

# CURRENT AFFAIRS

WEEKLY

WEEK: 4  
FEBRUARY  
2024

## MAINS

- GS- I**
  - ▣ THE EMPTY PLANET
  - ▣ SURROGACY RULES CHANGED IN INDIA
- GS- II**
  - ▣ THE RED SEA CRISIS & IMEC
  - ▣ NATO'S EXPANSION
  - ▣ PROTECTIONISM & IMPACT ON INDIAN ECONOMY
- GS- III**
  - ▣ DIGITAL PUBLIC INFRASTRUCTURES (DPIS)
  - ▣ HOUSEHOLD CONSUMPTION EXPENDITURE SURVEY (HCES)
  - ▣ GREEN AMMONIA PRODUCTION
  - ▣ INDIA'S FIRST INDIGENOUS SPACE MISSION
  - ▣ '10,000 GENOME' PROJECT COMPLETED
  - ▣ SOFT LANDING ON MOON
  - ▣ MEXICO: WORLD'S 'SINKING' CITY
  - ▣ CARBON CAPTURE AND STORAGE (CCS)

## PRELIMS

### ART & CULTURE

- ▣ Temples from Badami Chalukyan period
- ▣ Language Atlas of India

### HISTORY

- ▣ The City of Dwarka

### GEOGRAPHY

- ▣ Pancheshwar Multipurpose Project

### POLITY &

### GOVERNANCE

- ▣ SC Rejects Writ Petition on Criminal Appeal Delay

### SCIENCE &

### TECHNOLOGY

- ▣ AR and VR in the classroom
- ▣ Bitcoin Halving
- ▣ PAPA detects solar wind impact of CMEs
- ▣ Guinea worm disease inched closer to eradication
- ▣ India Achieves Kala

Azar Elimination Target in 2023

### ENVIRONMENT

- ▣ China Ravaging Africa's Donkey Population
- ▣ India's first green hydrogen fuel cell inland waterway vessel

### SCIENCE &

### TECHNOLOGY

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- ▣ INSAT-3DS: ISRO's meteorological satellite
- ▣ Astronomers Find What May Be the Universe's Brightest Object

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- ▣ Google unveils 'Gemma'
- ▣ Green bond issuances fall in FY24
- ▣ Dairy Farming in India

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- ▣ Grey-zone warfare
- ▣ India's diplomatic mission in Albanian capital
- ▣ Amrit Bharat Station Scheme
- ▣ New chapter in the Constitution
- ▣ Grant PC to women coast guard officers: SC
- ▣ Election of MP to Rajya Sabha
- ▣ Kaziranga National Park
- ▣ Solar installations fall 44% in 2023: Report
- ▣ TATA discovers tablet to treat Cancer
- ▣ Government approves mega Navy deal for BrahMos missiles
- ▣ All Odisha Tiger Estimation (AOTE) report 2023-24

## SPECIALS

- ◆ India's ambition to become a 'science power'

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## DISCLAIMER

*T*he 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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MOCK TEST - 1: 31 MARCH, 2024

MOCK TEST - 2: 14 APRIL, 2024

MOCK TEST - 3: 05 MAY, 2024

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PAPER 1: 9:30 AM to 11:30 AM

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## SECTION

## A

**MAINS ARTICLES**

- ☞ The Empty Planet
- ☞ Surrogacy rules changed in India
- ☞ The Red Sea Crisis & IMEC
- ☞ NATO's Expansion
- ☞ Protectionism & impact on Indian Economy
- ☞ Digital Public Infrastructures (DPIs)
- ☞ Household Consumption Expenditure Survey (HCES)
- ☞ Green Ammonia Production
- ☞ India's First Indigenous Space Mission
- ☞ '10,000 genome' project completed
- ☞ Soft Landing on Moon
- ☞ Mexico: World's 'sinking' city
- ☞ Carbon capture and storage (CCS)

## 1. THE EMPTY PLANET

**Context:** The global trend towards shrinking populations due to **declining birth rates** despite advances in healthcare and poverty reduction necessitates a comprehensive understanding of its implications on society and the economy.

- Over the last five decades, the global fertility rate has halved to 2.3, falling below the replacement rate of 2.1 in most advanced economies and following a similar downward trajectory in developing nations.

### 1: Dimension: Implications on Society:

- Shift in Priorities:** The declining birth rates reflect changing priorities among younger generations, with factors like dual-income families and evolving perceptions of marriage and parenthood influencing decisions on family size.
- Impact of Education:** Higher education levels correlate with lower fertility rates, signaling a transition from high fertility and low education to lower fertility and higher education in many societies.

### 2: Dimension : Implications on Economy:

- Aging Populations:** Shrinking birth rates contribute to aging populations, increasing the burden on working-age individuals to support both children and elderly parents.
- Workforce Challenges:** With fewer births, countries face shrinking workforces, posing challenges for **economic productivity, tax revenues, and sustaining growth**.

### 3: Dimension : Demographics and Economic Growth:

- Labour Supply:** Declining working-age populations globally **strain labour markets and social security systems**, posing **significant challenges for government programs**.
- Gender Dynamics:** In countries like **South Korea**, gender disparities in the workforce and societal expectations present obstacles to balancing career and family responsibilities.

#### Case Studies:

- South Korea:** Challenges include gender inequality, high costs of child-rearing, and societal pressures, highlighting the trade-offs between career and family.
- Singapore:** Factors such as financial costs, pandemic disruptions, and work-life balance issues contribute to declining birth rates.

## 4: Dimension : Finding Balance:

- Learning from Successes:** Nations like France and Denmark, with comparatively higher fertility rates, offer insights into policies and societal norms that support family formation while addressing modern challenges.
- The declining birth rates worldwide signify profound shifts in societal norms and economic dynamics, necessitating proactive measures to ensure sustainable population growth and mitigate the adverse effects of aging populations.
- Policymakers must prioritize initiatives that promote **work-life balance, address gender disparities, and provide adequate support** for families to foster a conducive environment for raising children and sustaining economic vitality.

## 2. SURROGACY RULES CHANGED IN INDIA

**Context:** The Centre has tweaked the surrogacy rules, bringing relief for married couples aspiring to become parents.

### 1: Dimension : Regulation of Surrogacy in India

- Surrogacy is a method of **assisted reproduction** where **intended parents** work with a **gestational surrogate** who will carry and care for their baby(ies) until birth.
- In the practice, one woman carries the child for another with the intention that the child should be handed over after birth.
- Such a surrogacy arrangement may be **altruistic** or **commercial** in nature.
- Intended parents use surrogacy to start or grow their families when they can't do so on their own.
- The Centre and State governments are expected to constitute a National Surrogacy Board (NSB) and State Surrogacy Boards (SSB) respectively, within 90 days of the passing of the Act.
- This body is tasked with enforcing standards for surrogacy clinics, investigating breaches and recommending modifications.

### 2: Dimension : The new Rules (Surrogacy (Regulation) Amendment Rules, 2024)

- The **Ministry of Health and Family Welfare** has amended the **Surrogacy (Regulation) Rules, 2022** to allow the use of a **donor gamete – ova or egg cells and sperm** – if one of the "intending couple" has a medical condition.
- The notification comes nearly a year after the Centre banned the use of donor gametes in surrogacy.



### ◆ Changes in surrogacy rules

- The notification by the Centre states that both gametes need not come from the "intending couple" in case the husband or the wife have a medical condition.
- In case when the District Medical Board certifies that either husband or wife constituting the intending couple suffers from medical condition necessitating use of donor gamete, then surrogacy using donor gamete is allowed subject to the condition that the child to be born through surrogacy must have atleast one gamete from the intending couple.
- ◆ However, the Surrogacy (Regulation) Amendment Rules, 2024 will not be applicable for widowed or divorced women.
- ◆ Indian laws bar single unmarried women from having children through surrogacy .

### 3: Dimension : Earlier Rules

- ◆ In 2023, the Centre through **Rule 7** under the '**Consent of the Surrogate Mother and Agreement for Surrogacy**' of the **Surrogacy (Regulation) Act** had mandated that both the egg and the sperm should come from the intending couple.

**Mayer-Rokitansky-Kuster-Hauser (MRKH) Syndrome** is a rare congenital disorder that affects production of eggs and can cause infertility

- ◆ The latest amendment came after the Supreme Court last year received petitions from women across the country after it allowed a woman with a **rare MRKH syndrome** to avail surrogacy with a donor egg.

### 4: Dimension : Impact of the new rules

- ◆ The new rules will relief to couples struggling with infertility problems.
- ◆ While very few people need surrogacy — it is only meant for those who do not have a uterus, have a damaged uterus, or have a thin uterine lining — among those who do, the women are likely to be older, having tried other methods of getting pregnant before considering surrogacy.

### 5: Dimension : Challenges to Surrogacy

- ◆ **Unawareness:** A surrogate mother is largely unaware of existing legal or medical procedures and the risks involved in the process.
- ◆ **No legal recognition:** Perhaps the most awful disadvantage is that surrogate mother is not legally recognized as "workers" in India since they do not sell mental or manual labour in the traditional sense of the term. Consequently, they do not have any legal rights.
- ◆ **No international recognition:** There are no internationally recognised laws for surrogacy, so many parents and children can be left vulnerable - or even stateless.

- ◆ **Profit-making profession:** In India, surrogacy is a \$2.3-billion industry which allowed medical practitioners to earn huge profits, without any rules and regulations governing their practice.
- ◆ **Risk to life:** Surrogacy puts the lives of poor women, who rented out their wombs to a surrogate couple to earn a living, at great risk due to repeated pregnancies.
- ◆ **Exploitation of Fundamental Rights:** The practice destroys the surrogate mother's fundamental rights. While the surrogate mother gets a very small amount, doctors and other professionals thrive on huge profits.
- ◆ **Injustice:** While the surrogate mother could not refuse to give up the child, the intended parents had the right to refuse the child.

### Mains Question

- Q. What are the recent amendments to surrogacy rules in India and their implications for infertile couples and surrogate mothers?

## 3. THE RED SEA CRISIS & IMEC

**Context:** The global supply chain turmoil, prompted by the prolonged Red Sea crisis, underscores the urgency of exploring alternative trade routes like the **India-Middle East-Europe Economic Corridor (IMEC)** introduced during the **2023 G-20 summit**.

### 1: Dimension : Significance of Red Sea route

- ◆ **Global trade:** The Red Sea owes its strategic importance for global trade to the **Bab el-Mandab Strait** which lies between **Yemen and Djibouti**.
- ◆ **Busiest route:** It is one of the world's busiest cargo and oil transit points with almost **12% of international merchandise trade passing through it**.

### India's share

- India's trade with **European and North African countries** flows entirely through the Red Sea route which is almost 24% of its exports and 14% of its imports.
- In the year 2022-23, India's bilateral trade with Europe and North Africa stood at \$189 billion and \$15 billion respectively.

- ◆ **Clear impact of re-routing:** An immediate consequence of the Red Sea conflict has been that major container and oil carriers have been forced to re-route shipments via the **Cape of Good Hope**. The re-routing has led to
  - rising ocean freight
  - inflated insurance costs

- ▶ longer voyage times leading to delays and shortage of products
- ▶ increased transportation costs
- ▶ higher shipping costs leading to increased commodity prices

## 2: Dimension : Impact of this turmoil on India

- ❖ **Drop in shipment:** The rising fears among traders have already seen a drop in Indian shipments.
  - ▶ Rising threats have prompted Indian exporters to hold back around 25% of their cargo ships transitioning through the **Red Sea**.
- ❖ **Opportunity for China to promote BRI:** As global supply chains are battling delayed shipments and rising costs, China is actively projecting **China-Europe freight trains**, which are part of the **Belt and Road Initiative (BRI)**, as an alternate route.

## Why IMEC is not receiving attention?

The **India-Middle East-Europe Economic Corridor (IMEC)**, which was announced during the G-20 summit in 2023, is another alternative which is not receiving much attention.

