCs who are excluded from reservation benefits in government jobs and educational institutions.
- This ensures that reservations benefit the genuinely underprivileged sections of OBCs.
- The concept was introduced following the Supreme Court's judgement in the Indra Sawhney case (1992), also known as the **Mandal Commission case**.

Criteria for determining the creamy layer

- **Families with an annual income above Rs 8 lakh** are considered part of the creamy layer.
 - ▶ This income threshold is periodically revised by the government. Additionally, children of high-ranking officers in Group A and Group B services are excluded.
- **Children of professionals** such as doctors, engineers, and lawyers with significant income and status are also considered part of the creamy layer.
- **Families owning large tracts of agricultural land** beyond certain specified limits are also included in the creamy layer.

PM KUSUM AND TARGET BENEFICIARIES IN INDIA

CONTEXT

A new report from the **Centre for Science and Environment (CSE)** revealed that the scheme PM KUSUM has achieved only 30 percent of its targets, raising concerns about its ability to meet the 2026 deadline.

About PM KUSUM:

- The Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM) scheme, launched in 2019 with the ambitious goal of solarising agriculture in India.
- The PM-KUSUM scheme is divided into three components:
 - **Component A:** Installation of mini-grids on barren lands.
 - **Component B:** Replacement of diesel water pumps with off-grid solar water pumps.
 - **Component C:** Replacement of electric water pumps with on-grid solar water pumps and installation of mini-grids for agriculture feeder solarisation.
- The PM-KUSUM Scheme was launched in 2019 for de-dieselisation of the farm sector and enhancing the income of farmers.
- It is aimed at ensuring energy security for farmers in India, along with honouring India’s commitment to increase the share of installed capacity of electric power from non-fossil-fuel sources to 40% by 2030 as part of Intended Nationally Determined Contributions (INDCs).
- The scheme aims to add Solar capacity of about 34,800 MW by March 2026 with the total Central Financial support of Rs 34,422 crore.
- **Nodal Ministry:** Ministry of New and Renewable Energy (MNRE)
- Under the Scheme, a central government subsidy upto 30% or 50% of the total cost is given for the installation of standalone solar pumps and also for the solarization of existing grid-connected agricultural pumps.
- Further, farmers can also install grid-connected solar power plants up to 2MW, under the Scheme on their barren/fallow land.
- This scheme is being implemented by the designated departments of the State Government.

Who are the beneficiaries?

- The **eligible categories** for KUSUM Scheme are:
 - An **individual farmer**.
 - A **group of farmers**.
 - FPO or **Farmer producer organization**.
 - **Panchayat**.
 - **Co-operatives**.
 - **Water User Associations**.

Challenges:

- One of the principal challenges that the scheme has faced in its implementation has been the availability of cheap electricity for farmers. However, this cheap electricity has its flip side – it leads to increases in a state’s subsidy burden. This access to cheap electricity leads to a lack of incentive for farmers to shift from electric water pumps to solar water pumps.

- Another challenge is the centralization of the implementation model in some states.
 - In Punjab, the report notes, the scheme’s implementation is overseen by the Punjab Renewable Energy Development Agency, as opposed to Rajasthan, where each component of the scheme has a different implementing agency.

Recommendations for improvement

To accelerate the scheme’s progress and ensure it meets its 2026 targets, the CSE report recommends several measures:

- **Decentralisation:** Local implementing agencies with on-ground knowledge should manage the scheme to better cater to farmers’ needs.
- **Financial viability:** Offering farmers the option to pay upfront costs in installments could make the scheme more accessible.
- **Increased central assistance:** Boosting financial assistance from the Centre, tailored to state-specific needs and fluctuating prices of solar modules, would alleviate the financial burden on farmers.

Conclusion:

The PM-KUSUM scheme holds the potential to reduce carbon emissions by 5.2 million tonnes, making its successful implementation crucial for India’s climate action efforts. With targeted recalibrations, the scheme can not only meet its 2026 targets but also play a significant role in promoting sustainable agricultural practices across the country.

DISASTER MANAGEMENT (AMENDMENT) BILL, 2024

CONTEXT

The Indian government is set to introduce the **Disaster Management (Amendment) Bill, 2024**, in the Lok Sabha.

Key-highlights of the Bill

- The bill aims to create a comprehensive disaster database at national and state levels and establish an Urban Disaster Management Authority for state capitals and major cities with Municipal Corporations.
- **Disaster Database:** This database will include disaster assessments, fund allocation details, expenditure reports, preparedness and mitigation plans, and a risk register categorized by type and severity of risk.
- **Empowerment of NDMA and SDMA:** The bill seeks to empower the National Disaster Management Authority (NDMA) and the State Disaster Management Authority (SDMA) to independently prepare disaster plans, replacing the reliance on plans made by the National and State Executive Committees.
 - The NDMA will also be authorized to appoint experts and consultants as necessary.

- ▶ The NDMA will regularly assess a wide spectrum of disaster risks, including those from extreme climate events and other potential threats, even if such disasters have not yet occurred.
- **Statutory Recognition:** The bill will grant statutory recognition to existing bodies like the National Crisis Management Committee and the High-Level Committee.
- The amendment aims to integrate disaster management more effectively into development plans, aligning with the recommendations of the 15th Finance Commission.
- **State Disaster Response Force:** The bill proposes that state governments establish a State Disaster Response Force.
- **New Section 60A:** This section will empower both the Central and State Governments to direct individuals to take necessary actions or refrain from them to mitigate disaster impacts, with penalties for non-compliance not exceeding ₹10,000.

Need for Disaster Management in India

- India is among the world's most disaster-prone countries with 27 of its 29 states and seven union territories exposed to recurrent natural hazards such as cyclones, earthquakes, landslides, floods and droughts.
- Disasters were historically perceived as inevitable or divine interventions. However, now two primary phenomena have intensified disaster risks:
 - ▶ **Climate Change:** Unpredictable weather patterns, excessive rainfall leading to floods, extreme temperatures, formation of glacial lakes threatening ecosystems, and impacts on food security, water scarcity, and infrastructure.
 - ▶ **Unplanned Development:** Rapid and unguided development in transportation, energy, urbanization, and tourism, which, although meant to improve quality of life, increase disaster vulnerability.
- Climate change and unplanned development necessitate a systematic approach to manage disasters.
- Effective disaster management (DM) includes a defined cycle encompassing prevention, preparedness, response, and recovery.

Current Structure of Disaster Management in India

□ National Level:

- ▶ **National Disaster Management Authority (NDMA):** Policy-making body.
- ▶ **National Disaster Response Force (NDRF):** Specialized force for disaster response.
- ▶ **National Institute of Disaster Management (NIDM):** Focuses on training, research, and knowledge dissemination.

□ State Level:

- ▶ **State Disaster Management Authorities (SDMAs):** State-level policy and planning.
- ▶ **State Disaster Response Forces (SDRFs):** State-level response units.

The Disaster Management Cycle

- **Prevention and Mitigation:** Initial measures to prevent disasters and reduce their impact.
- **Preparedness:** Capacity building through training and resource allocation.
- **Response:** Immediate relief and rescue operations with trained personnel and modern technology, focusing on saving lives and livelihoods.
- **Recovery:** Assessing damage, securing resources, and rebuilding to create a more resilient environment.

Recent Developments

- **Early Warning Systems:** Adoption of the Common Alerting Protocol (CAP) for disseminating warnings and advisories to the public via mobile networks.
- **International Cooperation:** Active participation of the NDRF and Indian Armed Forces in international disaster relief missions, e.g., Nepal earthquake (2015), Japan's triple disaster (2011), Turkey earthquake (2023).
- **G20 Leadership:** India prioritized DRR during its G20 presidency in 2023, emphasizing early warning technologies and disaster risk financing.

INCREASE IN CUSTOM DUTY ON CHEMICALS

CONTEXT

In the recent Union budget, the government hiked customs duty on laboratory chemicals from **10 per cent to 150 percent**, increasing concerns for the scientists' community in India.

About the update:

- Generally, chemicals attract duty of **2.5 percent, 5 percent, 7.5 percent or 10 percent**.
- Central Board of Indirect Taxes and Customs has reinstated a **10% import duty on chemicals for laboratory use**, reversing a previous hike announced in the Union budget for FY25.

Chemical's import dependence:

- Laboratory chemicals (Harmonised System Code 9802) include fine chemicals and pure compounds used by the pharmaceutical and biotech industry and researchers for lab analysis and synthesis. These chemicals are niche in nature and mostly imported.
- Analysis of trade under this HS Code shows that the value of imports has been sharply rising each year. It was ₹104 crore in FY21, ₹181 crore in FY22, ₹416 crore in FY23, and zoomed to ₹701 crore in FY24.

Key Exclusions and Compliance by CBIC:

- **Ethyl Alcohol:** Undenatured ethyl alcohol is excluded from the 10% duty and is subject to a 150% duty due to misuse concerns.
- **Compliance Requirement:** Non-compliance with end-use declarations will result in ineligibility for the concessional rate.

Tariff Classification:

- **Current Tariffs:** Chemicals generally attract import duties ranging from 2.5% to 10% under the Customs Tariff Act.
- **Special Classification:** Chemicals imported in packages not exceeding 500ml or 500g for laboratory use are specifically classified with a 10% duty.

Impacts on the increase in Custom Duty:

- Pharmaceutical companies and research labs might face soaring costs for critical imported chemicals, potentially driving up research expenses and end-product prices.
- Almost 95 per cent of research labs use imported lab chemicals, and most of this experimentation work needs to be reproduced globally.
- Thus, the focus must be on quality-oriented moves rather than raising government revenue.

