



**SIVARAJAVEL IAS ACADEMY**  
FOUNDER - DIRECTOR OF SMART LEADERS IAS

# the **CATALYST**

A Monthly Publication for Current Affairs

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## First Amrit Kaal Budget Focuses On Saptarishi

**FEBRUARY 2023**

# The **CATALYST**

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Sivarajavel IAS Academy 's

The **CATALYST** is a monthly magazine for current affairs which tries to give aspirants an in-depth comprehension of certain topics which appeared in different sources over the month. The Magazine has been designed in such a way that the reading experience is enriching and insightful for the readers.

The contents have been grouped into a thematic structure to help aspirants focus on the overall GS syllabus.

Section I contains theme based Current affairs Analysis:

- I. Within the Sub themes first few topics will be Prelims oriented followed by indepth coverage of Mains Topics.
- II. The last section will have Questions for practice\*.
- III. Fact Sheet and Quotes have also been provided
- IV. A Book Summary has been included

*\*New sections will be added or removed based on the new updates we include in the forthcoming issues.*

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# the **CATALYST**

## **From the Editor's Desk**

**Dear Readers,**

As we enter the final few weeks of preparation, I hope all of you have stepped on the throttle regarding Prelims preparation. Ideally, you must have sidelined or entirely paused the reviewing of your Mains specific and Optional subjects.

I hope the Crash Course programme we started is helping you revise each subject and assess your strengths and weaknesses in those subjects by the end of every week. Try to utilise this feature as it aids you in strengthening your basics. This is also the time to learn paramount skills like eliminating options in MCQs, besides learning.

To help you with this, we have also started a new Telegram channel - @srvias, that comes with MCQs every day to test your preparation.

Feel free to contact us regarding doubts in subject or preparation strategy or even if you feel demotivated. We are glad and ready to guide and counsel you. All the best.

In this February Issue of (From Feb 1 to Feb 28, 2023, Current Affairs), we have covered a range of topics with special emphasis on Union Budget, Lithium Reserves, Judicial Majoritarianism, Challenges to secure India's land borders etc.

We are constantly motivated by the reception given by our dear readers. We aspire to enrich the forthcoming issues. All feedback is welcome and suggestions to improve the magazine can be sent to [sivarajaveliasacademy@gmail.com](mailto:sivarajaveliasacademy@gmail.com).

Sincerely,  
P.Mohan

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# POLITY & GOVERNANCE

What's Inside?



सत्यमेव जयते

1. NO VOTING RIGHT TO ALDERMAN
2. ARTICLE 105 OF CONSTITUTION: THE LIMITS TO FREE SPEECH IN PARLIAMENT
3. THE MISSING DEPUTY SPEAKER
4. OPERATION SADBHAVANA
5. UPPER BHADRA PROJECT

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JUDICIAL MAJORITARIANISM

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## NO VOTING RIGHT TO ALDERMAN

### Why in the News?

Constitution doesn't allow aldermen right to vote, says SC

### Context

The Supreme Court while issuing notice to the Lieutenant-Governor and the pro tem presiding officer of the Municipal Corporation of Delhi (MCD) has held that the Constitution **does not allow aldermen (nominated members of a municipality) the right to vote in meetings.**

The Chief Justice of India while hearing a petition filed by the ruling party in Delhi has said that the difference between the elected members and aldermen (nominated members) is very substantial.

While hearing the arguments that the move by the pro tem presiding officer to allow the nominated members to vote is a violation of Article 243R(2)(iv) of the Constitution, Justice P.S. Narasimha noted that it is not just a statute, but the Constitution itself does not allow the aldermen to vote.

Section 76 of the **Delhi Municipal Corporation Act of 1957**, the Mayor, or in his absence the Deputy Mayor, has to preside over every meeting of the corporation, the simultaneous holding elections of Mayor, Deputy Mayor and members of the Standing Committees is directly

contrary to the provisions of the statute.