- ❖ **Lack of investment:** Part of the problem is that apart from the MoUs, there have not been any investments or operations regarding the corridor.
- ❖ **Israel-Palestine conflict:** Furthermore, the Israel-Palestine conflict has put a pause on the normalisation of Arab-Israel relations which is a key element of the multi-nation initiative.
- ❖ **Vulnerability:** Another major challenge is the vulnerability of the Strait of Hormuz. The entire trade of the IMEC architecture flows through the Strait of Hormuz and with Iran's proximity and control over the strait, the risk of disruptions remain very high.

### Fact Box: IMEC

- **Objective:** The corridor aims to provide a reliable and cost-effective **ship-to-rail transit network** between **Asia, Middle East and Europe**.
- **Proposals:** The corridor will comprise of **two separate corridors**,
  - ▶ **The Eastern corridor** - will connect India to the Arabian Gulf.
  - ▶ **The Northern corridor** - will connect the Arabian Gulf to Europe.
- The corridor is estimated to cut the journey time from India to Europe by 40% and slash transit costs by 30%.

## 4. NATO'S EXPANSION

**Context:** Sweden is set to join NATO after Hungary's parliament ratified its bid. Hungary's decision comes two years after both Sweden and Finland applied to join NATO in May 2022 following Russia's full-scale invasion of Ukraine.

## 1: Dimension : Significance for the alliance

- ❖ **Break from neutrality:** Sweden has not been involved in a war since 1814 and has "pursued a policy of non-alignment in peacetime and neutrality in wartime, basing its security on a strong national defense. Sweden's entry into NATO move signals a break from a history of neutrality for both countries.
- ❖ **Reducing the vulnerability:** Sweden's NATO membership strengthens alliance in Baltic Sea region.

### NATO Lake

After Finland joined last year, Sweden's membership means all the countries surrounding the Baltic Sea, except Russia, will be part of the US-led military alliance.

- ❖ **Sense of security:** At the time that Russia's invasion threatened Europe's security order and made Sweden's need for guaranteed security granted through NATO membership apparent.

### Fact Box: Sweden's military power

Unlike many countries who have joined NATO since the end of the Cold War, Sweden has maintained highly capable military forces with a good deal of cutting-edge technology, including fourth generation **Gripen fighter aircraft** equipped with **Meteor air-to-air missiles**, **Leopard 2 main battle tanks** and **Gotland-class attack submarines** powered by an air-independent propulsion system.

### Finland and Sweden armed forces

	Finland 	Sweden 
<b>Troops total</b>	<b>257,250</b>	<b>24,600</b>
Active 	19,250	14,600
Reserve 	238,000	10,000
Main battle tanks 	100	120
Combat aircraft 	107	96
Helicopters 	19	106
Armoured personnel carriers 	613	1,064
Artillery 	672	357

Source: IISS, Military Balance 2022

- ❖ **Reinforcing the Baltic states:** Three countries breathing a particular sigh of relief over the entry of Sweden - and Finland - are NATO's Baltic states, Estonia, Latvia and Lithuania, long seen as an Achilles heel for the alliance.

◆ **Strategic position:** Sweden's geographical position makes it an essential part of any NATO defence plans. Its location means it can serve as a land transit route to reinforce both Norway and Finland, while also allowing NATO to largely take control of the Baltic Sea in any potential conflict with Russia.

- This provides an alternative sea reinforcement option to the **Baltic states** other than the vulnerable land border between Poland and Lithuania which is within artillery range of the **Russian-held Kaliningrad area** and Belarus.

◆ **Kaliningrad threat:** Beyond its long Baltic coastline, Sweden brings with it the island of Gotland which would play a central role in helping NATO impose its will. But just across the water, Russia has its vital outpost -- the exclave of Kaliningrad.

◆ Wedged between Poland and Lithuania, Moscow has in recent years turned the region into one of the most militarised in Europe, with nuclear-capable missiles stationed there.

## 2: Dimension : Concerns

- ◆ **Russia:** For now, Russia is the biggest loser of Sweden joining NATO. Moscow has threatened Sweden and Finland since both countries turned toward NATO. Since the two Nordic countries began the process to join the alliance, the West has tightened its grip on the Baltic Sea, complicating a vital transit route for the Russian navy.
- ◆ **Fissure within the NATO alliance:** Not all NATO members view Russia as the principal security threat. In both cases, Sweden's membership has become embroiled in wider domestic issues.

### Fact Box: NATO

- **North Atlantic Treaty Organization (NATO),** a military alliance established by the North Atlantic Treaty (also called the Washington Treaty) of April 4, 1949, sought to create a counterweight to Soviet armies stationed in central and eastern Europe after World War II.
- **Collective defence:** The principle of collective defence is enshrined in Article 5 of the North Atlantic Treaty. Collective defence means that an attack against one Ally is considered as an attack against all Allies.
- **Objectives of NATO:**
  - **Political objectives:** NATO promotes democratic values and enables members to consult and cooperate on defence and security-related issues to solve problems, build trust and, in the long run, prevent conflict.
  - **Military Objectives:** NATO is committed to the peaceful resolution of disputes. If diplomatic efforts fail, it has the military power to undertake crisis-management operations.

## 5. PROTECTIONISM & IMPACT ON INDIAN ECONOMY

**Context:** The Centre's move to progressively **hike customs duties**, especially the more recent offensive targeted at imports of **Chinese components and inputs**, needs to be reviewed, as it can threaten the domestic economy.

- ◆ The blockade targeting Chinese imports gained traction across Central ministries and departments in the aftermath of the Galwan border clash since 2020.

### 1: Dimension : Impacts of such blockade

- ◆ **Impact on important sectors:** The blockade targeting Chinese imports is now seen to be impacting sectors such as **electronics and pharmaceuticals**.
- ◆ **Loss in domestic output:** The roadblocks to imports in these sectors is leading to a loss of domestic output.
- ◆ **Restriction on necessary input material:** To check cheap quality imports from China, India imposed **Quality Control Orders (QCOs)** that restrict MSMEs from getting necessary input material.
- ◆ **Loss of competitive advantage:** It is leading to a loss of competitive advantage for Indian manufacturing.
  - **Uncompetitive atmosphere:** The average tariffs in India have jumped to 18.1 per cent in 2022 from 13 per cent eight years ago in 2014, has made India uncompetitive vis-a-vis countries such as Vietnam, Thailand and Mexico.
- ◆ **Threatened supply chain:** India's high tariffs pose a disincentive to de-risking supply chains beyond China. As a result, countries such as **Vietnam, Thailand and Mexico** are offering lower tariffs on components to grab the space vacated by China.

### Ministry of Electronics and Information Technology (MeitY) on the issue

- Ministry of Electronics and Information Technology (MeitY) relayed concerns about high production cost due to high tariffs to the Finance Ministry.
- MeitY had pushed for a lowering of duties of about 20 per cent on parts including circuit boards, chargers and fully assembled phones, by at least 5 percentage points.
- This was partly agreed to and the government reduced duty on several IT goods ahead of the **Interim Budget 2024**.

### 2: Dimension : Significance of India's trade with China

- ◆ **Top source of imports:** India's trade with China is important because, for the last 15 years, China has been India's top source of imports.
- ◆ **Double share:** To put these numbers in perspective, in these two years, the second biggest source of imports

for India was the UAE, with an import share of 6.7 per cent in 2020-21 and 7.31 per cent in 2021-22. These numbers indicate that China is not only India's biggest source of imports, but its share in total Indian imports is also more than **double that of the UAE**.

- ❖ **Dominance in non-oil merchandise imports:** In total non-oil merchandise imports, China's dominance is even more pronounced. As oil imports account for 25-30 per cent of India's total imports, India's dependence on China for non-oil imports can be as high as 25 per cent or more.
- ❖ **Export Market:** China is a big market for Indian exports, as well. China has been among the top four export markets for India in the last few years. After Covid, India's exports to China have gone up.

#### Data Box: The trade numbers

- India-China trade continues to remain high despite bilateral tensions as the total trade last year climbed to a record **USD 136.2 billion** with India's trade deficit mounting to USD 99.2 billion, a tad lower than last year.
- **China's exports to India** stood at USD 117.7 billion, a bit lower compared to USD 118.5 billion last year, according to the annual trade data covering the period from January to December 2023 released by Chinese customs last month.

- **India imports from China:** Electrical machinery and equipment, fertilizer, antibiotics and organic compounds.
- **China's imports from India** totalled USD 18.5 billion slightly higher last year compared to the 2022 figure of USD 17.48 billion.
- **India's top exports to China:** Diamonds, cotton yarn, iron ore, copper and organic chemicals.

### Dimension 3: Pros & Cons Protectionism

- ❖ **Protectionism** refers to government policies that limit international commerce in order to benefit home companies and stimulate domestic investment in a particular industry.
- ❖ Protectionist policies are typically intended to boost domestic economic activity, but they can also be enacted to address safety or quality problems.
- ❖ **Tools of Protectionism:** Tariffs, Quotas, Subsidies, Anti-dumping duties

#### Protectionist policies followed by India:

- Aatmanirbhar Bharat
- Increase in tariffs
- Anti-Dumping duty
- Food protectionism
- Vaccine nationalization
- Opting out from RCEP

#### BENEFITS

- More Growth Opportunities
- Lower Imports
- More Jobs
- Higher GDP
- Benefits for local producers

#### DISADVANTAGES

- Restricting the trade flow
- Stagnation in technological advancement
- Limited choices for consumers
- Inflationary effect
- Economic isolation
- Uncompetitive domestic industries
- Against WTO norms

## 6. DIGITAL PUBLIC INFRASTRUCTURES (DPIS)

**Context:** Digital Public Infrastructures (DPIS) are likely to propel India towards a \$1 trillion digital economy by 2030, helping it to become a \$8 trillion economy, as per a recent report.

- ❖ DPI is a digital network that enables countries to safely and efficiently deliver economic opportunities and social services to all residents.
- ❖ DPI can be compared to roads, which form a physical network that connects people and provides access to a huge range of goods and services.

### 1: Dimension : DPI as enabler

#### Bouquet of services

- Unified Payments Interface (UPI)

- JAM (Jan Dhan Yojana, Aadhaar and Mobile number) trinity
- National Health Stack
- Digital Infrastructure for Knowledge Sharing (DIKSHA)
- National Digital Education Architecture (NDEAR)
- **Digital products:** Digital Locker, electronic KYC (eKYC), and on-demand digital signature (e-Sign), FASTag

- ❖ A strong DPI has three foundational systems—
  - Identity (like Aadhaar)
  - Payments (like UPI)
  - Data exchange (account aggregators and DigiLocker)

### 2: Dimension : India's Unique Approach to DPIS

India's approach to DPIS is characterized by several key principles:



◆ **Public Interest:**

DPIs are developed and implemented with the public interest at the core.

◆ **Openness and Interoperability:**

DPIs are based on open standards and interoperability platforms, enabling seamless integration with various services.

◆ **Data Privacy and Security:**

Data protection and privacy are paramount considerations in the design and implementation of DPIs.

◆ **Innovation and Collaboration:** India encourages innovation and collaboration between the public and private sectors to develop and enhance DPIs.