REFORMS TO INCOME TAX LAWS

CONTEXT

The government has announced its intent to review the IT Act. To fundamentally resolve the source of these disputes requires that the contentious sections of the Act be carefully redrafted, and tax structure simplified.

What is Taxation?

- Taxation is not just a vehicle for raising state revenue. It can also be critically important for economic and political development.
- In recent times, India has introduced some far-reaching reforms to increase compliance (like Goods and Services Tax (GST), reduction in corporate tax rate and phasing out of exemptions etc.) and to reduce tax evasion (like Place of Effective Management, Black Money Act etc.).

Income Tax Structure in India:

- Between assessment years 2019-20 and 2022-23, the number of taxpayers increased from 89.8 to 93.7 million.
- Budget 2024-25 has further reduced the tax rate for incomes below Rs 12 lakh, which will impact more than 80 per cent of individual returns and 51 per cent of the gross income filed in returns.
- Only 6.08 cr individuals pay taxes (~4.9%) much below the desired level of 23%.

- In India, only 15.5% of net national income is reported.
- Overall, Tax-to-GDP ratio (at 17.82% in FY 2017-18) still remains below that of emerging economies (~21%) and much below OECD average (~34%).

Reasons behind low Tax-to-GDP ratio in India:

▫ **Low tax base:**

- ▶ **Income Tax:** In India, the exemption threshold of income tax has been consistently raised, much rapidly than underlying income growth. This implies that relatively well off people are subsidized at the cost of services which could be provided to poor with the forgone money.
- ▶ **Corporate Tax:** Before the recently unveiled tax-cuts, India was branded as a high-tax destination with corporate tax rate over 30%.
 - ◆ Moreover, a complex system of exemptions, tax cuts, preferential tax rates, deferral of tax liabilities etc. has led to large tax collection expenditure and a significant amount of revenue foregone.

▫ **Tax Evasion:** Tax evasion and corruption undermines the legitimacy of the State. It creates a belief among the citizens that the public resources are being wasted, reducing the willingness to pay.

- ▶ A state that over-emphasizes or prioritizes redistribution over delivery of services ends up having middle class 'exit from the state' i.e. people start avoid paying taxes, start associating state with inefficiencies, promote using private hospitals or sending children to private schools etc. This will reduce the demand of services from state, further eroding its legitimacy to earn taxes.
- ▶ Multiplicity of exemptions and exclusions further increase the complexity of the tax structure and acts as a disincentive for tax-compliant society, as in case of GST.

▫ **Weak Tax Administration:** is considered a key barrier to effective and fair tax collection in the country.

- ▶ Tax administration and tax compliance is weak due to lack of technical expertise and financial resources, as well as due to corruption.
- ▶ Tax administrative capacity at sub-national and local government levels (e.g. user charges, property tax etc.) is particularly wanting.

▫ **Structural Issues:** Several structural factors have impinged upon India's tax revenue performance such as:

- ▶ large share of agriculture (historically untaxed sector) & service sector (lightly taxed sector).

Need for Tax Reforms:

Various committees, to consolidate the direct taxes, were constituted by the government like **Raja Chelliah Committee (early 1990s), Vijay Kelkar Committee (2002), and the Easwar Panel.**

- Recently, with the constitution of **Arbind Modi Committee on Income Tax Reforms** and Akhilesh Ranjan Panel on formulating a new Direct Tax Code (DTC), Government seems to be moving firmly in the direction of Direct Tax reform.
- Direct Taxes Code (DTC)** aims to revise, consolidate and simplify the structure of direct tax laws (like the Income tax Act, 1961; Wealth Tax Act, 1957) in India into a single legislation.

Direct Tax:

- It is the tax where the incidence and impact of taxation fall on the same entity.
- It is termed as a progressive tax because the proportion of tax liability rises as an individual or entity's income increases.
- It is of various types such as: income tax, corporate tax, dividend distribution tax, securities transaction tax, fringe benefit tax and wealth tax.
- Income Tax Act 1961 (ITA) has provision for income tax, corporate tax, property tax etc.

Measures taken by the Government

Increasing Tax Compliance

- CBDT launched 'E- Sahyog' portal to facilitate online filing of the returns;
- Project Saksham was launched by CBIC** to help in implementation of Goods and Services Tax (GST) and in extension of Indian Customs Single Window Interface for Facilitating Trade (SWIFT)
- Extending the scope of Tax Collected at Source (TCS):** E.g. 1% TCS is charged on luxury items (cars > 10 lakh/ cash payment > 2 lakh) collected by seller.
 - Push towards digitalization and formalization will increase expansion of tax net.

Anti-Tax Avoidance Measures:

- Advanced Pricing Agreements (APAs):** APA is an agreement between a taxpayer and tax authority determining the transfer pricing methodology for pricing the tax payer's international transactions for future years.
- GAAR (General Anti-Avoidance Rules), effective from April 1st, 2017, is a set of rules which helps the revenue authorities to decide:
 - whether a particular transaction has commercial substance or not
 - tax liability associated with a genuine transaction.

'WORLD DEVELOPMENT REPORT 2024: THE MIDDLE-INCOME TRAP'

CONTEXT

As per the World Bank's 'World Development Report 2024: The Middle-Income Trap' report, it may take India close to 75 years, China more than 10 years, and Indonesia nearly 70 years to reach one-quarter of the United States' income per capita.

Highlights of the Report:

- The report mentions the data from the past 50 years shows that countries usually hit a "trap" when they reach 10 percent of the annual **US GDP per capita or middle of the range** as per what the World Bank classifies as middle-income countries — equivalent to 8,0000 dollars as on date.
- By 2023-end, **108 countries** with a total population of six billion (75 per cent of the world) were classified as 'middle-income'.

SINCE 1990, ONLY **34 MIDDLE-INCOME ECONOMIES** HAVE MANAGED TO SHIFT TO HIGH-INCOME STATUS.

What is Per-capita Income?

- Per capita income is a measure of the **amount of money earned per person in a nation or geographic region.**
- Per capita income is used to determine the average per-person income for an area and to evaluate the standard of living and quality of life of the population.

Per Capita Income in the U.S.-

- The United States Census Bureau takes a survey of income per capita every year.
- The Bureau takes the **total income for the previous year for everyone 15 years old and older and calculates the mean average of the data.**
- The census includes earned income (including wages, salaries, and self-employment income), interest income, dividends, including income from estates and trusts, and government transfers (Social Security, public assistance, welfare, survivor, and disability benefits).

Classification of Countries based on Income Per capita:

- Based on per capita income, the World Bank has broadly classified countries into four categories.
 - Low-income countries,
 - Lower-middle income countries,
 - Higher-middle income countries, and
 - High-income countries.

What Is the Difference Between GDP and Per Capita Income?

- Gross domestic product (GDP) is the value of all the finished goods and services produced in a nation.
- It consists of consumer spending, government spending, investments, and net exports. Per capita income is the amount of income earned per person in a nation.

Why transition from a middle-income country to a higher status is majorly a Trap?

- **Shift towards higher value economy:** To progress from middle to high income, a country needs to **increase the productive output of its economy**. At lower levels of development, this involves a structural shift from agricultural production to the manufacture of goods and increasingly, the provision of high-value services.
- **Increasing modern technologies dependence:** Agriculture remains important to output and additional increases in farm productivity raise income through mechanization and the application of modern technologies.
- At the same time, the demand for rural labor falls and this excess or "surplus" labor can be utilized in an expanding manufacturing sector.
- The competitiveness of such output depends, in no small part, on relative labor costs. Labor is employed at higher levels of productivity than in agriculture but at wage levels sufficiently low to ensure that the output can be priced and marketed competitively.
- Thus, a common growth strategy for low-income countries is to expand into low-wage, low-cost, low-technology manufacturing in such items as textiles and food processing.
- Manufacturing adds to the total productive output of the economy, thus increasing income per capita.
- This pattern is adequate to move a country from low to middle income but growth will be limited if the national competitive strategy remains rooted in low-end manufacturing.

Limitations of Per Capita Income:

- **Living Standards:** Since per capita income uses the overall income of a population and divides it by the total number of people, it doesn't always provide an accurate representation of the standard of living. In other words, the data can be skewed, whereby it doesn't account for income inequality.
- **Inflation:** Per capita income doesn't reflect inflation in an economy, which is the rate at which prices rise over time. For example, if the per capita income for a nation rose from \$50,000 per year to \$55,000 the next year, it would register as a 10% increase in annual income for the population.

- **International Comparisons:** The cost-of-living differences can be inaccurate when making international comparisons since exchange rates are not included in the calculation. Critics of per capita income suggest that adjusting for purchasing power parity (PPP) is more accurate, whereby PPP helps to nullify the exchange rate difference between countries.
- **Savings and Wealth:** Per capita income doesn't include an individual's savings or wealth. For example, a wealthy person might have a low annual income from not working but might draw from savings to maintain a high-quality standard of living. The per capita metric would reflect the wealthy person as a low-income earner.
- **Children:** Per capita includes children from the total population who don't earn any income. Countries with many children would have a skewed result since they would have more people dividing up the income versus countries with fewer children.
- **Economic Welfare:** The welfare of the people isn't necessarily captured with per capita income. For example, the quality of work conditions, the number of hours worked, education level, and health benefits are not included in per capita income calculations. As a result, the overall welfare of the community may not be accurately reflected.

LEGALITY OF GM CROPS IN INDIA

CONTEXT

Supreme Court of India has recently delivered a split verdict on the question of allowing genetically modified (GM) mustard in farmer fields.