*Article 243R of Indian Constitution deals with the Composition of Municipalities*

### Who are Aldermen?

- Aldermen refers to the members of a municipal council, but the exact responsibilities depending on the location of its usage.
- They do not have the right to vote in the mayor polls, but they will hold influential power and play a significant role in the elections of Standing Committees, MCD in-house and ward committee meetings.
- They will be a part of a group that effectively controls the MCD's purse strings.
- According to the Delhi Municipal Corporation Act, of 1957; The administrator (the Lieutenant Governor) can nominate 10 people, over the age of 25 to the corporation.
- These people are expected to have special knowledge or experience in municipal administration.
- They are meant to assist the house in taking decisions of public importance.

## FREE SPEECH IN PARLIAMENT

### What does Article 105 say?

Article 105 of the Constitution deals with ***"powers, privileges, etc of the Houses of Parliament and of the members and committees thereof"***, and has four clauses.

Subject to the provisions of this Constitution and to the rules and standing orders regulating the procedure of Parliament, there shall be freedom of speech in Parliament.

(2) No member of Parliament shall be liable

to any proceedings in any court in respect of any thing said or any vote given by him in Parliament or any committee thereof, and no person shall be so liable in respect of the publication by or under the authority of either House of Parliament of any report, paper, votes or proceedings.

(3) In other respects, the powers, privileges and immunities of each House of Parliament, and of the members and the committees of each House, shall be such as may from time to time

be defined by Parliament by law, and, until so defined, shall be those of that House and of its members and committees immediately before the coming into force of section 15 of the Constitution (Forty-fourth Amendment) Act, 1978.

4) The provisions of clauses (1), (2) and (3) shall apply in relation to persons who by virtue of this Constitution have the right to speak in, and otherwise to take part in the proceedings of, a House of Parliament or any committee thereof as they apply in relation to members of Parliament.

*Simply put, Members of Parliament are exempted from any legal action for any statement made or act done in the course of their duties.* For example, a defamation suit cannot be filed for a statement made in the House.

This immunity *extends to certain non-members as well, such as the Attorney General for India* or a Minister who may not be a member but speaks in the House.

In cases where a Member oversteps or exceeds the contours of admissible free speech, the Speaker or the House itself will deal with it, as opposed to the court.

The Government of India Act, 1935 first brought this provision to India, with references to the powers and privileges enjoyed by the House of Commons in Britain. An initial draft of the Constitution too contained the reference to the House of Commons, but it was subsequently dropped.

However, the SC ruled that “the word “anything” in Article 105 is of the widest import and is equivalent to ‘everything’”

In 1998, the SC in the case of ‘P V Narasimha Rao vs. State’ answered two questions on parliamentary privilege, broadly relating to questions of corruption.

In 1993, Narasimha Rao was Prime Minister of a minority government at the Centre.

When a vote of no-confidence was called by members of the opposition against the government, some factions of the ruling party paid Jharkhand Mukti Morcha (JMM) members to vote against the motion.

The motion was defeated in the House, with 251 members supporting it and 265 members against it.

Two questions came before the Supreme Court.

1. **One, whether MPs could claim immunity from prosecution before a criminal court on charges of bribery** related to parliamentary proceedings, under Articles 105(1) and 105(2).
2. **Two, whether an MP is a “public servant” under the Prevention of Corruption Act, 1988.**

A five-judge Bench of the apex court ruled that the ordinary law would not apply to the acceptance of a bribe by an MP in case of parliamentary proceedings.

Broadly interpreted, as we think it should be, Article 105(2) protects a Member of Parliament against proceedings in court that relate to, or concern, or have a connection or nexus with anything said, or a vote given, by him in Parliament,” the court said, giving a wider ambit to the protection accorded under Article 105(2).

The Court rationalised this by saying it will “*enable members to participate fearlessly in Parliamentary debates*” and that these members need the wider protection of immunity against all civil and criminal proceedings that bear a nexus to their speech or vote.

# ARTICLE 105 OF CONSTITUTION: THE LIMITS TO THE MISSING DEPUTY SPEAKER

Supreme Court sought response from Centre on a Public Interest Litigation (PIL) that contends that not electing a Deputy Speaker to the 17th (present) Lok Sabha, since 2019, is “against the letter and spirit of the Constitution”.

## Constitutional Provisions:

**Article 93** says that the House of the People (Lok Sabha) shall, as soon as may be, choose two members to be Speaker and Deputy Speaker so often as the offices become vacant. However, it does not provide a specific time frame.