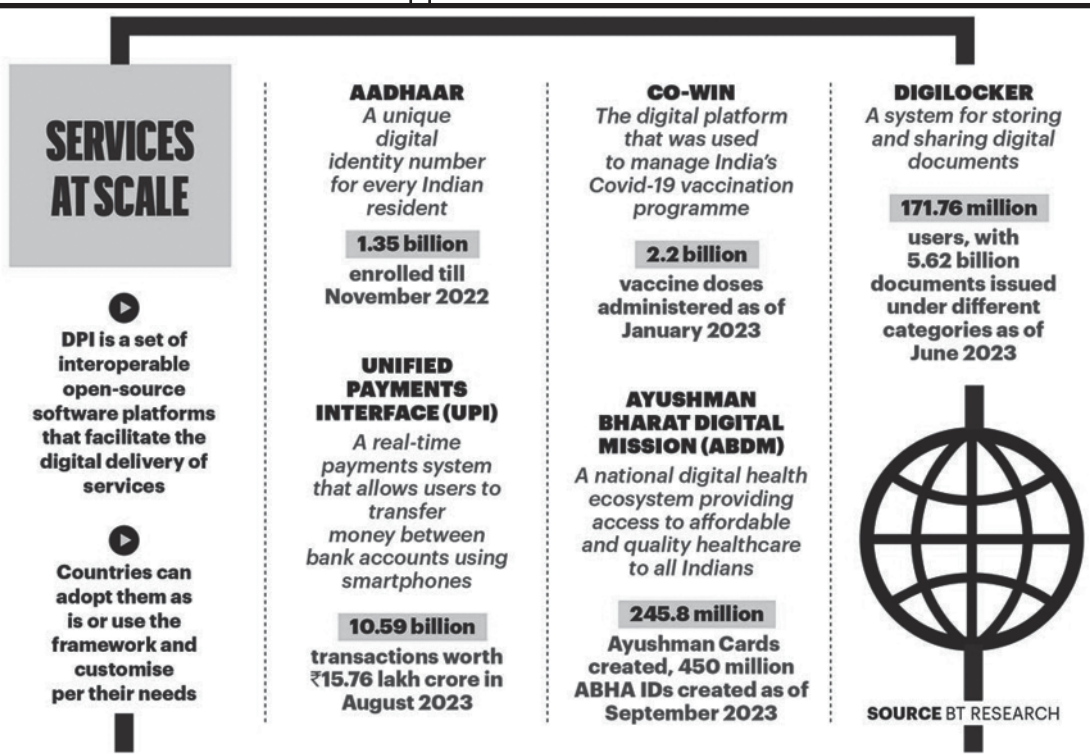
### 3. Dimension : Global implications

India's DPI journey has significant implications for the global development landscape:

- ◆ **Alternative Model:** India's DPIs offer an alternative model to the traditional "big tech" approach, emphasizing public ownership and control of critical infrastructure.
- ◆ **Global Adoption:** India's DPI frameworks and tools, such as MOSIP, can be adapted and implemented by other countries to suit their specific needs.
- ◆ **Accelerated Development:** DPIs can accelerate development by enabling efficient and inclusive delivery of public services.

## 7. HOUSEHOLD CONSUMPTION EXPENDITURE SURVEY (HCES)

**Context:** The government of India has finally conducted and released the Household Consumption Expenditure Survey of 2022-23 after more than a decade. The Household Consumption Expenditure Survey (HCES) is a survey conducted every five years to collect information about the consumption of goods and services by the households.



### 1: Dimension : Findings regarding rural and urban consumption in the survey

#### Data Box

- **Sample size:** sample size is quite big, comprising 2.6 lakh households.
  - Of these, 1.5 lakh are from rural areas and 1.1 lakh from urban areas.
- **Duration:** August 2022 to July 2023. The previous officially released survey was conducted in 2011-12.

- ◆ **Rural vs urban MPCE:** The monthly per capita consumption expenditure (MPCE) was Rs. 3,773 for rural areas and Rs.6,459 for urban areas in 2022-23.
  - Compared to the last survey in 2011-12, rural MPCE has increased at a CAGR of 9.2 per cent from Rs.1,430 while the urban MPCE has increased at an annual rate of 8.5 per cent from Rs.2,630.
- ◆ **MPCE on food vs non-food items:** The households are spending less on food than expected. MPCE on food by rural households is just 46 per cent, whereas expenses on non-food items is 54 per cent. For urban households, the food, non-food mix is 39 and 61 per cent.

### 2: Dimension : Reason behind this changing trend?

- ◆ The faster growth in rural consumption is a little strange given sluggish growth in rural areas in the recent past.

- But the **social welfare schemes** could have freed up some money allocated for food, thus increasing overall spends.
- Rural inflation has also been higher than urban inflation during this period, which would also be reflected in higher expenditure growth for rural households.

### Dimension 3: What are the findings of the survey regarding 'inequality'?

- Narrowing gap:** The consumption gap between urban and rural areas is narrowing but income inequality continues to make spends higher among high-income earners.
  - The difference between rural and urban consumption as a percentage of rural MPCE has fallen from 90.8 per cent in 2004-05 to 71.2 per cent in 2022-23.
- Improving income:** This shows that those living in rural areas have seen their incomes improve.

### Dimension 4: Findings regarding eating habits in rural and urban India

- Shift towards processed foods:** The largest share of food and drink consumption is going towards beverages, refreshments and processed foods indicating shifting eating patterns across India.
  - The share in MPCE for this component was 9.62 per cent in rural India while it was 10.64 per cent in urban India. Milk and milk products had the next largest share at 8.3 and 7.2 per cent in rural and urban areas followed by vegetables, egg, fish and meat and cereal and cereal substitutes.
- In rural India, the **share of cereal** in total **monthly per capita consumption expenditure (MPCE)** has fallen to 4.89 per cent in 2022-23 as compared to 10.69 per cent in 2011-2012.
- Cereal:** The share of cereal substitutes has gone down to 0.02 per cent from 0.06 per cent during the same period.
- Vegetables:** At the same time, the spending on vegetables has reduced to 5.38 per cent from 6.62 per cent.
- The share of this category has gone up to 9.62 per cent from 7.90 per cent in 2011-12. This is despite the total food spending as a percentage of total spending in rural India falling from 52.9 per cent in 2011-12 to 46.38 per cent in 2022-23.
- Some other categories, which saw higher spending percentages in rural India were **dry fruits (1.17 per cent), egg, fish & meat (4.91 per cent), fruits (2.54 per cent) and milk & milk products (8.33 per cent).**

## 8. GREEN AMMONIA PRODUCTION

**Context:** The quest for sustainable agriculture and energy solutions has ushered in an era of innovation, with companies worldwide striving to produce **green ammonia**.

### 1: Dimension : Opportunity for India

With the existing non-fossil-fuel capacity at around 186 GW, of which approximately 179 GW is renewable, India aim to add 50 GW of renewable capacity annually, targeting 500 GW by 2030.

- In 2023, India is about 60 MMTPA fertilizer consumption nation. This will grow to about 135 MMTPA by 2050.
  - The concomitant requirement of ammonia will also balloon.
- The demand, therefore, is massive. The opportunity to reduce the **carbon-footprint is enormous**.
- India is gearing up to establish about 5.8 million tonnes of green ammonia manufacturing across various regions.

### 2: Dimension : Challenges

- High cost:** The cost of making green ammonia is very high today compared to brown ammonia due to two major cost-components: **a) electrolyzer and b) green power**.
- Storage issues:** Storage of hydrogen, separated using electrolysis of water, is also a challenge today leading to disruption of a continuous supply of feedstock to the ammonia plants.

### 3. Dimension : Usage & Potential of Green Ammonia

- It is also known as renewable ammonia.
- To produce green ammonia, green hydrogen must first be obtained** through a process of water electrolysis.
- That is, water is decomposed into hydrogen and oxygen, using electrical energy generated from renewable sources.
- The hydrogen is then combined with atmospheric nitrogen through a process known as **Haber-Bosch synthesis**, which allows hydrogen and nitrogen to react at high pressure and temperature in the presence of a catalyst to form ammonia.
- The end result is the production of green ammonia using **green hydrogen and atmospheric nitrogen**.
- Main uses of green ammonia**
  - It is used in production of agricultural fertilisers

- It is also used as a raw material in the **production of a variety of chemical products**, such as nitric acid, synthetic fibres, explosives, dyes and pharmaceuticals.

- Other potential usage:** as a **fuel for ships**, as a **fuel in boilers, turbines or engines** to generate heat and electricity

	GREEN AMMONIA	GREY AMMONIA
<b>Formation</b>	It is a form of ammonia that is produced using renewable energy sources	Ammonia, or NH <sub>3</sub> , is nothing more than nitrogen and hydrogen, both highly abundant elements.
<b>CO<sub>2</sub> emission</b>	Green ammonia <b>does not emit CO<sub>2</sub></b> in its production process.	Ammonia's production process, emits 2 tonnes of CO <sub>2</sub> for every tonne of ammonia.

## 9. INDIA'S FIRST INDIGENOUS SPACE MISSION

**Context:** Group Captains Prasanth Balakrishnan Nair, Ajit Krishnan and Angad Pratap, and Wing Commander Shubhanshu Shukla carry on their shoulders the aspirations of 1.4 billion Indians as preparations for the country's first manned space mission gather steam.

### 1: Dimension : Significance of Gaganyaan Mission

- Gaganyaan mission is not only a scientific and technological endeavor, but also a national and global aspiration. The mission has a significant role to play in various aspects, such as:
- Enhancing India's Scientific and Technological Capabilities:** Gaganyaan mission will provide valuable data and insights on various phenomena such as **microgravity, radiation, human physiology**, etc.
- Inspiring Young Generations:** Gaganyaan mission will inspire young generations to pursue careers in science, technology, engineering and mathematics (STEM) fields.
- Contributing to Global Space Cooperation:** The mission will demonstrate India's commitment and capability to participate in international space endeavors such as **the International Space Station (ISS), the Artemis program, the Lunar Gateway**, etc.
- Boosting India's Prestige and Soft Power:** Gaganyaan mission will boost India's prestige and soft power in the international arena as a space-faring nation. It will also enhance India's image and influence in global affairs.
- Generating Social and Economic Benefits:** It will generate social and economic benefits for India, such as creating jobs, improving **education, health care, agriculture, disaster management, and environmental protection**.

### About Gaganyaan Mission

- Gaganyaan literally means 'celestial vehicle'.

- The spacecraft will carry the IAF pilots to an orbit of 400 km on a three-day mission before bringing them back safely with a landing in the Indian seaways.
- The Gaganyaan mission aims to demonstrate the capability to launch human beings (three crew members) to **low earth orbit (LEO)** and bring them back safely to earth by landing them in either the **Bay of Bengal** or the **Arabian Sea**.
- Launch Vehicles:** The **Launch Vehicle Mark-3 (LVM3)** is the launch vehicle for the **Gaganyaan mission**.

### Fact Box: The Elite Group

- The Gaganyaan Mission will take India into an **elite club of nations** to have successfully sent their astronauts to space using indigenous rockets.
- The United States, Russia and China are the only other countries to have achieved this feat.
- The success of the Gaganyaan Mission will further elevate the status of the Indian Space Research Organisation (ISRO), which has had back-to-back achievements recently in the form of the **Chandrayaan Mission** to the moon and the **Aditya L-1 Mission** to study the sun.

### Composition of the Mission

The mission consists of four test flights, including two uncrewed flights and one flight with a humanoid robot, before the final crewed flight.

- Flight Test Vehicle Abort Mission-1 (TV-D1):** The first test flight, called Flight Test Vehicle Abort Mission-1 (TV-D1), was successfully launched in October 2023, to demonstrate the crew escape system that can protect the astronauts in case of a rocket malfunction.
- Flight Test Vehicle Abort Mission-2 (TV-D2):** The second test flight, called Flight Test Vehicle Abort Mission-2 (TV-D2), will be launched in 2024 to test the orbital module and re-entry technologies.
- Vyommitra:** The third test flight, called Flight Test Vehicle Abort Mission-3 (TV-D3), will be launched in 2024 with a humanoid robot named **Vyommitra** that

will simulate human functions and communicate with the ground station.

- ◆ **Astronauts:** The fourth and final test flight, called Flight Test Vehicle Abort Mission-4 (TV-D4), will be launched in 2025 with three astronauts on board.

#### Fact Box: Vyommitra

- **Vyommitra** is a female-looking humanoid robot, to space.
- The robot is capable of monitoring module parameters, sending out alerts, and carrying out life support functions.

## 10. '10,000 GENOME' PROJECT COMPLETED

**Context:** The Department of Biotechnology (DBT) officially announced the completion of the '10,000 genome' project — an attempt to create a reference database of whole-genome sequences out of India.

The United Kingdom, China, and the United States are among the countries that have programmes to sequence at least 1,00,000 of their genomes.

### 1: Dimension : Distinct variations in Indian Population

- ◆ The Indian population of 1.3 billion consists of over 4,600 population groups, and many of them are endogamous.
- ◆ These factors have contributed to the **genetic diversity of the current population**.
- ◆ Thus, the Indian population harbours distinct variations and often many disease-causing mutations are amplified within some of these groups.