What are Genetically Modified Crops (GM Crops)?

- Genetically modified (GM) crops are plants used in agriculture, the DNA of which has been modified using genetic engineering techniques.
- In most cases, the aim is to introduce a new trait to the plant that does not occur naturally in the species like resistance to certain pests, diseases, environmental conditions, herbicides, etc.
- Genetic modification is also done to increase the nutritional value, and production of pharmaceuticals, biofuels etc.
- GM crops are also referred as genetically engineered (GE) plants, transgenic crops, living modified organisms (LMOs), or biotech crops.

About GM Crops and Prospects:

- **Historical Background:** GM crops first introduced in USA in the mid-1990s, are presently widely cultivated and used globally.
 - GM crops currently grown are engineered mainly for insect resistance or herbicide tolerance. A total of 16 GM crops are cultivated in various countries out of which corn, soybean, cotton and canola are the four largest acreage.

Understanding DMH-11

Genetically modified mustard, after the GEAC approval seems set to be India's first transgenic food crop

Dhara Mustard Hybrid-11 (DMH-11)

DMH-11 works on the principle of removing male fertility in one parent and restoring it in the offspring

WHO DEVELOPED IT?

Scientist, ex-DU vice-chancellor Deepak Pental developed it in 2007. It had been stuck in the regulatory process after initial approval in 2017

₹70cr cost of the partially govt-funded project

ITS ADVANTAGES: It would bring "better yields, lower costs for farmers", Pental said. It allows for hybridisation of a plant that otherwise self-pollinates (making hybrids next to impossible), leading to high-output hybrids

AND CONCERNS: GM technologies are fiercely resisted, amid fears they may compromise food security, lead to seed monopolies, biosafety hazards. Coalition for a GM-free India called the clearance "shocking", alleging that the "regulator colluded with the developer"



FIGURE: 2

Some Major GM Crops in India:

- ▶ In India, Bt cotton is the only GM crop approved for cultivation.
- ▶ It is grown on approx. 11 million hectares.
- ▶ Bt cotton, first grown in 2002 now occupies more than 90% of cotton area in the country.
- ▶ Several more crops such as chickpea, pigeonpea, corn, sugarcane, etc. are in various stages of research and field trials.

GM Mustard Debate:

- The Genetic Engineering Appraisal Committee (GEAC) approved the environmental release of the transgenic mustard hybrid Dhara Mustard Hybrid-11 (DMH-11) in October 2022.

What is GM Mustard?

- Dhara Mustard Hybrid-11 (DMH-11) was developed in India by hybridising the Indian mustard variety 'Varuna' and 'Early Heera-2' (Eastern European variety).

- It contains two alien genes ('barnase' and 'barstar') isolated from a soil bacterium called *Bacillus amyloliquefaciens* that enable breeding of high-yielding commercial mustard hybrids.
- It is approved by the Genetic Engineering Appraisal Committee (GEAC) for cultivation.

What are challenges related to GM Crops in India?

- The impact of growing GMO crops like GM mustard on the health of the population, the environment (the soil on which it is grown), the food chain, the groundwater, etc., is still unknown.
- GMOs carry risks of 'unintended' effects and toxicity due to changes made at genetic level which would be irreversible
- Weeds are wild plants that soak up nutrients from the soil and do not allow crops to absorb the nutrients.
- GMOs can pose significant allergy risks. Genetic enhancements often combine proteins not contained in the original organism, which can cause allergic reactions for humans.

- GMOs also carry risk of affecting the biodiversity by compromising the gene pool of wild varieties of crops.
- GMOs also carry a financial burden for producers as seeds have to be bought new from the GM crop companies for every crop.
- They also carry ethical concerns like violation of natural organisms' intrinsic values, and tampering with nature by mixing genes among species.

RULES RELATED TO NOTIFY AN "ECOLOGICALLY SENSITIVE AREAS (ESAS)"

CONTEXT

Recently, a senior official mentioned that a **draft notification** classifying parts of the Western Ghats in six States as **Ecologically sensitive areas (ESAs)**, yet to become law after a decade because of States' objections.

About the draft:

- The last time this draft was issued was in July 2022.
- The draft had proposed to declare **13 villages in Wayanad**, spanning the three talukas of Mananthavady, Sulthan Bathery, and Vythiri, as part of an ESA.
- Despite its six iterations, affected States like **Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu** — have objected to specific places that have been included in the ESA regions.
- The dominant sentiment in Kerala was that this notification would subsume agricultural plantations, curtail the State's hydro-electricity plans, and lead to a migration crisis given the State's high population density.

What are Ecologically sensitive areas (ESAs)?

- Ministry Of Environment, Forest and Climate Change notifies Ecologically Sensitive Areas (ESA), which have unique biological resources and requires special attention for their conservation.
- In so far as the **13 States of Indian Himalayan Region** are concerned, 2 ESAs and 92 ESZs have been already notified.
- The last decade has seen significant action around Ecologically Sensitive Areas at the national level.
- The MoEF has defined the term 'ecological sensitivity'. The criteria and procedure for designation of areas as 'ecologically sensitive' have been decided and 'environmental sensitivity' has emerged as an important driver of conservation.

Criteria to declare ESAs:

- The Pronab Sen Committee Report was submitted to the MoEF in September 2000. The report mentions that recommendations of the earlier reports (Report of the MoEF on **Parameters for Determining Ecological**

Fragility, 1990 and the Planning Commission Report on Conserving Ecologically Fragile Ecosystems, 1996) that developed parameters had not been effectively implemented;

- ▶ The report defines 'ecological sensitivity / fragility' as the imminent possibility of permanent and irreparable loss of extant life forms from the world, and of significant damage to the natural processes of evolution and speciation.
- ▶ These criteria are divided further into three categories: species-based, ecosystem-based and geomorphological features-based. The species-based category includes criteria like **endemism, rarity, presence of endangered species** and centres of evolution of domesticated species as primary criteria and centres of lesser-known food plants as auxiliary criteria.
- ▶ One of the most significant recommendations of the Pronab Sen Committee Report states that though its criteria only deal with ecological sensitivity, the protection provided by the EPA should address broader environmental concerns as well.

CONCERNS RELATED TO DEEP-SEA MINING

CONTEXT

Amid concerns raised against mining metals and rare earths from ocean deep floor which can permanently damage fragile marine systems. The **International Seabed Authority, or ISA**, is working on a set of rules to regulate the extraction of raw materials from the ocean floor.

What is Deep-sea Mining?

- Deep-sea mining is the process of retrieving mineral deposits from the deep seabed – the ocean below 200m.
- Depleting terrestrial deposits and rising demand for metals mean deep-sea mining may begin soon, even though research suggests that it could destroy habitats and wipe out species.
- Deep-sea mining should be halted until the criteria specified by the IUCN are met, including the introduction of assessments, effective regulation, and mitigation strategies.

The present state of deep-sea mining:

- By 2025, the ISA wants to define a set of legally binding rules to manage deep-sea mining — without these rules, any planned mining operation will not be able to get started.
- Discussions have been ongoing for several years, but these latest talks have laid bare the extent to which the new rules remain divisive, especially when it comes to the issues of underwater monitoring and avoiding environmental damage.