**Article 178** contains the corresponding position for Speaker and Deputy Speaker of the Legislative Assembly of a state.

Experts point out that both Articles 93 and 178 use the word “shall”, indicating that the election of Speaker and Deputy Speaker is mandatory under the Constitution. Government argues that there is no “immediate requirement” for a Deputy Speaker as “bills are being passed and discussions are being held” as normal in the House. Further, there is a panel of nine members selected from different parties who can act as chairpersons to assist the Speaker to run the House.

In Lok Sabha, *the election of Deputy Speaker is governed by Rule 8 of The Rules of Procedure and Conduct of Business in Lok Sabha*. The Deputy Speaker is elected by the Lok Sabha from amongst its members right after the election of the Speaker. The date of election of the Deputy Speaker is fixed by the Speaker.

The election of the Deputy Speaker usually takes place in the second session and is generally not delayed further in the absence of genuine and unavoidable constraints. *Like the Speaker, the Deputy Speaker remains in office usually for the entire duration of the House (5 years)*. The

Deputy Speaker may vacate his/her office earlier in any of the following three cases:

1. If he ceases to be a member of the Lok Sabha.
2. If he resigns by writing to the Speaker.
3. If he is removed by a resolution passed by a majority of all the then members of the Lok Sabha. Such a resolution can be moved only after giving 14 days’ advance notice.

## Position of the Deputy Speaker:

Under article 95 The Deputy Speaker performs the duties of the Speaker’s office when it is vacant and acts as the Speaker when the latter is absent from the sitting of the House. **In both the cases, he assumes all the powers of the Speaker.** Deputy Speaker is not subordinate to the Speaker. He is directly responsible to the House. Consequently, if either of them wishes to resign, they must submit their resignation to the House which *implies that Speaker gives resignation to deputy Speaker*.

## Need of Deputy Speaker:

**Maintains Continuity:** Deputy Speaker maintains continuity of the office whenever speaker is absent or the office becomes vacant.

**Represents The House:** If Speaker resigns, he/she tenders resignation to Deputy Speaker. If the post of Deputy Speaker is vacant the Secretary-General receives the letter of resignation and informs the House about it. The resignation is notified in the Gazette and the Bulletin, as per the Rules for Presiding Officers of Lok Sabha.

**Strengthens the Opposition:** Since 2011, convention has been to offer the position of deputy Speaker to Opposition party. Though Constitutionally, Deputy speaker can be from Opposition or Majority party.

## OPERATION SADBHAVANA

Operation Sadbhavana (Goodwill) is an unique humane initiative *undertaken by Indian Army in the State of Jammu & Kashmir* to address aspirations of people affected by scrooge of terrorism, sponsored and abetted by Pakistan.

The unique operation has provided succor to a large section of population of the State.

As part of a grand design an insidious attempt was made by terrorist 'tanzeems' to systematically subvert Government officials, target property, public services and symbols of State authority in order to inflict hardship and alienate local population from the national fabric.

It was in these challenging operational environment that the Indian Army as part of the overall Counter Terrorism strategy decided to use its footprint to wrest the initiative back from the terrorists, re-integrate the 'Awaam' (Locals) with the national mainstream and blunt the proxy war abetted by Pakistan.

In a situation where the Army was looked upon as the last bastion which could provide relief to the masses affected by terrorism, *Indian army swiftly launched 'Operation Sadbhavana' with a modest budget of Rupees four crores in 1998.*

The timely intervention was carried out with an aim of supplementing efforts of the State administration in restoring public services, rebuilding infrastructure and creating a conducive environment for development in the State. In the intervening years since 1998 the Army has spent in excess of Rupees 550 crores on various people centric development activities in the State.

The focus of Operation Sadbhavana is to *improve the overall core social indices of*

*Education, Women & Youth Empowerment, and Health care* with simultaneous thrust on capacity building through implementation of community/ infrastructure development projects.

The underlying theme is to blunt Pakistan sponsored anti India propaganda and facilitate all around development of the State based on a participative model involving the local people, Army and the civil administration. Accordingly, the core of Operation Sadbhavana theme gyrates around aspirations of local populace and India's national interest.