### 2: Dimension : Significance of complete human genome

- ◆ A complete human genome makes it easier to study **genetic variation** between individuals or between populations.
- ◆ A genome refers to **all of the genetic material in an organism**.
- ◆ The human genome is mostly the same in all people, but a very small part of the DNA does vary between one individual and another.
- ◆ It can help identify differences from the average human genome that are often associated with disorders and disease but can also be associated with other factors like **disease resistance or sensitivity** to an **environmental perturbation** like **sunlight or exercise**.

### What is the human genome?

- The human genome is the entire set of 23 large **deoxyribonucleic acid (DNA)** residing in the nucleus of every cell of each human body.
- It carries the complete genetic information responsible for the development and functioning of the organism.
- **Base:** The DNA consists of a double-stranded molecule built up by four bases –
  - ▶ adenine (A)
  - ▶ cytosine (C)
  - ▶ guanine (G)
  - ▶ thymine (T)
- Every base on one strand pairs with a complementary base on the other strand (A with T and C with G).
- In all, the genome is made up of approximately 3.05 billion such base pairs.

- ◆ Genome sequencing has been used to evaluate rare disorders, preconditions for disorders, even cancer from the viewpoint of genetics, rather than as diseases of certain organs. Nearly 10,000 diseases — including **cystic fibrosis and thalassemia** — are known to be the result of a **single gene malfunctioning**.

### What is Genome Sequencing?

- ◆ Genome sequencing involves revealing the order of bases present in the entire genome of an organism.
- ◆ While the sequence or order of base pairs is identical in all humans, there are differences in the genome of every human being that makes them unique.
- ◆ The process of deciphering the order of base pairs, to decode the genetic fingerprint of a human is called **genome sequencing**.

## 11. SOFT LANDING ON MOON

**Context:** The United States have achieved first moon landing (moon's south pole) in half century with private spacecraft (Texas-based company Intuitive Machines).

### 1: Dimension : Complexities of soft landing

- ◆ A soft landing entails a successful landing by a spacecraft without sustaining any significant damage to itself or its payloads.
- ◆ Whereas, in a hard landing, the probe suffers damage which may result in the failure of the mission.

### 2: Dimension : Challenges of Landing on Moon

- ◆ **Less gravity than Earth:** The Moon has much less gravity than the Earth. Its thin and tenuous atmosphere, along with lunar dust, also makes it tough for spacecraft to land.



- ◆ **Dust:** The presence of dust, even in very small quantities, can have a significant effect on temperature control and optical performance of hardware on the lunar surface.
- ◆ **Deep space communication** also poses a challenge as the "large distance from the Earth and the limited on-board and radio signals are weak with heavy background noises that need to be picked up by large antennas".

#### Fact Box: The South Pole

- The region has a difficult terrain, full of craters and deep trenches. It is also far from the **equatorial region** explored by previous lunar missions.
- Some areas on the south pole are shrouded in darkness and have never received sunlight.
- Temperatures are so cold there that they can plummet to as low as -230 degree Celsius. This rocky terrain, complete darkness and extremely cold weather make it more difficult for electronic instruments to function properly.
- Situated on the edge of the **Aitken basin**, the largest impact basin on the Moon, the lunar south pole offers a unique opportunity to study materials from the Moon's deep crust and mantle.

- Before Russia, countries such as Japan, Israel and the United Arab Emirates (UAE) have tried and failed to land on the Moon's south pole.

## 12. MEXICO: WORLD'S 'SINKING' CITY

**Context:** A new study in **Advancing Earth and Space Science** unveils a concerning reality - **Mexico City** is gradually sinking 30 centimetres every year.

### 1: Dimension : What's at 'stake'?

- ◆ Mexico City is one of the largest metropolises globally. It is the home to over 21 million people.
- ◆ This subsidence, which has persisted for over a century, has intensified in recent years, reaching a staggering half a metre annually.
- ◆ The potential for an additional descent of 30 metres is a looming threat, contingent on the absence of a **severe water crisis**.

### SIMILAR SHRINKING PATTERNS AROUND THE WORLD

<b>Jakarta</b>	<ul style="list-style-type: none"> <li>• Jakarta is the <b>largest city</b> and <b>capital of Indonesia</b>.</li> <li>• Jakarta is congested, polluted, prone to earthquakes, and rapidly sinking into the <b>Java Sea</b>.                             <ul style="list-style-type: none"> <li>► It has been described as the <b>world's most rapidly sinking city</b> and it is estimated that <b>one-third</b> of the city could be <b>submerged by 2050</b>.</li> </ul> </li> </ul>
<b>Florida</b>	<ul style="list-style-type: none"> <li>• Low-lying south Florida, at the front line of climate change in the US, will be swallowed as sea levels rise</li> </ul>
<b>Islands in India</b>	<ul style="list-style-type: none"> <li>• India has a fragile network of over <b>1,382 islands</b>. However, several of these islands are under threat due to unseasonal cyclonic storms, sea erosion and new development projects.</li> <li>• One such island in <b>Lakshadweep</b> has entirely disappeared from the map.</li> <li>• Islands across the country that are under threat: <b>Lakshadweep, Vaan island, Andaman and Nicobar islands, Ghoramara, Majuli island, Munroe Thuruthu</b></li> </ul>
<b>Joshimath (Uttarkhand)</b>	<ul style="list-style-type: none"> <li>• Joshimath, the ancient Uttarakhand town has become a cause of concern.</li> <li>• Though the town of Joshimath has been witnessing cracks emerging for the past two decades, things have escalated over a few days when the area was declared a disaster prone region</li> </ul>

### 2: Dimension : Reason behind the situation

- ◆ **Extensive extraction of water:** The primary culprit behind this phenomenon is the extensive extraction of underground water, with 70 percent of the city's drinking water sourced from aquifers located in a **basin**.

The **Cutzamala water system**, a network of reservoirs, pumping stations, canals and tunnels, supplies about 25% of the water used by the Valley of Mexico, which includes Mexico City.

- ◆ **Destruction of protective walls:** The city's history plays a significant role in this subsidence. Originally established on the **Aztec city Tenochtitlán** and **Lake**

**Texcoco**, the Spanish arrival in the 16th century led to the destruction of protective walls that prevented flooding.

- ◆ **Climate change:** Years of abnormally low rainfall, longer dry periods and high temperatures have added stress to a water system already straining to cope with increased demand.

### 3: Dimension : Reversal

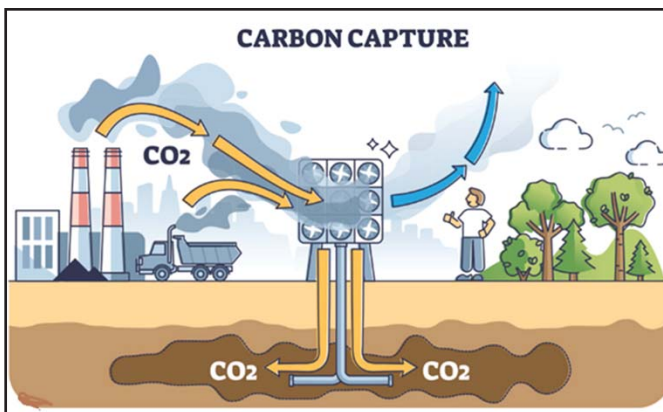
- ◆ The damage is almost irreversible due to the weight of the city and its shallow foundations causing **soil compaction**.
- ◆ Unless water levels rise significantly, the subsidence is likely to persist.

## 13. CARBON CAPTURE AND STORAGE (CCS)

**Context:** Germany plans to enable underground carbon storage at offshore sites, pushing ahead with a much-discussed technology in an acknowledgment that time is running out to combat climate change.

### 1: Dimension : The CCS Approach

- ◆ **Capturing:** Carbon capture and storage (CCS) is the separation and capture of **carbon dioxide (CO<sub>2</sub>)** from the emissions of industrial processes prior to release into the atmosphere and storage of the CO<sub>2</sub> in deep underground geologic formations.
  - **Approaches:** The most well-developed approach to storing CO<sub>2</sub> is injecting it underground into **naturally occurring, porous rock formations** such as **former natural gas or oil reservoirs, coal beds** that can't be mined, or **saline aquifers**.



- ◆ **Geological sequestration:** Once CO<sub>2</sub> has been captured using CCUS technology, it's pressurised and turned into a liquid-like form known as 'supercritical CO<sub>2</sub>'. From there it's transported via pipeline and injected into the rocks found in the formations deep below the earth's surface. This is a process called geological sequestration.

### Difference between Carbon Capture and Carbon Storage

- **Carbon capture** is the process of removing CO<sub>2</sub> from industrial exhaust gases by utilising gas separation systems.

- **Carbon storage** is the process of injecting the captured CO<sub>2</sub> into underground rock formations for permanent storage.

### 2. Dimension : Can Sequestered Carbon Escape?

- ◆ Carbon stored underground could find multiple ways to escape and seep back into the atmosphere due to chemical reactions that take place between the carbon dioxide, rocks, water in the pores and even the cement from abandoned wells.
- ◆ If these emissions escape, this would add to existing greenhouse gas emissions which exacerbate global warming.

### 3. Dimension : What about India?

- ◆ Carbon capture and storage (CCS) is vital for India to be self-reliant, achieve **net-zero GHG emissions by 2070, and ensure a just transition**.
- ◆ Despite India promoting renewable and alternative energy sources, long-term projections show that to meet the growing energy demand of power systems and industries, fossil fuels will need to remain an integral part of India's energy economy.
- ◆ Cumulatively, India will have to inject 5.3–10 gigatonnes (Gt) of CO<sub>2</sub> by 2050 to mitigate fossil fuel use-based emissions under 1.5°C temperature increase scenarios.

### What is Germany's Plan?

- ◆ **Germany's target:** Germany (home to many **energy-intensive industries**) aims to cut its emissions to "net zero" by 2045.
  - The International Energy Agency estimates that 100 billion tonnes of CO<sub>2</sub> must be stored by 2060 to limit temperature rise to 2 degrees Celsius.
- ◆ The proposed "carbon management strategy" foresees enabling the **transport of carbon dioxide** and its storage under the sea in **Germany's exclusive economic zone**, except in marine conservation areas.
- ◆ It doesn't foresee allowing storage sites on land.

**Neighboring Denmark** last year launched an ambitious project that aims to bury vast amounts of carbon dioxide beneath the **North Sea**.



## SECTION

## B

## SPECIALS

☞ India's ambition to become a 'science power'

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## INDIA'S AMBITION TO BECOME A 'SCIENCE POWER'

**Context:** India celebrates **National Science Day** on 28<sup>th</sup> February every year. The theme for the year 2024 is 'Science for Sustainable Development', which highlights the role of science in making India a **developed country by 2047**.

So, let us understand the role of science in achieving India's ambitions.

### 1: Dimension : The Potential of growth in the field of Science and Technology in India:

- ◆ Science and Technology hold the key to the progress and development of any nation.
- ◆ Technology plays a fundamental role in **wealth creation, improvement of the quality of life, and real economic growth and transformation in any society**.
- ◆ Science and technology have created the **development of nations and societies** that are all proportional to each other.
- ◆ Advances in science and technology facilitate **higher yields, greater efficiency, and greater nutritional content**.
- ◆ Advances in scientific knowledge and its application helped to slow the **trend of high fertility, and high mortality and led to increasingly better health for people in India**.
- ◆ Science and technology provide the basis for improvements in human health by the introduction of technologies in medical facilities.

#### Present Developments in the field of Science and Technology in India:

- India has had a strong focus on science and technology, realizing that it is a key element for economic growth.
- **India ranks third among the most attractive investment destinations for technology transactions in the world.**
- With more and more multinational companies setting up their **R&D centers in India**, the sector has seen an uptrend in investment in recent years.
- India is among the top countries globally in the field of scientific research, positioned as one of the **top five nations in the field of space exploration**.
- The country has regularly undertaken space missions, including missions to the moon and the famed Polar Satellite Launch Vehicle (PSLV).
- India has made progress with the inception of the **National Artificial Intelligence Strategy** thereby paving the way for exploring the potential of artificial intelligence.

### 2: Dimension : Why growth in the field of science is affected?

- ◆ **Lesser budgetary Support:** India's R&D expense has dropped to the current **0.64% of GDP** from 0.8% in 2008-2009.

Most developed countries spend between **2% and 4%** of their respective GDPs on R&D.