Exploration for minerals in the Area

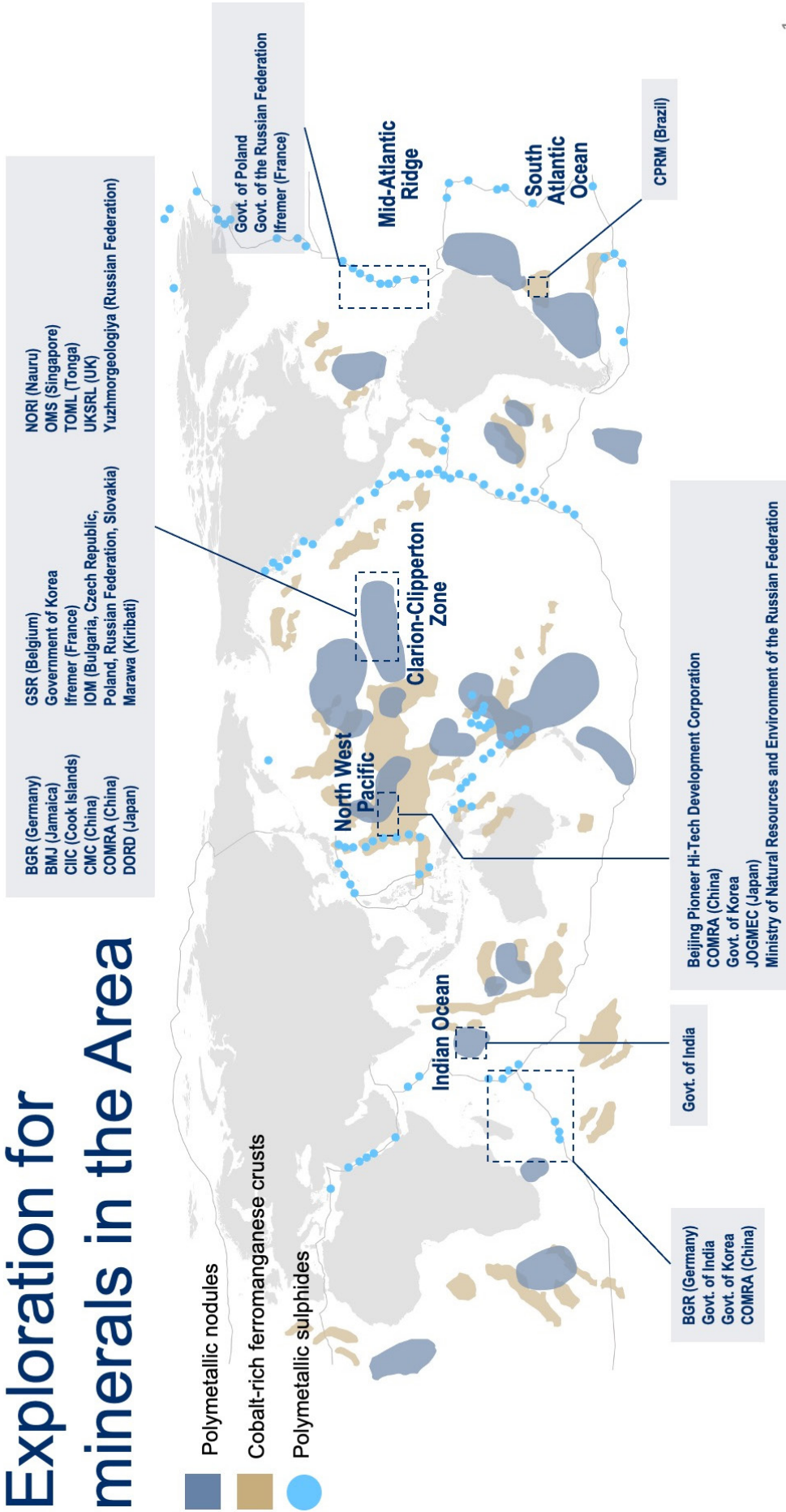


Figure: 04

- Several states, including **Germany, Brazil, and the Pacific Island nation of Palau**, have said they won't agree on the new rules until their environmental impact has been fully investigated.
- China, together with Norway, Japan, and Nauru in the Central Pacific have made mining companies to start putting their plans into action.

Concerns related to Deep-sea Mining:

- Deep-sea mining focuses on extracting manganese nodules and other minerals from the ocean floor in international waters, known as the high seas, which cover over half of the world's oceans.
- These resources are considered the "common heritage of mankind," meaning they belong to everyone and are managed by the International Seabed Authority (ISA) under the United Nations Convention on the Law of the Sea.
- The UN's sea convention mandates that activities in the high seas, including profits from deep-sea mining, must be equitably shared among states. However, groupings like the **Deep-Sea Conservation Coalition** are skeptical about the feasibility of ensuring equitable sharing.

Impacts:

- Disturbance of the seafloor:** The digging and gauging of the ocean floor by machines can alter or destroy deep-sea habitats. This leads to the loss of species, many of which are found nowhere else, and the fragmentation or loss of ecosystem structure and function.
- Sediment plumes:** Deep-sea mining will stir up fine sediments on the seafloor, creating plumes of suspended particles. This is exacerbated by mining ships discharging wastewater at the surface. Scientists are concerned these particles may disperse for hundreds of kilometers, take a long time to resettle on the seafloor, and affect ecosystems and commercially important or vulnerable species.

Present Regulations:

IUCN Members adopted Resolution 122 to protect deep-ocean ecosystems and biodiversity through a moratorium on deep-sea mining unless and until several conditions are met. These include:

- The risks of mining are comprehensively understood and effective protection can be ensured;
- Rigorous and transparent impact assessments are conducted based on comprehensive baseline studies;
- The Precautionary Principle and the 'Polluter Pays Principle' are implemented;
- Policies incorporating circular economic principles to reuse and recycle minerals have been developed and implemented;
- The public are consulted throughout decision-making;
- The governance of deep-sea mining is transparent, accountable, inclusive, effective and environmentally responsible.

PUNJAB'S IRRIGATION PROBLEM AND WATER SCARCITY

CONTEXT

The Punjab government faces a serious funds crunch, and some experts have raised questions over the technical viability of the proposed project.

About the Need for Irrigation Water in Punjab:

- The need for irrigation in Punjab is greater as this is chiefly an agricultural region.
- The total surface area of Punjab is only 1.4% of the total area of India, but it yields approximately 12% of the cereals produced in the country. The major yielded crop is wheat.

Present Concerns:

- The Issue of depleting the water table in the region has increased due to excessive irrigation as 27% area in Punjab was irrigated by canal water and 73% area from groundwater.
- Though the use of **canal-based irrigation** has slowly picked up in the Malwa region of the state, farmers in Majha largely prefer to depend on tubewells.
- Despite the presence of a sizable network of canals, use needs to be optimized even in Malwa as only 21% water of the Bhakra Main Line (BML) canal, 31% of the Ghaggar branch and 45% Patiala feeder are being used for irrigation by farmers.
- It is estimated that the number of tube-wells has shot up to 12.32 lakh in recent years from only 1.92 lakh in 1970.
- Area under irrigation by groundwater has increased from **55% to 73%**, which has become a key concern.

Proposed Malwa Canal:

- Canal Description:** A 149.53-km canal named after the Malwa region in Punjab, originating at the Harike Headworks on the Sutlej River.
- Route and Irrigation Impact:** Flowing parallel to the Sirhind and Rajasthan Feeder canals, it will irrigate 2 lakh acres in seven districts.

Why New Canals are being built?

- Supplementary Water Supply:** The Malwa canal will provide additional water to areas the Sirhind Feeder cannot effectively supply, especially during kharif paddy season.
- Current Supply Issues:** The Ferozepur Feeder struggles to supply the Sirhind Feeder, necessitating rotational canal operation.
- Lift Pumps and Groundwater Concerns:** Over 300 lift pumps operate on the Sirhind Feeder, with farmers demanding canal water due to polluted groundwater.

Why is Ground water significant?

- Groundwater is the largest source of usable, fresh water in the world.
- In many parts of the world, especially where surface water supplies are not available, domestic, agricultural, and industrial water needs can only be met by using the water beneath the ground.
- Pumping water out of the ground at a faster rate than it is replenished over the long-term causes similar problems.

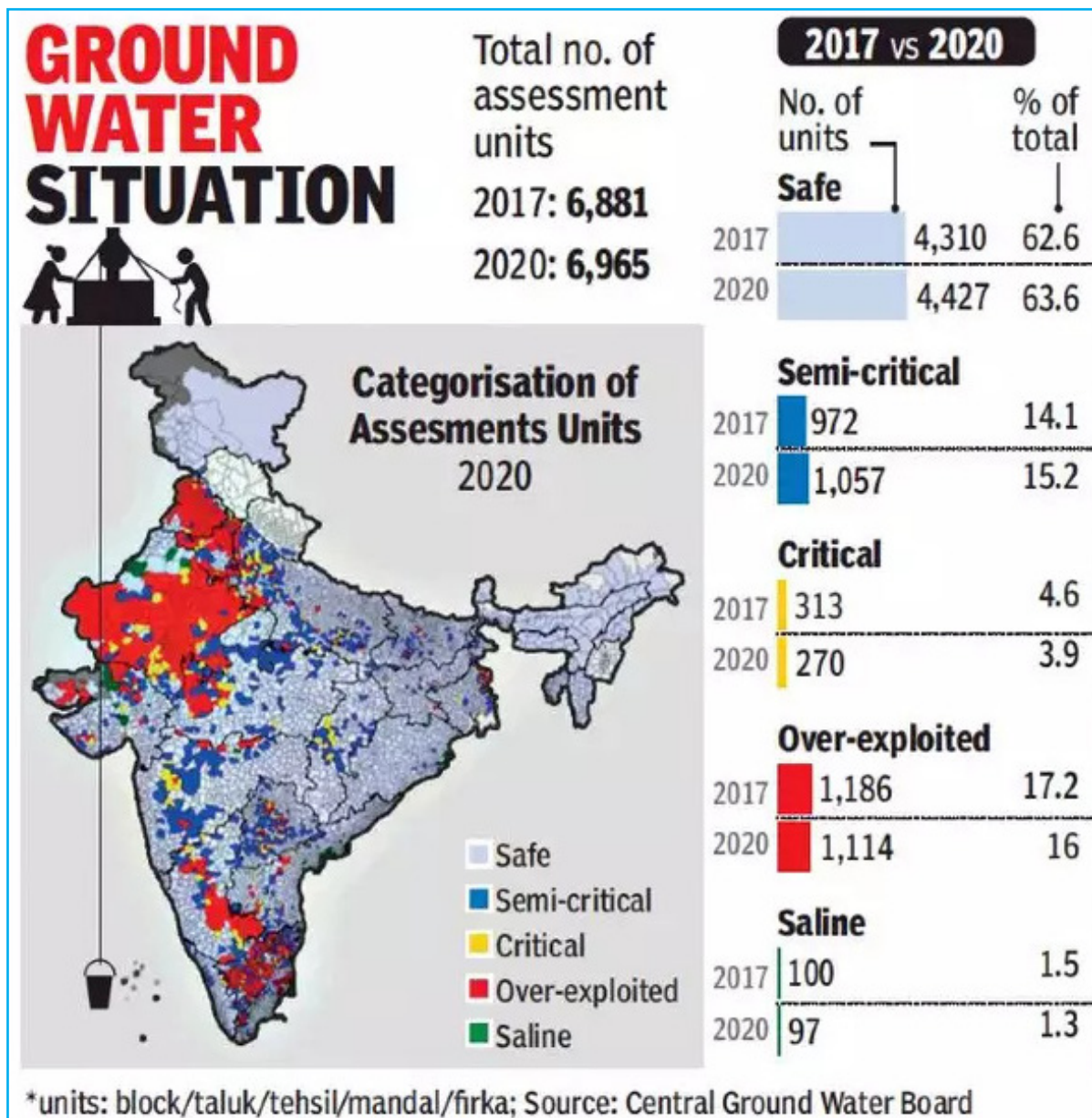
Impacts of Ground water depletion:

Groundwater depletion is primarily caused by sustained groundwater pumping. Some of the negative effects of groundwater depletion:

- Lowering of the Water Table:** Excessive pumping can lower the groundwater table, and cause wells to no longer be able to reach groundwater.