### Education

Ever since the inception of Operation Sadbhavana Indian Army has established 46 Army Goodwill Schools and rendered assistance to approximately 1900 State Government run schools by carrying out renovation, modifications, infrastructure augmentation and provisioning of equipment.

All Goodwill schools are affiliated to J&K State educational Board barring two residential schools, located at Rajouri and Pahalgam which are affiliated to CBSE Board.

The popularity of Army Goodwill Schools can be measured by the fact that there is a growing clamor from local population for opening schools in almost all corners of the State.

Approximately 14,000 students are currently enrolled and close to one lakh children have obtained primary/higher secondary levels quality education in last one and half decades of insurgency.

## UPPER BHADRA PROJECT

### Why in News?

Finance Minister Nirmala Sitharaman on Wednesday announced a grant of Rs 5300-crore for the Upper Bhadra irrigation

### About

Upper Bhadra Project is a **major lift irrigation Scheme under implementation in the central region of Karnataka State.**

It envisages lifting upto 17.40TMC of water in first stage from Tunga to Bhadra and lifting 29.90TMC of water in second stage from Bhadra to Tunnel near Ajjampura, in Tungabhadra sub-basin of Krishna basin.

According to the state government, the project is a major lift irrigation scheme planned to irrigate 2.25-lakh-hectares spread across drought-prone central districts.

It will primarily cover Tarikere, Kadur taluks of Chikmagalur district, Hosadurga, Hiriur, Chitradurga and Challakere taluks of Chitradurga district, Jagalur taluk of Davanagere, and Sira,

Chikkanayakanahalli taluks of Tumkur.

Its primary objective is to provide sustainable irrigation in the kharif season and the other objective is recharging groundwater tables and providing drinking water by filling 367 tanks to their 50% capacity in drought-prone taluks of the above said districts.

The project is proposed to be implemented in two stages with different packages. "In the first package, the plan is to lift 17.4 TMC water from Tunga river to Bhadra reservoir in two stages and the work is under progress.

The second package will lift 29.9 TMC water from Bhadra reservoir to Ajjampura tunnel in two stages; work is physically completed and the third package will be conveying water through Ajjampur and tunnel work is physically completed," the department's update on the project reads.

In October 2022, chief minister Basavaraj Bommai had said that the status of a national project will change the irrigation scenario of central Karnataka.

# JUDICIAL MAJORITARIANISM

*GS-II Separation of powers between various organs, dispute redressal mechanisms and institutions.*

As the recent majority judgment of the Supreme Court on demonetisation comes under criticism, the minority judgment by J. Nagarathna is being hailed for its challenge to the RBI's institutional acquiescence to the Central government. In this context, concerns over Judicial Majoritarianism in their Judgements came into discussion.

## About Judicial Majoritarianism

Numerical majorities are of particular importance to cases which involve a substantial interpretation of constitutional provisions.

*The requirement for a majority consensus flows from Article 145(5) of the Constitution which states that no judgment in such cases can be delivered except with the concurrence of a majority.*

It also provides for judges to freely deliver dissenting judgments or opinions. In important cases, Constitutional Benches, consisting of five or more judges (7, 9, 11 or even 13 judges), are being set up.

## The Concerns

A meritorious minority decision, irrespective of the impeccability of its reasoning, receives little weightage in terms of its outcomes.

### Example:

The dissenting opinion of Justice Subba Rao in the *Kharak Singh v. State of U.P.* (1962) case upholding the Right to Privacy which received the judicial stamp of approval in the *K.S. Puttaswamy v. UoI* (2017) case.

The dissenting opinion of Justice H.R. Khanna in *A.D.M. Jabalpur v. Shivkant Shukla* (1976) upholding the right to life and personal liberty even during situations of constitutional exceptionalism is a prime example.

The weightage given to numerical majorities in judicial decisions is opposed to the merits of their reasoning. All judges on a particular Bench give their rulings on the same set of facts, laws, arguments and written submissions. So, any differences in judicial decisions can be attributed to a difference in either the methodology adopted or the logic applied by the judges in their interpretation. In such circumstances, it is entirely possible that the majority may fall into either methodological fallacies and errors or be limited by their 'judicial hunch' respectively.