- ◆ **Under-utilisation of Funds:** The **Union Ministry of Science and Technology** has consistently under-utilized its budget.
- ◆ **Inadequate management of Departments:** In 2022-2023, the Department of Biotechnology (DBT), used only **72% of its estimated budget allocation** on Centrally Sponsored Schemes/Projects while the Department of Science and Technology (DST) used **only 61%**.
- ◆ **Comparison with developed countries:** India currently spends just about 0.65% of its national GDP on research and development activities. **The global average is about 1.8%.**

### 3: Dimension : Challenges associated with lack of funding

- ◆ **Lesser motivation for researchers/scientists:** Researchers face a struggle to secure and sustain funding. While the scientific workforce is increasing, funding has been on a decline over the past decade.
- ◆ The situation is particularly perilous for **early career researchers** who find it hard to compete for funds with senior researchers.
- ◆ **No diversification of fields of research:** Researchers and funding bodies are reluctant to invest their resources in replication studies due to high investment results.
- ◆ **Demotivated emerging ideas and talents:** Scientific research typically requires **expensive equipment, manpower, and significant financial investment**, and they need to compete for funding support from the government, corporations, and foundations to conduct their research.
- ◆ **Lesser pace for outcomes:** Due to a lack of infrastructure and funding, the models prepared by scientists or researchers may face hurdles to reach the final stage and time can also be wasted for that reason.



**4: Dimension : Impacts:**

- ◆ Low developments for cost-efficient technologies for Agriculture and Societal benefits.
- ◆ More reliance on imports and thus a stake in the 'Make in India' initiative.
- ◆ Complicated models/structures for common people which launched in the markets can cause failures for emerging Entrepreneurs.
- ◆ Drawback for local businesses and trades.
- ◆ Less confidence at the world level for Indian research models.
- ◆ Ultimately lesser pace of development in local areas due to lack of funds.

**5. Dimension : Role of Science and Technology in Economic Growth:**

In economics, it is widely accepted that **technology is the key driver of the economic growth of countries, regions and cities**. Technological progress allows for the more efficient production of more and better goods and services, which is what prosperity depends on. The role of technology in economic development can be summarised as follows:

- ◆ **Efficiency:** Technology can contribute to the efficiency of a business's output rate, allowing for larger quantities of products to be moved or of services to be rendered.
- ◆ **Specialization:** Technology has to lead to an increase in the division of labour and specialization of jobs within a business, further contributing to the efficiency with which a business can run.
- ◆ **Natural Resources:** Technology has a huge effect on the ability of businesses and governments to access natural resources and use them in the most effective ways possible to benefit both the business and the economy.
- ◆ **Industrial Expansion:** Thanks to the increased efficiency of labour with the ever-improving state of technology, businesses can increase total output, which in turn leads to higher profits and greater economic development.
- ◆ **Research:** Better technology has led to further research

**ALLOCATIONS IN INTERIM BUDGET 2024-25**

(in cr)

	2023-24 BE	2023-24 RE	2024-25 IB	Change*
Department of Atomic Energy	25,078.49	26,799.78	24,968.98	-0.41%
Department of Space	12,543.91	11,070.07	13,042.75	4.51%
Department of Science & Technology	7,931.05	4,891.78	8,029.01	2.00%
Department of Biotechnology	2,683.86	1,607.32	2,251.52	-26.90%
CSIR	5,746.51	6,202.53	6,323.41	9.30%
Ministry of Earth Sciences	3,319.88	2,879.02	2,521.83	-27.72%
Department of Agriculture Research	9,504.00	9,876.60	9,941.09	4.43%
Department of Medical Research	2,980.00	2,892.83	3,001.73	0.75%
Department of Defence Research	12,850.00	12,942.85	13,208.00	2.77%

BE: Budget Estimates, RE: Revised Estimates, IB: Interim Budget

\*2023-24 BE to Interim Budget

Source: Budget documents

into nearly every sector of business and science, meaning businesses can benefit from all sorts of technological advancements.

- ◆ **The Internet and International Trade:** Information technology is the single most important element in the success and growth of international trade and job market growth, allowing businesses to share information and conduct trade in less time than the blink of an eye.

**6: Dimension : Required Measures**

- ◆ **To avoid inadequate R&D Spending:** There is a need to allocate at least **3% of the GDP** annually until 2047.
- ◆ **Decrease dependency on Public Funding:** India's reliance on public money for R&D is highlighted as a sign of an immature financing system and a weak domestic market, with the private sector contributing only **36.4% in 2020-2021**.
- ◆ **To overcome private Sector hesitancy:** The private sector's reluctance to invest in R&D in India is attributed to factors such as a poor capacity to evaluate R&D, unclear regulatory roadmaps, lack of clear exit options (especially in biotechnology), and concerns about intellectual property rights theft.

**Conclusion**

India needs the bureaucratic capacity to evaluate science projects and, after allocations, monitor utilization. Building such capacity is a prerequisite for India becoming a science power by 2047.



## SECTION



### PRELIMS ARTICLES

- ❧ Temples from Badami Chalukyan period
- ❧ Language Atlas of India
- ❧ The City of Dwarka
- ❧ Pancheshwar Multipurpose Project
- ❧ SC Rejects Writ Petition on Criminal Appeal Delay
- ❧ AR and VR in the classroom
- ❧ Bitcoin Halving
- ❧ PAPA detects solar wind impact of CMEs
- ❧ Guinea worm disease inched closer to eradication
- ❧ India Achieves Kala Azar Elimination Target in 2023
- ❧ China Ravaging Africa's Donkey Population
- ❧ India's first green hydrogen fuel cell inland waterway vessel
- ❧ Green bond issuances fall in FY24
- ❧ Dairy Farming in India

# PRELIMS 2024

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TEST: 01	29 FEB, 2024	PAPER 1 (GS)	TEST: 11	07 April, 2024	PAPER 1 (GS)
TEST: 02	29 FEB, 2024	PAPER 2 (CSAT)	TEST: 12	07 April, 2024	PAPER 2 (CSAT)
TEST: 03	10 MARCH, 2024	PAPER 1 (GS)	TEST: 13	14 April, 2024	PAPER 1 (GS)
TEST: 04	10 MARCH, 2024	PAPER 2 (CSAT)	TEST: 14	14 April, 2024	PAPER 2 (CSAT)
TEST: 05	17 MARCH, 2024	PAPER 1 (GS)	TEST: 15	21 April, 2024	PAPER 1 (GS)
TEST: 06	17 MARCH, 2024	PAPER 2 (CSAT)	TEST: 16	21 April, 2024	PAPER 2 (CSAT)
TEST: 07	24 MARCH, 2024	PAPER 1 (GS)	TEST: 17	28 April, 2024	PAPER 1 (GS)
TEST: 08	24 MARCH, 2024	PAPER 2 (CSAT)	TEST: 18	28 April, 2024	PAPER 2 (CSAT)
TEST: 09	31 MARCH, 2024	PAPER 1 (GS)	TEST: 19	05 MAY, 2024	PAPER 1 (GS)
TEST: 10	31 MARCH, 2024	PAPER 2 (CSAT)	TEST: 20	05 MAY, 2024	PAPER 2 (CSAT)

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## 1. TEMPLES FROM BADAMI CHALUKYAN PERIOD

**Context:** Archaeologists have unearthed two ancient temples dating back to the **Badami Chalukyan period**, along with a rare inscription, in Mudimanikyam village of Nalgonda district, Telangana.

### Key-findings

- ◆ **Origin:** The temples are estimated to be at least 1,300 years old (8th or 9th century AD).

- ◆ **Location:** on the way to the Krishna river
- ◆ **Architectural style:** They showcase unique architectural styles, blending **Badami Chalukyan and Kadamba Nagara influences**.
- ◆ In one temple, a **panavattam** (base of a Shiva lingam) in the sanctum sanctorum has been found. In another, a Vishnu idol was recovered.
- ◆ The discovery also includes an inscription, labelled as '**Gandaloranru**', dating back to the **8th or 9th Century AD**, offering clues about the historical context of the region.

## TEMPLE ARCHITECTURE

### Temple Architecture of Chalukya Period

- From the 5th century CE onwards (535-757CE), the Chalukyas of Badami were the leading force in Deccan.
- They were indigenous Kannara family with Kannaras as mother tongue.
- Their early inscriptions indicate that they worship both Vaishnavite and Shaivite deities.
- The temple architecture of Chalukya Period is actually the mixture of Nagar and Dravida styles. However, this style has been termed as Besar style.
- This style originate and flourished at Aihole, Badami and Pattadakal of Karnataka state between 5th to 7th century CE.

### Kadamba Architecture

- The Kadamba have been regarded as one of the foundations upon which the **Karnataka architecture is based**.
- The Kadamba style of architecture has many distinguishing characteristics, including a few things in common with the Chalukyan and the Pallava styles.
- They drew from the architectural tradition of the **Satavahanas**.
  - ▶ The Shikara, called **Kadamba Shikara**, constitutes the most prominent feature of their architecture.
  - ▶ The **Kadamba Shikara** has a pyramid-like shape and rises in steps with a Stupika or Kalasha at the top without any decoration.

### Nagara or North Indian Temple Architecture:

- **Origin:** 5th century AD.
- **Region:** From Northern India to Karnataka to parts of Madhya Pradesh, Odisha and Gujarat, giving it its pan-India appeal.
- The Nagara style is mainly associated with the land between the **Himalayas and Vindhyas**.
- The basic plan of Nagara temple is square, with a number of **graduated projections (rathakas)** in the middle of each face which gives it a **cruciform shape** in the exterior.

## BASIC COMPONENTS OF A TEMPLE

<b>Garbhagriha (Sanctum)</b>	Earlier, it was just a small cubicle with a small entrance but as time passed, it grew into a large chamber. It houses the idol or image of the deity.
<b>Mandapa (Congregation Hall)</b>	The entrance to the temple and it features space for a large number of worshippers to gather at this place. It can be described as a hall which has a roof supported by a number of pillars.
<b>Shikhar or Vimana (Tower)</b>	It is a mountain-like spire which is generally seen in the temples that were constructed after fifth century AD. In North India style, it is called Shikhar while in South India it is called Vimana. Shikhar has a curved shape while Vimana has a pyramidal tower-like shape.
<b>Antrala (Vestibule)</b>	The mandapa in front of garbhagriha is called as Antrala or vestibule.
<b>Mahamandapa or Gudhamandapa</b>	The large wall in front of Antrala is called Mahamandapa or Gudhamandapa.
<b>Ardhamandapa (Entrance Porch)</b>	There is also a smaller mandapa in front of Mahamandapa which is called as Ardhamandapa or half porch. This is followed by Dwara or doorways.
<b>Pradakshinapath</b>	The garbhagriha is surrounded by a corridor or circulatory path called Pradakshinapath.

### Significance of the discovery

- ◆ The discovery gives more insight into the religious practices of the Badami Chalukyan period.
- ◆ They are significant as they are Badami Chalukyan shrines that adopted the Kadamba nagara style in the Rekha nagara format, making them the only two of their kind in Telangana today.

## 2. LANGUAGE ATLAS OF INDIA

**Context:** In light of India's focus on promoting education in mother tongue languages, a proposed linguistic survey by the **Indira Gandhi National Centre for Arts (IGNCA)** aims to determine the actual number of "active" languages spoken across the country, highlighting the significance of preserving linguistic diversity.

### 1: Dimension : Nneed of Language Atlas of India

- ◆ **Mapping the diversity:** Given the diversity, there is an urgent need to carry out a comprehensive linguistic survey in order to create the **Language Atlas of India**.
- ◆ **Knowing numbers:** The survey would help to focus on the number of languages and dialects in India.
- ◆ **Knowing scrips and dialects:** It would also try to know how many languages are spoken in India, and how many scrips and dialects there are.
  - ▶ IGNCA has identified the **Central Institute of Indian Languages, the National Museum, Centres for Endangered Languages, and the Linguistic Departments** of various universities as potential partners and collaborators in carrying out the survey.