- Increased Costs:** As the water table lowers, the water must be pumped farther to reach the surface, using more energy. In extreme cases, using such a well can be cost prohibitive.
- Reduced Surface Water Supplies:** Groundwater and surface water are connected. When groundwater is overused, the lakes, streams, and rivers connected to groundwater can also have their supply diminished.
- Land Subsidence:** Land subsidence occurs when there is a loss of support below ground. This is most often caused by human activities, mainly from the overuse of groundwater, when the soil collapses, compacts, and drops.
- Water Quality Concerns:** Excessive pumping in coastal areas can cause saltwater to move inland and upward, resulting in saltwater contamination of the water supply.

India's Groundwater usage profile:



MAP: 1

BIO-BITUMEN FOR ROAD CONSTRUCTION

CONTEXT

Union Road Transport Minister Nitin Gadkari has mentioned that the government will allow the mixing of **lignin up to 35% in petroleum-based bitumen** for road construction as a large part of it is imported from other countries.

About Bio-Bitumen:

- Bitumen is a black substance produced through the distillation of crude oil and is widely used for making roads and roofs.
- Bio-bitumen is a bio-based binder derived from renewable sources such as vegetable oils, crop stubble, algae, lignin (a component of wood) or animal manure.
- Bio-bitumen production has been developed as a local alternative to petroleum bitumen, thereby reducing environmental impact.
- It is used in the construction of roads and roofs. It is used as a direct replacement, modifier, and rejuvenator.
- Straw will be used in making roads with bio-bitumen technology, which can reduce pollution.

Properties and Uses:

- The main uses of bio-bitumen are in airtight structures, such as a waterproof binder for road construction (asphalt floors), buildings, and marine structures.
- Due to its high adhesive and waterproof quality, it has been developed as a replacement medium for impermeable and traditional binders in structures.
- **Uses of bio-bitumen as an alternative to petroleum bitumen** : Bio-bitumen in India can be used as a viable

alternative to petroleum bitumen in construction of structures that are natural and environmentally safe. Construction of national highways is expected to be around 12,300 km in the financial year 2023-24, Which is equal to approximately 34 kilometers per day.

Need for Bio-bitumen in India:

- **Reducing import dependence:** Its primary objective is to replace imported bitumen with domestically produced bio-bitumen in the coming decade, thereby reducing foreign exchange expenditure.
- **Addressing environmental concerns:** Bio-bitumen production aims to reduce environmental issues associated with stubble burning by using biomass and agricultural waste as feedstock.
- **Promoting sustainable practices:** By using bio-based materials, this initiative supports sustainable road construction practices and is in line with global environmental standards.
- **Technical development and experimental studies:** The Central Road Research Institute (CRRI) is collaborating with the Indian Petroleum Institute to conduct a pilot study on a 1 km road using bio-bitumen.

Major challenges of bio-bitumen production in India:

- **Cost Effectiveness:** Currently bio-bitumen production can be more expensive than conventional methods.
- **Long term Performance:** More extensive field trials are needed to assess the long-term performance and sustainability of bio-asphalt.
- **Standardization:** For bio-bitumen to be widely adopted, it is necessary to establish clear standards and specifications for it.

Figure: 04

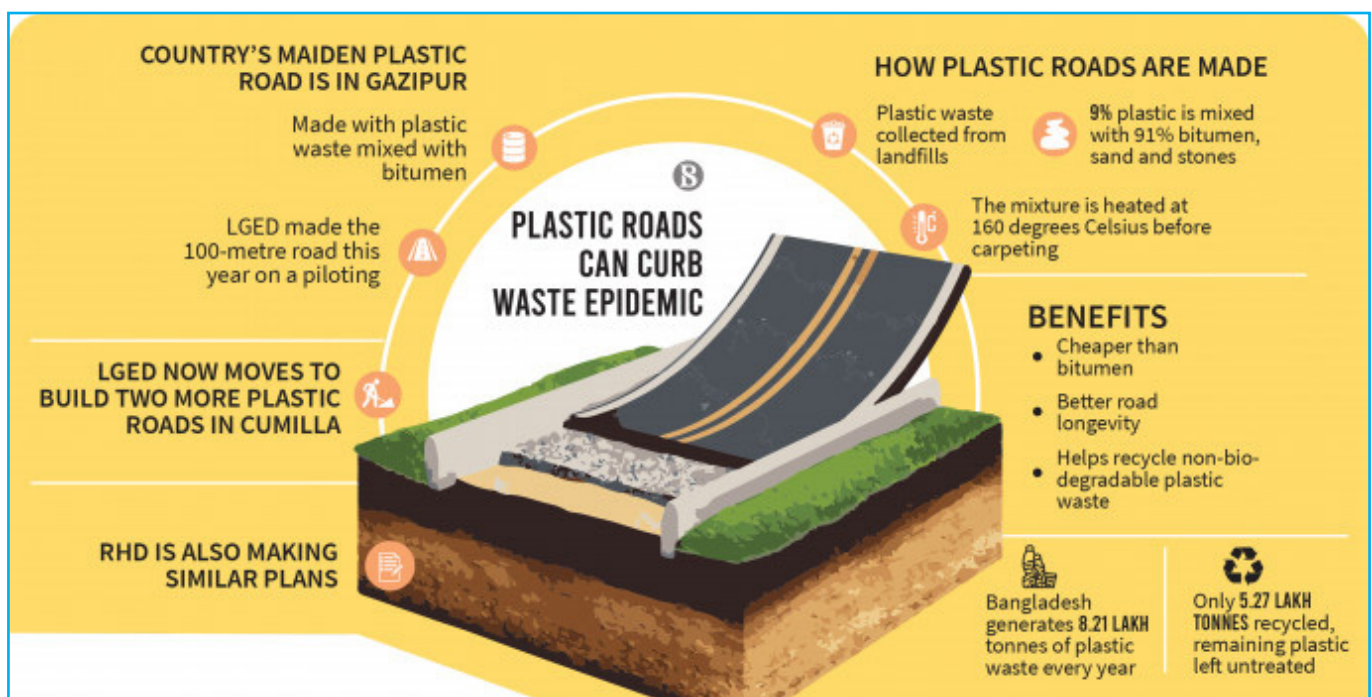


Figure: 05

Other available alternatives:

► Steel slag road technology:

- ◆ Steel slag is a new method of using waste generated during steel production to create stronger and more durable roads.
- ◆ Companies in Hamburg, Germany developed 100% recycled asphalt pavement (RAP) to reduce costs, save energy, and reduce carbon emissions.

► Plastic Road:

- ◆ India has constructed a total of more than 2,500 kilometers of wide plastic roads.
- ◆ Even at the global level, plastic roads are being constructed in more than 15 countries.
- ◆ For example, in Ladakh it is mandatory to use at least 10% plastic waste for road construction.



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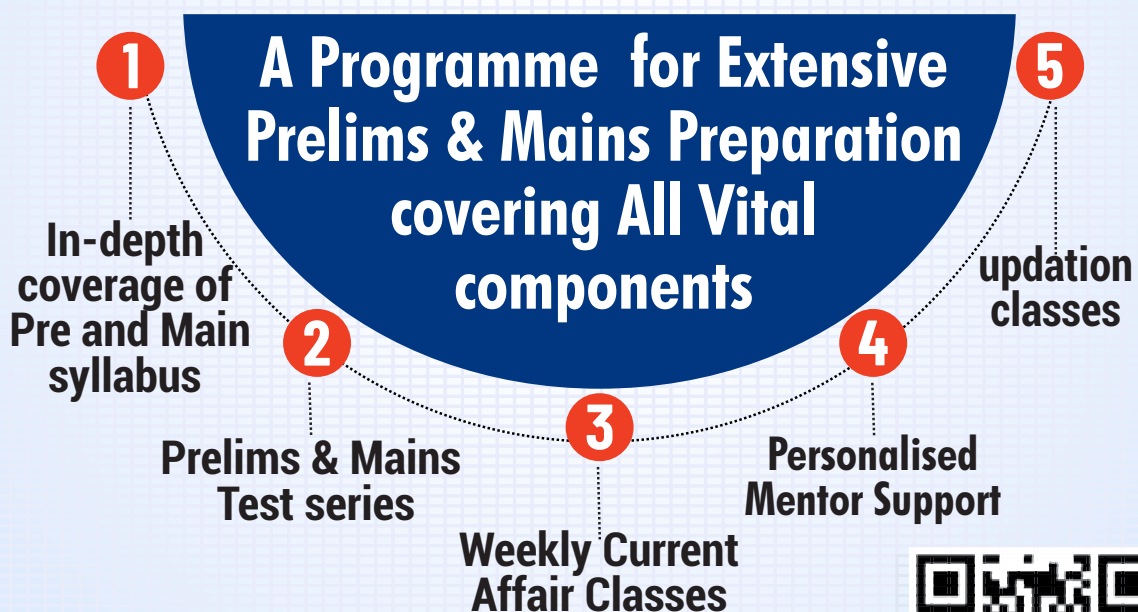
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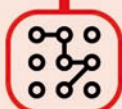


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33

**SUB SECTIONAL
TESTS**
50 QUESTIONS

12

**SECTIONAL TESTS
(GS & CSAT)**
100 & 50 QUESTIONS

07

**CURRENT AFFAIRS
TESTS**
100 QUESTIONS

16

**MOCK TESTS TESTS
(GS & CSAT)**
100 & 80 QUESTIONS



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SECTION - B

QUICK BYTES

CLOUDBURSTS

CONTEXT

Cloudbursts hit various locations in Himachal Pradesh and Uttarakhand, leading to casualties.