A study also found that the rate of dissent where the Chief Justice was a part of the Bench was lower than in those cases where the CJ was not on the Bench. The rate of judicial

dissent at the height of the Emergency in 1976 was 27% as opposed to 10% in 1980. Such situations call into **question the efficiency and desirability of head-counting procedures for a judicial determination on questions of national and constitutional importance.**

## Way Forward

A system can be devised, that either gives more weightage to the vote of senior judges given that they have more experience or to the junior judges as they may represent popular opinion better.

Such alternatives, however, can only be explored once we identify and question the premises and rationales which underlie head counting in judicial decision-making.

The absence of a critical discourse on judicial majoritarianism represents one of the most fundamental gaps in our existing knowledge regarding the functioning of our Supreme Court.

As pending Constitutional Bench matters are listed for hearing and judgments are reserved, we must reflect upon the arguments of judicial majoritarianism on the basis of which these cases are to be decided.



# INTERNATIONAL RELATIONS



What's Inside?

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2. NEW START TREATY
3. GREEN DEAL INDUSTRIAL PLAN
4. GLOBAL QUALITY  
INFRASTRUCTURE INDEX (GQII)
5. NORTHERN IRELAND  
PROTOCOL AND WINDSOR  
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INDO-US COOPERATION

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INDIA FRANCE PARTNERSHIP

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ONE YEAR OF RUSSIA – UKRAINE  
WARs

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## SOLOMON ISLANDS

### Why in the News?

The United States has opened an embassy in the Solomon Islands in its latest move to counter China's push into the Pacific.

### About Solomon Islands

Solomon Islands is a nation in Melanesia, east of Papua New Guinea, comprising more than 990 islands. Its capital is **Honiara**, located on the island of Guadalcanal.

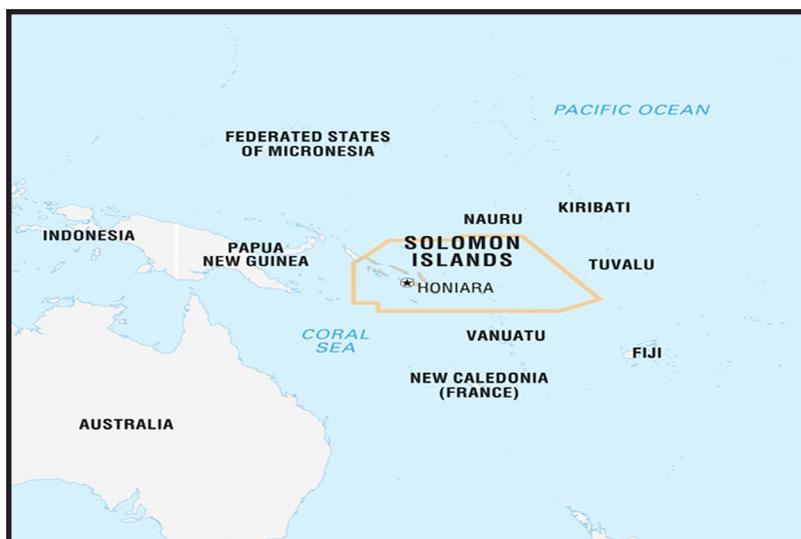
The Solomon Islands have been inhabited by Melanesian people for at least 30,000 years.

It consists of a double chain of volcanic islands and coral atolls in Melanesia.

Melanesia is a subregion of Oceania in the southwestern Pacific Ocean.

The country comprises most of the Solomons chain—with the exception of Buka and Bougainville, two islands at the northwestern end that form an autonomous region of Papua New Guinea.

The island is a **constitutional monarchy**, with the British monarch, represented by a governor-general, serving as the formal head of state. Still, the country, a member of the Commonwealth, is independent, and the governor-general is appointed on the advice of the unicameral National Parliament.



## NEW START TREATY

### Why in the News?

President Vladimir Putin announced that Russia is suspending its participation in the New START treaty, the only remaining nuclear arms control treaty between the United States and Russia.

### START Treaty

The name START comes from the original “Strategic Arms Reduction Treaty”, known as START-I.

START-I was signed between the US and the erstwhile USSR in 1991, and came into force in 1994.

START-I capped the numbers of nuclear warheads and intercontinental ballistic missiles (ICBMs) that each side could deploy at 6,000 and 1,600 respectively.