### How diverse is India's language map?

- ◆ India recognises **22 languages officially**, which are part of Schedule **8 of the Indian Constitution**.
- ◆ According to Census data, **97 % of the Indian population speaks one of these languages**.
- ◆ There are an additional **99 non-scheduled languages** included in the Census, and according to the 2011 Census, around **37.8 million people identify** one of these non-Scheduled languages as their mother tongue.
- ◆ The native language of **1.2 million people** remains unaccounted for due to the decision to not include languages with less than **10,000 speakers in the Census since 1971**.
- ◆ Many of these languages not recorded in the **official Census** records are spoken by tribal communities.

### Fact Box: Indira Gandhi National Centre for the Arts (IGNCA)

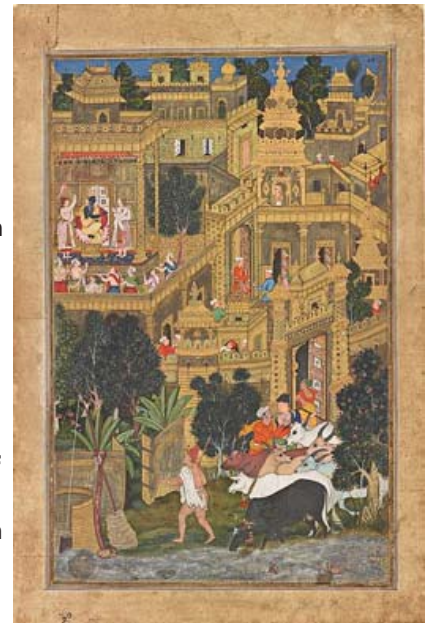
- **Established in:** 1987
- IGNCA was established as an **autonomous institution** under the **Ministry of Culture**, as a centre for research, academic pursuit and dissemination in the field of the arts.
- The Arts' encompass a wide range of subjects – from archaeology and anthropology to the visual and performing arts, enveloping them in a complementary and non-demarcated vision.

## 3. THE CITY OF DWARKA

**Context:** PM Narendra Modi recently performed underwater prayers at 'Dwarka Nagari', believed to be the kingdom of Lord Krishna. Since the start of the 20th century, several attempts have been made by scholars to establish the location of Dwarka as mentioned in the Mahabharata.

### About the City

- ◆ **'Dwarka'**, which translates to a 'gate' in Sanskrit, has been the gateway to India, which acted as an important centre of trade between India and West Asia.
- ◆ The city of Dwarka, one of the **Sapt Puris of Hinduism**, was said to have been reclaimed from the sea by **Lord Krishna** after he shifted from **Mathura** in Uttar Pradesh to **Dwarka** in Gujarat.
- ◆ Dwarka, according to legends, was submerged under the **Arabian Sea** as **Lord Krishna** departed from the world, marking the beginning of the **Kali Yuga**.



### What does archaeological evidence say?

- ◆ While the mythical narrative about Lord Krishna and Dwarka is rooted in the Puranas, archaeological evidence, over the years, points to **several structures** and a **sudden submersion of a city**.
- ◆ **Period:** Offshore excavations have revealed remnants of a city-state dating back to 2000 BC.

- ◆ The quest to uncover Dwarka's sunken secrets started in the **1930s by Hiranand Shastri**, followed by the **first extensive excavation** being carried out in 1963.
- ◆ Subsequent excavations unveiled a plethora of **ancient artefacts** and the submerged remnants of the **ancient Dwarka**.
- ◆ Several ancient habitational sites were discovered in the coastal area of **Bet Dwarka island**.
  - ▶ Notably, the island of **Bet Dwarka** is located some 30 kilometres northeast of the **Dwarkadhish Temple in Gujarat**.
- ◆ However, the material examination and **carbon dating** of the man-made objects recovered from the seabed in Dwarka, reveals urnam structures from pre-Harappan times, which bolsters the argument for Dwarka's historical reality.
- ◆ **Thermoluminescence dates surface explorations** suggest that the earliest habitation on the island commenced in the mid-second millennium BC.

#### Dwarkadhish Temple

- At present, devotees are mainly drawn to Dwarka for the Dwarkadhish Temple.
- The temple is believed to have been established more than 2500 years ago by Lord Krishna's great-grandson, Vajranabh.
- The ancient temple has been renovated several times, especially leaving imprints of the 16th and 19th centuries.

## 4. PANCHESHWAR MULTIPURPOSE PROJECT

**Context:** More than a month after India and Nepal signed the agreement on long-term power sharing, the two sides have not managed to make any forward movement on the stalled negotiations over the landmark **Pancheshwar Multipurpose Project (PMP)**.

#### What is Pancheshwar project?

- ◆ The Mahakali or Kali River rises at an altitude of 3,600 meters in the Greater Himalaya range at Kalapani, in the Pithoragarh district of Uttarakhand.
- ◆ This river forms the natural border between India and Nepal in Uttarakhand.
  - ▶ Kalapani is near the Lipu-Lekh pass at the border between **India, Nepal, and Tibet**.
- ◆ The **Kali river**, which forms the boundary of India and Nepal, is also connected to the territorial dispute of Kalapani-Limpiadhura-Lipulekh as the river originates in the triangular area that is claimed by both countries.

- ◆ Once the Kali River descends from the Himalayan foothills and onto the Gangetic plain, at Banbasa near the town of Tanakpur, its name changes to the Sharda River.
  - ▶ The river is a part of the Ganga river system, joining the main river near the city of Madhubani.
- ◆ This river is the center of the Pancheshwar Dam.
- ◆ The Pancheshwar multipurpose hydroelectric project is to be built over the Mahakali river jointly by the Indian and Nepalese Governments.
- ◆ The project involves the construction of two dams on the river Mahakali, for
  - ▶ irrigation, flood control, and;
  - ▶ generation of power for both countries
- ◆ The project is to come up near the Pancheshwar temple, 2.5 km downstream of the confluence of the Mahakali and Sarju rivers.

#### Why the project is not moving ahead?

- ◆ The project is aimed at generating around 6,480 MW energy (to be divided equally between two sides), along with water for irrigation of 130,000 hectares of land in Nepal and 240,000 hectares of Indian territory, respectively.
- ◆ The project is stalled because the Indian and the Nepali sides are unable to come to a consensus on sharing of benefits.
  - ▶ While electricity is divided equally, India gets the lion's share of irrigation and flood control benefits.
- ◆ On the other hand, Kathmandu feels water is 'white gold' and India should pay Nepal for it.
- ◆ India cannot accept this claim as it challenges India's understanding of other water-based treaties, including the Indus Waters Treaty with Pakistan.

#### Possible consequences

- ◆ **Possibility of destruction:** The project lies in areas with Seismic levels 4 to 5. If any mis-happening takes place and the dam is harmed, the destruction will be on a very heavy scale.
- ◆ **Vulnerable zone:** The project has a drainage area of -12,000 sq. km, out of which -2700 sq. km lies in the glacial and periglacial zones.
- ◆ **Affecting communities:** Communities on both sides of the Mahakali river – 31,023 families, close to 50,000 people or more, will be directly impacted.
- ◆ **Environmental concerns:** Biodiversity loss, Floods, Loss of landscape/aesthetic degradation, Soil erosion, Deforestation and loss of vegetation cover, Surface water pollution / Decreasing water quality, and Groundwater pollution or depletion are some of the environmental issues faced by the project.

## 5. SC REJECTS WRIT PETITION ON CRIMINAL APPEAL DELAY

**Context:** The Supreme Court said one cannot **question delay in a pending criminal appeal** by filing a **writ petition** alleging violation of **fundamental right**.

### The issue (Petition)

- ◆ The Supreme Court dismissed a writ petition filed seeking a direction to the Allahabad High Court to decide his criminal appeal pending since 2016 or grant him bail by suspending his sentence.

### Key-points made by the SC

- ◆ Accepting the prayer of the petitioner and issuing any direction, as prayed, would amount to **inappropriate exercise of discretionary jurisdiction** showing disrespect to another constitutional court; hence, no such direction, as prayed by the petitioner, can be issued.

- ◆ The bench also said the **Constitution does not grant power of superintendence to the Supreme Court over the High Court**.

There is no provision in **Chapter-IV (titled The Union Judiciary)** under **Part-V (The Union)** of the **Constitution of India** which, in terms similar to **Article 227 of the Constitution (Power of superintendence over all courts by the High Court)** under **Chapter-V** thereof, confers power of superintendence on the **Supreme Court over the High Courts**.

### What are Writs?

- ◆ A writ petition can be termed as a formal written order issued by a judicial authority who possesses the authority to do so.
- ◆ In India, writs are issued by the Supreme Court under Article 32 of the Constitution of India and by the High Court under Article 226 of the Constitution of India.
- ◆ Someone can seek justice through the five types of writs as provided by Article 32 of the Constitution. These are —

<b>Habeas corpus</b>	Considered to be among the most important writs for personal liberty, habeas corpus literally means to 'produce the body'. It is invoked to seek relief in cases where a person has been unlawfully detained. Individuals can file habeas corpus petitions if they believe they have been wrongfully imprisoned.
<b>Mandamus</b>	The writ of mandamus is issued by a higher court to a lower court or a government official or body, directing them to perform duties that they have refused to do.
<b>Certiorari</b>	A superior court issues a certiorari writ for re-examination of an action or decision by a lower court. It is invoked when a judgment has been delivered in violation of principles of natural justice or in opposition to the procedure established by law.
<b>Prohibition</b>	The writ of prohibition is to stop a lower court from going ahead with certain proceedings to ensure that it does not exceed its jurisdiction.
<b>Quo warrant</b>	This writ is issued to prevent people from assuming positions in public office when she or he is not entitled to it.

## 6. AR AND VR IN THE CLASSROOM

**Context:** Recent advancements in science and technology, particularly **augmented reality (AR)** and **virtual reality (VR)**, are revolutionizing education by offering immersive learning experiences. These innovations, fostering problem-solving skills, are garnering attention for their transformative potential in both traditional and continuing education settings.

### What is AR, VR?

- ◆ **Augmented reality (AR):** In AR, the digital content is overlaid onto the real-world scenarios, and this provides an immersive experience of virtual objects in the real world.
  - **For example**, a teacher can use an AR app to demonstrate a volcanic eruption while teaching geography or geology or even to teach how

volcanic eruptions can impact air routes. Such AR technologies promote active learning.

- ◆ **Virtual reality (VR):** VR technology, on the other hand, offers a completely virtual environment.
  - **For example**, virtual field trips, foreign language acquisition or virtual laboratories. These technologies when adopted in educational domain offers an enhanced hands-on experience which were never witnessed within the traditional classroom.

### Benefits of the technology

- ◆ **It enhances problem-solving skills in students.** It also facilitates opportunities to think critically, collaborate with peers, and to develop innovative solutions.
- ◆ **Fostering immersive learning experiences:** Traditional learning methods often struggle to capture the attention of today's digital-native students. AR and VR technologies offer a solution by providing immersive learning experiences that cater to their learning styles.



- ◆ **Promoting collaborative learning:** Collaboration is a vital skill in the modern workforce, and AR and VR technologies facilitate collaborative learning experiences within the classroom.

### Challenges and considerations

- ◆ Limited access to technology
- ◆ Concerns about cost
- ◆ The need for teacher training
- ◆ Issues related to data privacy, digital citizenship, and screen time management

## 7. BITCOIN HALVING

**Context:** 'Bitcoin Halving' is predicted to happen in April this year.

### What is the Bitcoin Halving?

- ◆ The Bitcoin Halving refers to the 50% reduction in the reward paid to Bitcoin miners who successfully process other people's cryptocurrency transactions so that they can be added to the public digital ledger known as the **blockchain**.
- ◆ **Proof of work:** Bitcoin miners rely on advanced computer equipment to solve a complex mathematical puzzle through a process known as '**Proof of work**' to grow Bitcoin's blockchain and keep the ecosystem running.
  - ▶ Carbon footprints: This intense activity is the reason Bitcoin transactions result in huge carbon footprints and require vast amount of electricity. **No real mining is carried out.**

### Why does the Bitcoin Halving matter to crypto investors?

- ◆ Bitcoin mining increases the supply of BTC in circulation while the Bitcoin Halving reduces the rate at which these coins are released, making the asset more scarce.
  - ▶ Scarcity is seen as pushing up prices, as is the case with gold.