What is Cloudburst?

- A cloudburst is a sudden, intense localised rainfall where more than 100 millimetres of rain falls in an hour, often causing flash floods.
- The phenomenon responsible is called '**orographic lift**'. Warm air currents push rain-ready clouds upwards. As they rise, water droplets grow larger and new ones form.
- These dense clouds eventually burst, releasing torrential rain over a small area. This can quickly cause water bodies to overflow.
- Cloudbursts are more common in mountainous regions because the terrain causes moisture-laden air to rise quickly along mountain slopes.
- **Prediction:** A **doppler-radar system** is ideal for predicting cloudbursts. After the 2013 calamity, there were calls to equip monitoring stations in cloudburst-prone areas with this technology.

INDO-PACIFIC ECONOMIC
FRAMEWORK FOR
PROSPERITY (IPEF)

CONTEXT

India has been elected as the Vice Chair of the Supply Chain Council under the Indo-Pacific Economic Framework for Prosperity (IPEF).

About Indo-Pacific Economic Framework
for Prosperity (IPEF):

- **Launch:** May 2022 in Tokyo, Japan.
- **Members:** 14 countries from the Indo-Pacific region, including the USA, India, Japan, Korea, and others.
- **Objective:** To enhance economic cooperation, growth, stability, and prosperity among partner countries in the region.
- **Key Pillars of IPEF:** Trade, Supply Chain Resilience, Clean Economy, Fair Economy, Supply Chain Resilience
- **Significance:**
 - ▶ IPEF focuses on strengthening and diversifying supply chains to make them more resilient against disruptions.
 - ▶ It enhances the competitiveness of critical supply chains in the region.
- **India's Role:** India's election as Vice Chair of the Supply Chain Council signifies its critical role and commitment to enhancing supply chain resilience and economic cooperation in the Indo-Pacific region. This involvement aligns with India's broader economic strategy and its efforts to integrate more deeply into global supply chains.

BREACH OF PRIVILEGE
NOTICES

CONTEXT

Privilege Motion has been moved against PM Modi in Lok Sabha.

Lawmaker’s Privileges in India

Lawmakers in India, including Members of Parliament (MPs) and Members of Legislative Assemblies (MLAs), have specific privileges to ensure they can perform their duties effectively. These privileges include:

- **Protection Against Misinformation:** Lawmakers are safeguarded against false information within the legislative House.
- **Speech Immunity:** Speeches made by lawmakers in the House cannot be challenged in court.
- **Right to Reply:** Lawmakers have the right to respond if they are mentioned by another member.
- **Prior Information:** Lawmakers must be informed about any government policy or law changes during a legislative session before they are made public.

What Constitutes a Breach of Privilege?

- A breach of privilege occurs when:
 - **Unsubstantiated Comments:** An unsubstantiated comment is made against a member or minister.
 - **Maligned Reputation:** The reputation of an MP is damaged.
 - **Obstruction of Duties:** A lawmaker is hindered from performing their duties.
- In such cases, the affected lawmaker can file a complaint to the Speaker (or the Chairman in the case of Rajya Sabha) claiming that their privileges have been breached.
- Once a breach of privilege notice is moved, the Speaker examines its feasibility.
- **Referral to Committee:** If the Speaker consents, the notice is sent to the privileges committee for detailed examination.
- **Committee Review:** The committee calls both the accused and the complainant before submitting its report to the House.
- **Further Action:** The House decides on the necessary action based on the committee’s report.



FACT BOX

Rules Governing Privilege Notices in India

India’s Parliament has specific rules for moving privilege notices:

- **Rule 222:** A member may raise a question involving a breach of privilege with the Speaker’s consent.
- **Rule 223:** A member wishing to raise a question of privilege must give notice in writing to the Secretary General by 10.00 AM on the day the question is proposed to be raised.

BANKS MAY OFFER SMALL LOANS ON UPI AGAINST FDS

CONTEXT

Private banks are likely to target new-to-bank customers for credit on UPI against fixed deposits as collateral. Although the **National Payments Corporation of India (NPCI)** is yet to launch a **credit-line-on-UPI service**, banks have begun working on their structures.

About the update:

- “Pre-sanctioned Credit Line at Banks through UPI” is an innovative financial offering designed to revolutionize the lending landscape. This product empowers individuals and businesses to access pre-sanctioned credit lines from banks.
- It facilitates the availability of low-ticket, high-volume retail loans, fostering economic growth and enhancing financial inclusion.
- Leveraging advanced technologies such as data analytics and artificial intelligence, banks can identify credit line opportunities for customers and merchants engaged in significant UPI-based digital payments.
- Since the customer is going to use UPI in which the customer is always connected, and available real-time the banks can start from the low-ticket credit lines and go higher up based on consumer behavior and repayment patterns.

National Payments Corporation of India (NPCI):

- The National Payments Corporation of India (NPCI) is an umbrella organization for operating retail payments and settlement systems in India.
- It is an initiative of the Reserve Bank of India (RBI) and the Indian Banks’ Association (IBA) to promote cashless transactions in the country.
- NPCI provides various retail payment and settlement systems such as Unified Payments Interface (UPI), Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), Real-Time Gross Settlement (RTGS), Bharat Bill Payment System (BBPS), and National Automated Clearing House (NACH).
- These services facilitate seamless and efficient fund transfers across different banks and payment platforms.

DIRECT SEEDING METHOD

CONTEXT

Private sector investment in agriculture technologies will help to boost crop yields or cutting production costs for Indian farmers majorly like the Direct Seeding Method for Rice Cultivation.

What is Direct Seeding Method?

- Direct Seeding of Rice refers to the process of establishing a rice crop from seeds sown in the field rather than by transplanting seedlings from the nursery.

- It has been recognized as the principal method of rice establishment since 1950's in developing countries.
- The cultivation technique involves fertilising and planting directly into the soil in one or two steps. The soil is mildly disturbed by the seeding machine.
- Direct seeding is can be done by sowing of pre-germinated seed into a puddled soil (wet seeding) or standing water (water seeding) or prepared seedbed (dry seeding).



FACT BOX

- Rice (*Oryza sativa*) is the seed of the grass species *Oryza glaberrima* or *Oryza sativa*.
- With a high carbohydrate content, rice is known to provide instant energy.
- Rice consumes about 4,000 - 5,000 litres of water per kg of grain produced. But it is no aquatic crop: it has great ability to tolerate submergence. Water creates unfavourable conditions for weeds, by cutting off sunlight and aeration to the ground.
- India is the largest consumer of rice crop. Not only this, India is also the second largest producer of rice, after China.

TIGER DEATHS IN MADHYA PRADESH

CONTEXT

Recently, concerns were raised by a **Special Investigation Team (SIT)** that was looking into the deaths of 43 tigers between 2021 and 2023 in Madhya Pradesh's **Bandhavgarh Tiger Reserve (34 deaths)** and **Shahdol Forest Circle (9 deaths)** regarding medical ignorance of department.

About SIT Report:

- According to the report, there was a "lack of interest by higher authorities and Forest Range Officers in discharging their duties, resulting in arrests in only two out of five cases where unnatural causes of death".
- In many cases where tigers were found dead due to electrocution and there was a lack of information on revenue, and private land ownership in the region.

Tiger Population and Conservation:

- The number of tigers in **Madhya Pradesh** has increased from 526 to 785 in the last four years. It is followed by **Karnataka (563)** in second place and **Uttarakhand (560)** in third place.

HOW THE TIGERS DIED, ACCORDING TO SIT REPORT

Reason for death	Bandhavgarh Tiger Reserve	Shahdol forest circle
Electrocution	3	3
Infighting	17	0
Disease/illness	4	0
Senility	2	0
Body parts seized	2	0
Poisoning	0	1
Road accident	0	1
Unconfirmed	6	4
Total	34	9

Figures for 2021-2023 period



FIGURE: 01

Project Tiger:

- ▶ Project Tiger is a wildlife conservation initiative in India that was launched in 1973.
- ▶ The primary objective of Project Tiger is to ensure the survival and maintenance of the tiger population in their natural habitats by creating dedicated Tiger Reserves.
- ▶ Starting with only nine reserves covering 9,115 sq. km, the project marked a paradigm shift in wildlife conservation efforts.

ARTIFICIAL LIGHT POLLUTION

CONTEXT

According to a new study, High levels of artificial light at night (ALAN) are making tree leaves tougher and harder for insects to eat, posing a threat to urban food chains.

About Light Pollution:

- Light pollution, defined as the presence of unwanted, inappropriate, or excessive artificial lighting, can have numerous negative impacts.
- These range from disturbing migrating birds and newly hatched sea turtles to marring wilderness experiences and landscape beauty.
- Light pollution has increased about 10 percent each year over the past decade, making it one of the most drastic changes humans have made to the environment

Impacts:

- ▶ Artificial lights that run all night, like streetlights, can make leaves grow tougher and less appetizing for insects.
- ▶ Artificial light has increased levels of night-time brightness by almost 10%: most of the world's population experiences light pollution every night. Because plant properties affect their interactions with other plants and animals, any changes to plants caused by artificial light could have a significant impact on the ecosystem.