## 8. PAPA DETECTS SOLAR WIND IMPACT OF CMES

**Context:** The Plasma Analyser Package for Aditya (PAPA) payload onboard the Aditya-L1 has been operational and performing nominally. Its advanced sensors have successfully detected the impact of **coronal mass ejections (CMES)** including those that occurred recently.

### What is PAPA?

- ◆ PAPA is an energy and mass analyzer designed for **in-situ measurements** of **solar wind electrons and ions** in the low energy range.

### It has two sensors:

- ▶ the Solar Wind Electron Energy Probe (SWEEP, measuring electrons in the energy range of 10 eV to 3 keV)
- ▶ the Solar Wind Ion Composition Analyser (SWICAR, measuring ions in the energy range of 10 eV to 25 keV and mass range of 1-60 amu)
- ◆ The sensors are also equipped to measure the direction of arrival of solar wind particles.

### Important Observations

- ◆ The SWEEP and SWICAR sensors on PAPA-Aditya-L1 are currently making continuous observations of solar wind electrons and ions in the default mode, demonstrating that they are performing as per the design in all modes of operations.
- ◆ The observations made by PAPA emphasise its effectiveness in monitoring space weather conditions and its capability to detect and analyse solar phenomena.

### Aditya-L1

- ◆ The launch of Aditya-L1 by **PSLV-C57 rocket** was successfully accomplished by ISRO.
- ◆ Aditya-L1 spacecraft carried seven payloads to study the Sun — four to observe the light from the Sun and the remaining three to measure **in situ parameters** of the plasma and magnetic fields.
- ◆ Aditya-L1 was placed in a **halo orbit** around the **Lagrangian Point 1 (L1)**, which is 1.5 million km from the Earth in the direction of the Sun.
- ◆ It revolves around the Sun with the same relative position and hence can see the Sun continuously.

### Important Terms

- **Coronal Mass Ejection (CME):** A coronal mass ejection is a large expulsion of plasma and magnetic field from the sun's corona. Plasma is the highly ionised gas present on the sun, while corona is the outermost part of the sun's atmosphere. The corona is structured by strong magnetic fields. If these fields are closed, the solar atmosphere can release sudden, violent bubbles of gas and magnetic fields which constitute the CME.
- **Solar Storm:** Solar storms are magnetic plasma ejected at great speed from the solar surface. They occur during the release of magnetic energy associated with sunspots ('dark' regions on the Sun that are cooler than the surrounding photosphere), and can last for a few minutes or hours.
- **Lagrangian Point 1 (L1):** L1 is among the five Lagrange points in the Earth-Sun system. At this point, the gravitational forces of the two bodies balance the centrifugal force felt by a smaller object.
- **Halo Orbit:** A halo orbit is a type of orbit around an L1, L2, or L3 Lagrangian point.

## 9. GUINEA WORM DISEASE INCHED CLOSER TO ERADICATION

**Context:** Global efforts have dramatically reduced Guinea worm disease from over 3.5 million cases in the 1980s to just six cases in 2023, marking a significant stride towards eradication.

### The declining numbers (WHO data)

- There were more than 3.5 million cases of this disease in the 1980s.
- The cases dwindled to 14 cases in 2021, 13 in 2022, and just six in 2023.

### Where does India stand?

- India eliminated Guinea worm disease in the late 1990s.
- Measure taken by India:** rigorous campaign of surveillance, water safety interventions, and community education.

### What is guinea worm disease?

- Guinea worm disease, also called dracunculiasis, is caused by a parasite called guinea worm (*Dracunculus medinensis*).
  - A parasite is an organism that feeds off another organism to survive.
- The worm's larvae are carried by water fleas found in stagnant water in ponds, open wells, and freshwater lakes.
- When someone drinks contaminated water, the larvae can invade their stomach and intestines.
- Treatment:** There is no drug to treat Guinea worm disease and no vaccine to prevent Guinea worm infection.
- By 2021, only five countries remained endemic – Mali, Chad, South Sudan, Ethiopia, and Angola.

## 10. INDIA ACHIEVES KALA AZAR ELIMINATION TARGET IN 2023

**Context:** India achieves a major milestone in the battle against Kala Azar, with less than one reported case per 10,000 population across all blocks in 2023, showcasing a significant reduction from 891 cases and three deaths in 2022 to 595 cases and four deaths last year, according to data from the National Vector Borne Disease Control Programme.

### About the disease:

- Kala-azar or black fever is a chronic and potentially fatal parasitic disease of the internal organs, particularly the liver, spleen, bone marrow and lymph nodes.
- Caused by:** It is caused by bites from female phlebotomine sandflies – the vector (or transmitter) of the leishmania parasite.
- Transmission:** Leishmania donovani is transmitted by sandfly bites in parts of Asia (primarily India), Africa (primarily Sudan), South America (primarily Brazil), Europe (primarily in the Mediterranean region) and in North America.
- According to WHO, if the disease is not treated, the fatality rate in developing countries can be as high as 100% within 2 years.
- Symptoms of Kala azar:** Fever, loss of appetite (anorexia), fatigue, enlargement of the liver, spleen and nodes and suppression of the bone marrow.
- Diagnosing Kala azar:** The first oral drug found to be effective for treating kala-azar is miltefosine.

## 11. CHINA RAVAGING AFRICA'S DONKEY POPULATION

**Context:** The increasing demand for donkey gelatin in China has led to a significant decline in donkey populations across Africa, prompting African governments to address the issue through regulation.

### The Species

- The donkey is a domesticated equine.
- Family:** It belongs to the horse family, Equidae, and descended from the African wild ass (*Equus africanus*).
- Donkeys are highly resistant to harsh climate conditions and can carry heavy loads for a sustained period of time, making them a prized resource in some areas in Africa.

### China's Donkey Trade

- China's donkey skin trade is the key component of a multibillion-dollar industry for what the Chinese call **ejiao, or donkey gelatin**.
- It is a traditional medicine recognized by China's health authorities, but whose actual benefits remain debated among doctors and researchers in China.
- Vendors of traditional Chinese medicine and health food companies have marketed ejiao as having potential benefits for people with **circulatory, gynecological or respiratory issues**.
- Ejiao-based food products have flourished: pastries made with ejiao, walnuts, sesame and sugar have become a popular snack across China; a well-known brand of a tea beverage has targeted young consumers with ejiao milk tea.

### Key-decision taken by Africa

- ◆ The **African Union**, a body that encompasses the continent's 55 states, adopted a continentwide ban on donkey skin exports this month in the hope that stocks will recover.
- ◆ Some African countries, like Ethiopia, Ivory Coast and Tanzania, have already implemented nationwide bans on donkey skin exports.

Africa is home to 60 percent of the world's donkeys. Ethiopia is home to the largest population of donkeys in Africa.

### Why the trade is still prevalent EVEN after ban?

- ◆ **Porous borders and lax implementation** of fines have made it difficult to stem the trade.
- ◆ **For instance**, in West Africa, donkeys are being trafficked from landlocked countries before they are slaughtered in often gruesome conditions in border areas with nations that have access to the sea. The pelts are then exported through cargo ports.

## 12. INDIA'S FIRST GREEN HYDROGEN FUEL CELL INLAND WATERWAY VESSEL

**Context:** Prime Minister Narendra Modi launched the country's first indigenous green hydrogen fuel cell inland waterway vessel under the Harit Nauka initiative in Tamil Nadu's Thoothukudi.

### About

- ◆ The hydrogen-fueled electric vessel project is part of India's transformative efforts on the innovative and new technology fronts on green energy and sustainable cost-effective alternate fuel front.
- ◆ **Wide range of application:** Hydrogen fuel cells can be used in a wide range of applications, including transportation, material handling, stationary, portable, and emergency backup power applications.
- ◆ **Environmental benefits:** Hydrogen fuel cell powered vessel have zero emission, zero noise and energy efficient which in turn reduce the effect of global warming.
- ◆ **Promotion:** The inauguration of this project will provide impetus for using hydrogen in marine application as envisaged under National Green Hydrogen Mission.
- ◆ **Competitive advantage:** Early adoption of hydrogen fuel cell technology in the marine sector will provide it a global competitive advantage where by meeting sustainable green energy aspiration.

### Why hydrogen?

- ◆ India's commitment to a sustainable future aims for net zero emissions by 2070.
- ◆ At the forefront of this endeavour is the adoption of green hydrogen as a maritime fuel.

## 13. GREEN BOND ISSUANCES FALL IN FY24

**Context:** Fundraising through **green corporate bonds** by companies and banks fell to a two-year low so far in the current financial year due to low investor appetite and little incentive for the issuers.

### What are Green Bonds?

- ◆ **Category:** Debt Instruments
- ◆ Green bonds are fixed-income securities that are dedicated only to projects with environmental advantages or climate and environment-related objectives.

**Green bonds** differ from conventional fixed-income securities in one aspect that the issuer pledges to use the proceeds to finance projects meant for positive environmental or climate effects.

### The numbers

- ◆ Green bonds worth Rs 500 crore were issued so far in this financial year, as compared to Rs 739 crore in the previous financial year.
- ◆ In the financial year 2021-22, green bonds worth Rs 2,677 crore were issued.

### Why the low appetite?

- ◆ In India, there is no obligation to invest in these green bonds and there are also no dedicated companies to invest in them. As a result, the appetite of the Indian investor for such bonds has been low.
- ◆ Also, green bonds are new in India and hence, pricing based on the international issue of bonds becomes difficult.

## 14. DAIRY FARMING IN INDIA

**Context:** In a divergence from global trends, India's dairy sector experiences a robust 6% growth, propelled by the substantial contribution of the **Gujarat Cooperative Milk Marketing Federation (Amul)**, as highlighted by Prime Minister Narendra Modi.

**More on the news**

- ◆ Prime Minister Narendra Modi inaugurated five projects worth Rs 1,200 crore at the **Golden Jubilee celebration of Gujarat Cooperative Milk Marketing Federation (GCMMF)**, which runs the brand Amul.
- ◆ PM Modi highlighted Gujarat's contribution to India's dairy sector, highlighting the double-engine government and the double-engine milk production in the state.

**The numbers**

- ◆ India has the world's largest bovine population and is a leader in milk production.
- ◆ In the past 10 years, the milk production in India has gone up by around 60% and the per person availability of milk has grown by around 40%.
- ◆ At a time when the global dairy sector is growing merely at a rate of 2%, India's dairy sector is growing at a rate of 6%.
- ◆ In the last 2 decades, the number of milk corporations in the state has doubled from 12 to 23.
- ◆ **Women participation:** More than 36 lakh people are connected with the dairy industry, including 11 lakh women. Out of the 16,384 milk houses, 3300 are completely run by women.
- ◆ **State-wise production:**
  - ▶ Uttar Pradesh contributed the highest share of

milk production at 15.7%, followed by Rajasthan (14.44%), Madhya Pradesh (8.73 %), Gujarat (7.49 %) and Andhra Pradesh (6.70 %).

- ▶ The highest annual growth rate was recorded by Karnataka (8.76%) followed by West Bengal (8.65%) and Uttar Pradesh (6.99%).

**Important Government Initiatives**

- ◆ The government has built 60,000+ **Amrit Sarovars** across the country. This very initiative will not only benefit farmers but will also strengthen the rural economy.
- ◆ The government has provided **Kisan Credit Card** facility to cattle farmers and fish farmers.
- ◆ The **National Programme for Dairy Development** was launched in 2014. It aims at strengthening infrastructure for milk production and processing, encouraging value-addition in milk and milk products apart from increasing farmers' access to organised markets.
- ◆ The **Dairy Processing & Infrastructure Development Fund** was initiated in 2017.
- ◆ The government has launched the **Rashtriya Gokul Mission** towards development and conservation of indigenous bovine breeds.
- ◆ **Livestock Health and Disease Control Programme** focuses on vaccination of animals of economic and zoonotic importance.