Effect on Mammals and Birds:

- ▶ **Mammals** – Mammals such as bats, raccoons, coyotes, deer, and moose can experience difficulty foraging for food at night due to over illumination. They risk exposure to natural predators and increased mortality due to night vision impairment. They also experience a decline in reproduction that leads to a shrinking population.
- ▶ **Birds** – Birds such as owls and nighthawks use moonlight and starlight to hunt and migrate at night. Artificial lights sources can overwhelm natural light sources, causing birds to be drawn to or fixated on the artificial lights. This results in birds deviating from their intended migration route, flying until they experience exhaustion and collapse.

Recent Interventions:

Dark sky reserves:

- ▶ A dark-sky preserve (DSP) is an area, usually surrounding a park or observatory, that restricts or reduces light pollution or maintains and protects naturally dark night skies. Different terms have been used to describe these areas as national organizations and governments have worked independently to create programs.

PUMPED STORAGE TECHNOLOGY

CONTEXT

Budget 2024-25 promised that "a policy for promoting **pumped storage projects** will be brought out for electricity storage and facilitating smooth integration of the growing share of renewable energy with its variable and intermittent nature."

About the Update:

What is Pumped storage?

- ▶ Pumped storage hydropower (PSH) is a type of hydroelectric energy storage. It is a configuration of two water reservoirs at different elevations that can generate power as water moves down from one to the other (discharge), passing through a turbine.
- ▶ The system also requires power as it pumps water back into the upper reservoir (recharge).
- ▶ PSH acts similarly to a giant battery, because it can store power and then release it when needed.

Why Pumped storage technology is required?

- ▶ Pumped storage hydropower (PSH) is one of the most-common and well-established types of energy storage technologies and currently accounts for 96% of all utility-scale energy storage capacity in the United States.
- ▶ PSH facilities store and generate electricity by moving water between two reservoirs at different elevations.
- ▶ Vital to grid reliability from the pumped storage hydropower fleet includes about 22 gigawatts of electricity-generating capacity and 550 gigawatt-hours of energy storage with facilities in every region of the country.

Benefits:

- PSH provides energy storage and other grid services that can help to integrate additional renewable resources, such as wind and solar, with the power system.
- PSH is also the only currently commercialized technology for long-duration storage, which may become increasingly valuable as the power system evolves to include more variable renewables.

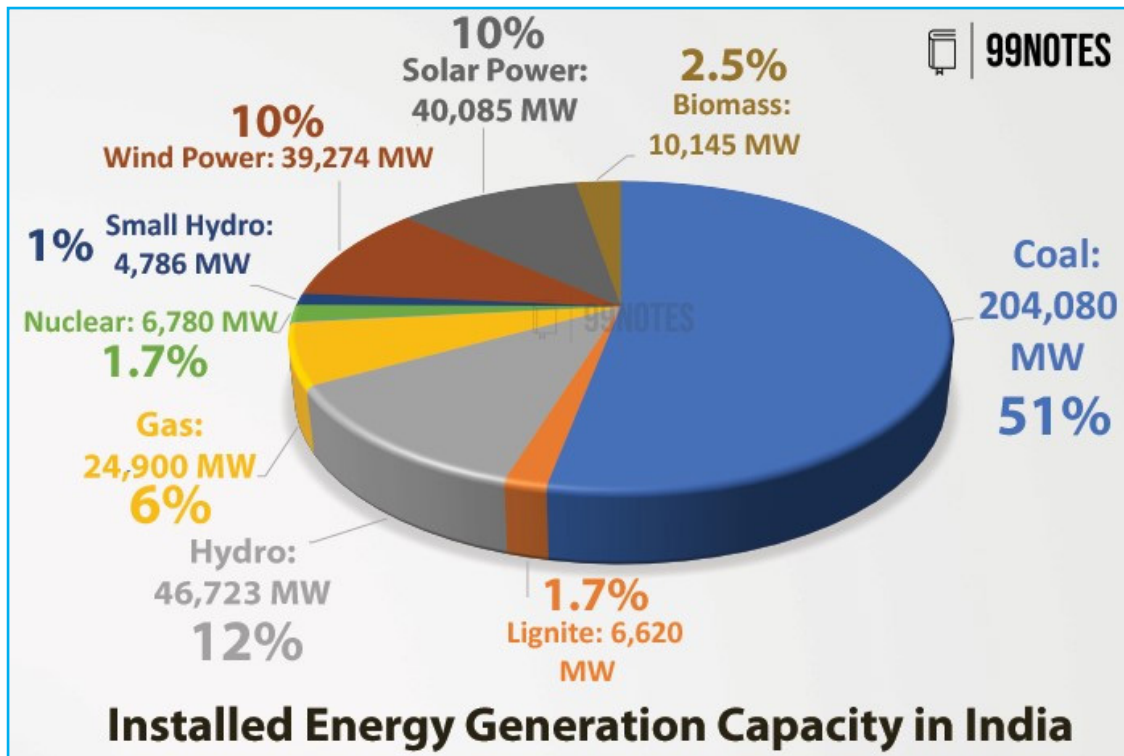


FIGURE: 02

LYME DISEASE

CONTEXT

The global spread of Lyme disease is being fueled by climate change, making diagnosis and treatment more challenging. Lyme disease is a bacterial infection caused by *Borrelia burgdorferi*, which is transmitted to humans through the bite of infected ticks.

About the disease:

- **Cause and Transmission:** Lyme disease is caused by the bacterium *Borrelia burgdorferi*, which is transmitted to humans through the bite of infected black-legged ticks, commonly known as deer ticks.
- **Symptoms and Stages:** Early symptoms include fever, chills, headache, fatigue, muscle and joint aches, and swollen lymph nodes. A characteristic sign is the "bull's-eye" rash, known as erythema migrans. If untreated, the infection can spread to joints, the heart, and the nervous system.
- **Treatment:** Lyme disease is typically treated with antibiotics. Early-stage Lyme disease is often treated with oral antibiotics such as doxycycline, amoxicillin, or cefuroxime. Later stages may require intravenous antibiotics for more severe cases.

Prevention: Preventive measures include avoiding tick-infested areas, using insect repellent, wearing protective clothing, performing regular tick checks after outdoor activities, and promptly removing any attached ticks. Reducing tick habitats around homes by clearing tall grasses and using pesticides can also help prevent Lyme disease.

REMOTE SENSING TECHNOLOGIES

CONTEXT

Recently the Parliament session has underlined the difficulties around predicting landslides, calling out the inadequacy of **remote sensing technologies**.

What is Remote Sensing?

- Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft). Special cameras collect remotely sensed images, which help researchers "sense" things about the Earth. Some examples are:
 - ▶ Cameras on satellites and airplanes take images of large areas on the Earth's surface, allowing us to see much more than we can see when standing on the ground.
 - ▶ Sonar systems on ships can be used to create images of the ocean floor without needing to travel to the bottom of the ocean.
 - ▶ Cameras on satellites can be used to make images of temperature changes in the oceans.

Some specific uses of remotely sensed images of the Earth include:

- Large forest fires can be mapped from space, allowing rangers to see a much larger area than from the ground.
- Tracking clouds to help predict the weather or watching erupting volcanoes, and help watching for dust storms.

- Tracking the growth of a city and changes in farmland or forests over several years or decades.
- Discovery and mapping of the rugged topography of the ocean floor (e.g., huge mountain ranges, deep canyons, and the “magnetic striping” on the ocean floor).

- It is **one of the 17 elementary particles that make up the Standard Model** of particle physics, which is scientists’ **best theory about** the behaviors of the universe’s most **basic building blocks**.
- Higgs boson plays such a fundamental role in subatomic physics that it is sometimes **referred to as** the **“God particle.”**

HIGGS BOSON

CONTEXT

In a recent finding it was found that the Higgs boson is responsible for the mass and interactions of all the particles making elementary particles interacting with a field and dubbed the Higgs field.

About Higgs Boson:

- The Higgs boson is the **fundamental force-carrying particle of the Higgs field**, which is **responsible for granting fundamental particles their mass**.
- This field was first proposed in the mid-sixties by **Peter Higgs**, for whom the particle is named.
- The particle was finally **discovered on July 4, 2012, by researchers** at the Large Hadron Collider (LHC), the most powerful particle accelerator in the world, located at the European particle physics laboratory CERN, Switzerland.
- The LHC confirmed the existence of the Higgs field and the mechanism that gives rise to mass and thus completed the standard model of particle physics.

Features:

- The Higgs boson has a **mass of 125 billion electron volts**, meaning it is **130 times more massive than a proton**.
- It is also **chargeless with zero spin**, a quantum mechanical equivalent to angular momentum.
- It is the **only elementary particle with no spin**.

What is a Boson?

- A boson is a **“force carrier” particle** that comes into play **when particles interact** with each other, with a **boson exchanged** during this interaction. For example, **when two electrons interact**, they **exchange a photon**, the force-carrying particle of electromagnetic fields.
- Because quantum field theory describes the microscopic world and the quantum fields that fill the universe with wave mechanics, a boson can **also be described as a wave in a field**.
- So, a photon** is a particle and a wave that **arises from an excited electromagnetic field**, and the **Higgs boson** is the particle or “quantized manifestation” that **arises from the Higgs field when excited**.

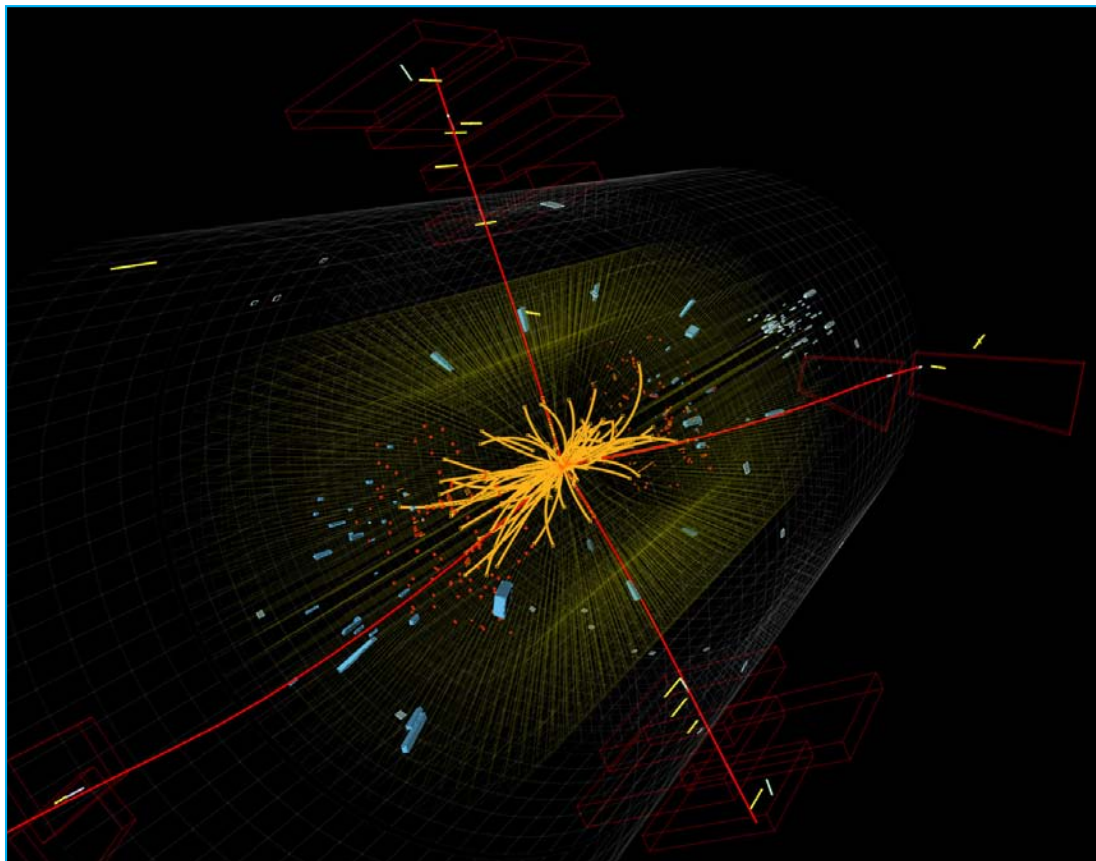


FIGURE: 03

- This mass-granting phenomenon also only applies to fundamental particles like electrons and quarks. Particles like protons, made up of quarks, get most of their mass from the binding energy that holds their constituents together.

SICKLE CELL ANAEMIA

CONTEXT

- ▣ In a reply in Rajya Sabha, the Union health minister has mentioned that a total of 3.85 crore people in 17 identified States have been screened for sickle cell anaemia as of July 31, 2024.
- ▣ The National Sickle Cell Anaemia Elimination Mission (NSCAEM) was launched by Prime Minister Narendra Modi from Madhya Pradesh on July 1, 2023.

What is Sickle Cell Disease?

- It is an inherited blood disorder.
- It affects hemoglobin, the molecule in red blood cells that delivers oxygen to cells throughout the body.
- People with this disease have atypical hemoglobin molecules called hemoglobin S, which can distort red blood cells into a sickle, or crescent, shape.
- These sickle cells also become rigid and sticky, which can slow or block blood flow.

What causes it?

- The cause of Sickle cell disease is a defective gene, called a sickle cell gene.
- A person will be born with sickle cell disease only if two genes are inherited—one from the mother and one from the father.

▣ Symptoms:

- ▶ Early stage: Extreme tiredness or fussiness from anemia, painfully swollen hands and feet, and jaundice.
- ▶ Later stage: Severe pain, anemia, organ damage, and infections.

▣ Treatments:

- ▶ The only cure for this disease is bone marrow or stem cell transplantation.
- ▶ However, some treatments can help relieve symptoms, lessen complications, and prolong life.

National Sickle Cell Anaemia Elimination Mission:

- It was announced as part of the Union Budget 2023.
- **Vision:** Eliminate sickle cell disease (SCD) as a public health problem in India before 2047.
- The overall aim is to enable access to affordable and quality health care to all SCD patients and to lower the

prevalence through awareness, change of practices and screening interventions.

- The mission will entail awareness creation, universal screening of seven crore people in the 0-40 years age group in affected tribal areas and counseling through collaborative efforts of central ministries and state governments.
- Initially, the focus shall be on 17 states with higher prevalence of SCD viz., Gujarat, Maharashtra, Rajasthan, Madhya Pradesh, Jharkhand, Chhattisgarh, West Bengal, Odisha, Tamil Nadu, Telangana, Andhra Pradesh, Karnataka, Assam, Uttar Pradesh, Kerala, Bihar and Uttarakhand.

RASHTRIYA VIGYAN PURASKAR

CONTEXT

The government has announced the first set of **Rashtriya Vigyan Puraskar**, or national awards for scientists.

About the Award:

- **Vigyan Ratna Awards:** These awards will recognise lifetime achievements & contributions made in any field of science and technology.
- **Vigyan Shri Awards:** These awards will recognise distinguished contributions to any field of science and technology.
- **Vigy1an Team Awards:** These awards are to be given to a team comprising of three or more scientists/researchers/innovators who have made an exceptional contribution working in a team in any field of science and technology.

▣ Vigyan Yuva-Shanti Swarup Bhatnagar (VY-SSB):

- ▶ These awards are the highest multidisciplinary science awards in India for the young scientists (maximum 45 years).
- ▶ They are named after Shanti Swarup Bhatnagar, the founder and director of the Council of Scientific & Industrial Research (CSIR), who was also a renowned chemist and visionary.

▣ Awards Open to PIOs:

- ▶ Persons of Indian origin (PIOs) will now be eligible for the new awards, but only one PIO may receive the Vigyan Ratna.
- ▶ Three PIOs each can be selected for the Vigyan Shri and the VY-SSB.
- ▶ However, PIOs will not be eligible for the Vigyan Team awards.

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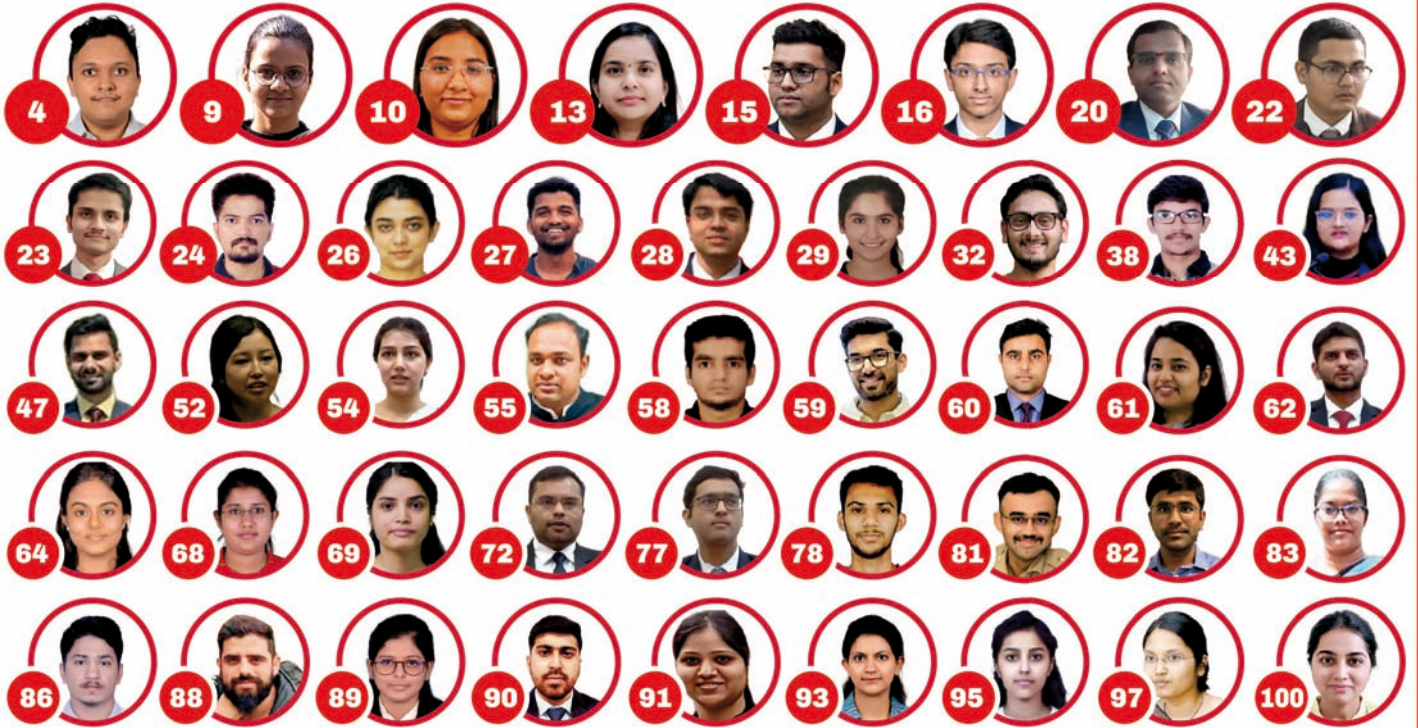


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