## SECTION **D**

### QUIK BYTES

- ☞ Attukal Pongala
- ☞ Grey-zone warfare
- ☞ India's diplomatic mission in Albanian capital
- ☞ Amrit Bharat Station Scheme
- ☞ New chapter in the Constitution
- ☞ Grant PC to women coast guard officers: SC
- ☞ Election of MP to Rajya Sabha
- ☞ Kaziranga National Park
- ☞ Solar installations fall 44% in 2023: Report
- ☞ TATA discovers tablet to treat Cancer
- ☞ Government approves mega Navy deal for BrahMos missiles
- ☞ All Odisha Tiger Estimation (AOTE) report 2023-24

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### ATTUKAL PONGALA

Lakhs of women arrived in Thiruvananthapuram district of Kerala, to observe 'Attukal Pongala'.

#### About Attukal Pongala

- Attukal Pongala is a **ten day annual Malayalam event**.
- **Time:** Malayalam month of Makaram-Kumbham (Feb-March) on Karthika star.
- The 'Attukal Pongala' is dubbed as one of the **biggest gatherings of women in the world**.
- It is attended by women from different parts of Kerala and neighbouring states such as Tamil Nadu.
- The goddess at the centuries-old **Attukal Devi temple** is worshipped by the devotees in the form of '**Bhadrakali**' or '**Kannaki**' to whom the 'pongala' offering is made on the ninth day of the 10-day festival at the temple.
- **Ritual:** Women gather around the premises of temple and cook 'pongala payasam'.
  - ▶ The pongala payasam is a rice pudding made with **red rice, jaggery, banana, ghee, and coconut**, boiled over in earthen pots as part of the ritual.
  - ▶ It is offered to the presiding deity, **Attukal Amma (Goddess Bhagwati)**.



### GREY-ZONE WARFARE

Growing concerns over "grey-zone" warfare tactics amid tensions with China highlighted by Chief of Defence Staff Gen. Anil Chauhan.

#### What is grey-zone warfare?

- The grey zone describes a set of activities that occur between peace (or cooperation) and war (or armed conflict).
- A multitude of activities fall into this murky in-between—from nefarious economic activities, influence operations, and cyberattacks to mercenary operations, assassinations, and disinformation campaigns.



### INDIA'S DIPLOMATIC MISSION IN ALBANIAN CAPITAL

Albania is planning to open an Embassy in New Delhi while India will soon have a diplomatic mission in Tirana.

#### India and Albania

- India and Albania established diplomatic relations in 1956.
- Albania is at the crossroads between the European Union and East. Albania is a part of many corridors that link India with the **European Union**.
- Albania's neighbour Greece is keen to join the **India Middle-East Economic Corridor (IMEC)** and become India's gateway to the European market.
- **Indian companies** are represented in the manufacturing sector in Albania, primarily in clothing.
- **Tourism** remains a major driver of the country's economy. It received over 10 million tourists in 2023, more than four times its national population. Of this, Indian tourists constituted 50,000 visitors.



### AMRIT BHARAT STATION SCHEME

Prime Minister Narendra Modi laid the foundation for over 550 Amrit Bharat stations across the country, with an allocated budget of Rs 40,000 crore.

#### What is Amrit Bharat Stations Scheme?

- **Objective:** To enhance station facilities with modern infrastructure, including roof plazas and city centers, fostering a more convenient and comfortable experience for passengers.
- The initiative underscores a commitment to bolstering India's transportation infrastructure.



- As part of the scheme, Indian Railways is crafting **comprehensive Master Plans**, integrating urban development around railway stations.
- This integrated approach signifies a holistic vision aimed at fostering overall urban development centered on these pivotal transport hubs.

### The numbers

- Indian Railways, renowned as one of the **world's busiest and oldest railway systems**, served a staggering 3.52 billion passengers and transported 1512 MT of freight in 2023.
- Aptly dubbed the **lifeline of India**, it operates over 13,000 trains daily, connecting 7,325 stations across the nation.

## NEW CHAPTER IN THE CONSTITUTION

The **22nd Law Commission**, headed by former Karnataka **High Court Chief Justice Ritu Raj Awasthi**, is likely to recommend adding a new chapter to the Constitution on 'one nation, one election'.

### What will be in the new chapter (recommended)?

- **Three-tier simultaneous polls:** The new chapter in the Constitution would include issues related to "simultaneous election", "sustainability of simultaneous elections" and "common electoral roll" for Lok Sabha, state legislative assemblies, panchayats and municipalities so that the three-tier simultaneous polls could be held together "in one go".
- **Overriding powers:** The new chapter will have power of **non-extant** to override other provisions in the Constitution dealing with **terms of assemblies**.
- **Synchronisation:** The five-year period in which the terms of assemblies will be synchronised will be spread over three phases.
  - ▶ The Commission would recommend that the first phase may deal with state assemblies whose period will have to be curtailed by a few months -- three or six months.



## GRANT PC TO WOMEN COAST GUARD OFFICERS: SC

Supreme Court directed the Centre to set up a fresh selection board to consider the issue of granting permanent commission to women coast guard officers.

### The current induction method

- The **SSC (short service commission) officers** are inducted under the **10+4 scheme**, in which the officer serves for 10 years and can exercise the option of extending his service by four years.
- The **Permanent Commission** is granted to SSC officers subject to service requirement and availability of vacancies.



In 2020, Supreme Court had delivered a significant verdict paving the way for **granting permanent commission to women officers in the Indian Navy**.

## ELECTION OF MP TO RAJYA SABHA

Members of the Legislative Assembly (MLAs) begin casting their votes to elect Members of Parliament (MPs) for 15 Rajya Sabha seats.

### Election of MPs in Rajya Sabha

- As per the **Constitution of India**, the number of MPs in the **Rajya Sabha cannot exceed 250**.

- Currently, the Upper House of the Indian Parliament has 245 members comprising 233 members who are elected from states and Union Territories (UT), while the President of India nominates the other 12 members from the disciplines of **art, literature, science, and social services**.
- The voting process in Rajya Sabha follows a **single transferable vote (STV) system** through an **open ballot**, wherein each MLA is allowed to vote once, and the same is counted.
  - ▶ Every vote cast by the MLAs is counted only once.
- While a party having a majority in Lok Sabha might send more MPs to Rajya Sabha, this need not be the case always.



### Design

- The Indian Parliament, designed by **British architects Edwin Lutyens and Herbert Baker**, bears resemblance to the **parliamentary model in the United Kingdom**.
- Similar to the **House of Lords** in the UK, the Rajya Sabha in India comprises members elected indirectly, in contrast to the **directly elected members** of the Lok Sabha, which resembles the **House of Commons in the UK**.

## KAZIRANGA NATIONAL PARK

The **National Board for Wildlife (NBWL)** has approved an elevated road over nine corridors used by the animals of **Kaziranga National Park** and **Tiger Reserve**, usually during heavy floods.

### Important facts about Kaziranga National Park

- **Location:** Spread over Golaghat and Nagaon districts of Assam Kaziranga National Park lies at the edge of eastern Himalayas.
- **Origin:** The park owes its existence to the conservation efforts of Mary Curzon and her husband **Lord Curzon, then Viceroy of India**.
- It became a reserve forest in 1904 primarily to protect the declining population of Rhinos.
- **The Assam National Park Act** was passed by the Assam Government in 1968, declaring Kaziranga a designated national park with an area of 430 sq km.
- An additional area of 429 sq km was added later to provide an extended habitat to the wild animals.
- The Central Government recognized it as a national park in 1974.
- Kaziranga National Park got the status of a tiger reserve in 2006
- Kaziranga National Park is a **UNESCO World Heritage Site**.
- The Kaziranga National Park in Assam is home to the threatened one-horned Rhino.
- **Other important species:** Wild Asiatic Water Buffalo and Eastern Swamp Deer, leopards, Royal Bengal Tigers, two of the largest snakes in the world (the Reticulated Python and Rock Python), King Cobra (the longest venomous snake in the world)



## SOLAR INSTALLATIONS FALL 44% IN

India installed 7.5 GW of solar capacity in 2023, a 44% decrease year-on-year from 13.4 GW in 2022, according to Mercom India Research.

### The numbers

- India witnessed a 44% decline in solar installations in 2023, reaching 7.5 GW, largely attributed to land acquisition-related challenges.
- The cumulative installed solar capacity as of December 2023 stood at 72 GW, with utility-scale projects comprising 85.4% and rooftop solar 14.6%.



- **Large-scale solar installations** fell 51%, primarily due to land and transmission issues.
- **Rajasthan followed by Karnataka, and Gujarat** were the top three states for cumulative large-scale solar capacity, accounting for 54.8 per cent of installations in the country as of December 2023.
- **India's large-scale solar project** pipeline stood at 105.3 GW, with another 70.6 GW of projects tendered and pending auction, the report said.
- **Country's installed renewable energy capacity**, including large hydropower projects, stood at 179.5 GW, accounting for 42 per cent of the overall power mix at the end of December 2023.
- **Solar energy projects** accounted for 48.5 per cent of all new power capacity installed last year.
- As of December 2023, solar energy accounted for 16.9 per cent of India's total installed power capacity and almost 40.1 per cent of the total installed renewable energy capacity.
- **What led to the decline?** land acquisition-related issues



### TATA DISCOVERS TABLET TO TREAT CANCER

The Tata Institute in Mumbai, a premier cancer research and treatment facility in India, has claimed to have discovered a treatment that can prevent the resurgence of cancer the second time.

#### R+Cu

- The developed tablet is claimed to prevent the occurrence of cancer for the second time in patients and will also reduce the side effects of treatments like radiation and **chemotherapy** by 50 per cent.
- The '**R+Cu**' when taken orally, generate Oxygen radicals in the stomach which are quickly absorbed to enter **blood circulation**.
- The oxygen radicals destroy **cfChPs** released in circulation and prevent '**Metastases**' - The movement of cancer cells from one part of the body to another.
- The researchers claimed that prevents Chemotherapy toxicity.
- The researchers in their presentation called it the "**Magic of R+Cu**".



**Dying cancer cells** release cell-free chromatin particles (**cfChPs, or fragments of chromosomes**) which can turn healthy cells into **cancerous ones**.

### GOVERNMENT APPROVES MEGA NAVY DEAL FOR BRAHMOS MISSILES

In a mega boost for the Indian Navy, the **Cabinet Committee on Security** has cleared the acquisition of over 200 BrahMos extended-range supersonic cruise missiles for deployment on its warships.

#### What is BrahMos?

- The BrahMos is a ramjet supersonic cruise missile of a short-range developed by the **Defence Research and Development Organisation (DRDO)** and the **Russian Federation's NPO Mashinostroyeniya (NPOM)**.
- It is named after two major rivers of India and Russia: **Brahmaputra and Moskva**.
- The use of BrahMos missiles for land as well as anti-ship attacks.
- They can be launched from land, air and sea, and all three variants are in service in the Indian armed forces.
- It is a two-stage (solid propellant engine in the first stage and liquid ramjet in second) missile.
- It operates on the "**Fire and Forgets**" principle i.e. it does not require further guidance after launch.



**ALL ODISHA TIGER ESTIMATION (AOTE) REPORT 2023-24**

The tiger population in Odisha has increased. At present, there are 30 tigers and eight cubs — all below one year old, revealed the first **All Odisha Tiger Estimation (AOTE) report 2023-24**.

**The numbers**

- As per the report, of the 30 tigers, a total of 27 unique adult tigers were camera-trapped in **Similipal Tiger Reserve (STR)** other forest ranges.
  - ▶ Simlipal National Park is a national park and a tiger reserve in the Mayurbhanj district in the Indian state of Odisha
  - ▶ Simlipal was designated a tiger reserve in 1956 and in May 1973 the essential part of the Project Tiger in May 1973.
  - ▶ Since 2009, it has been part of the UNESCO World Network of Biosphere Reserve.
- Apart from the STR, **Keonjhar Territorial and Keonjhar Wildlife, Paralakhemundi Territorial and Hirakud Wildlife** have one tiger each.

**Key Findings of Tiger Census, 2022:**

- India has at least **3,167 tigers in total**.
- This is ostensibly an increase since the last census of 2018.
- There were **2,967 tigers recorded in 2018**, and 2,226 in 2014.
- **Regional upgradation:**
  - ▶ The tiger population has grown the most in the **Shivalik hills and Gangetic flood plains**, followed by central India, the north eastern hills, the Brahmaputra flood plains, and the Sundarbans.
  - ▶ There was a decline in the **Western Ghats numbers**.







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