START-I lapsed in 2009 and was replaced first by the Strategic Offensive Reductions Treaty (SORT, also known as the Treaty of Moscow), and then by the New START treaty.

## New START Treaty

The New START Treaty is officially known as – “Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms”.

It was signed by then-President Barack Obama and then-Russian president Dmitry Medvedev in 2010.

The treaty entered into force in February 2011, and placed new verifiable limits on intercontinental-range nuclear weapons.

Under the treaty, the United States and Russia were given seven years to scale back their stockpiles of strategic offensive arms — broadly, nuclear warheads deployed by missiles, planes or submarines that can travel long distances.

After February 2018, both the countries had to maintain the stockpiles of these arms within the limits fixed by the treaty, for the period the treaty remained in force. The US and Russia Federation subsequently agreed to extend the treaty through February 4, 2026.

## What limits did the New START impose on the two countries?

700 deployed intercontinental ballistic missiles (ICBMs), deployed submarine-launched ballistic

missiles (SLBMs), and deployed heavy bombers equipped for nuclear armaments

1,550 nuclear warheads on deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments (each such heavy bomber is counted as one warhead toward this limit)

800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.

## How is compliance with the treaty ensured?

Detailed procedures for the implementation and verification of the central limits, and all treaty obligations, are part of the treaty terms. The treaty provides for 18 on-site inspections per year for US and Russian inspection teams.

## Compliance status

Both countries met the limits spelled out in the treaty by February 2018 and appear to have remained at or below them since then.

However, regular inspections mandated by the agreement have not been held for the past three years — initially because of the coronavirus pandemic, and later because relations soured after Russia invaded Ukraine.

# GREEN DEAL INDUSTRIAL PLAN

## Why in news?

In a bid to support and expand its green industry, the European Union on February 1 revealed the “Green Deal Industrial Plan

## About

The European Green Deal Industrial Plan was announced by President von der Leyen in her speech at to the World Economic Forum in Davos in January 2023 as the *initiative for the EU to sharpen its competitive edge through clean-tech investment and continue leading on the path to climate neutrality*.

The move has come just a few months after the United States announced its *Inflation*

*Reduction Act (IRA)*, which contains billions of dollars of tax cuts for clean energy and climate change programs with incentives for US-based manufacturing.

The Plan aims to provide a more supportive environment for the scaling up of the EU’s manufacturing capacity for the net-zero technologies and products required to meet Europe’s ambitious climate targets.

It is based on four pillars:

A predictable and simplified regulatory environment, speeding up access to finance,

enhancing skills, and open trade for resilient supply chains.

The InvestEU Programme is well placed to boost net-zero investments in the EU.

InvestEU is the Union's instrument for catalysing private investments in EU priority areas.

### Proposed Acts and actions under the Plan

- Net-Zero Industry Act
- Critical Raw Materials Act
- European Sovereignty Fund
- Net-Zero Industry Academies

### Inflation Reduction Act of USA

The Inflation Reduction Act of 2022 (IRA) is a landmark United States federal law which aims to curb inflation by reducing the deficit, lowering prescription drug prices, and investing into domestic energy production while promoting clean energy.

The law, as passed, will raise \$738 billion and authorize \$391 billion in spending on energy and climate change,

Inflation Reduction Act is a much toned-down version of his election manifesto promise of the Build Back Better plan.

## GLOBAL QUALITY INFRASTRUCTURE INDEX (GQII)

### Why in news?

India's national accreditation system under the *Quality Council of India (QCI) has been ranked 5th in the world in the recent Global Quality Infrastructure Index (GQII) 2021.*

### About

The GQII ranks the 184 economies in the world on the basis of the quality infrastructure (QI). The GQII measures the relative development of countries' Quality Infrastructure.

Quality infrastructure (QI) refers to the public and private institutional framework needed to implement standardisation, accreditation and conformity assessment services including inspection, testing, laboratory and product certification. Governments often play an important role in QI.

Geographically, the top 25 QI systems are mainly located in Europe, North America, and Asia-Pacific, with some exceptions, such as India (10th), Brazil (13th), Australia (14th), Turkey (16th), Mexico (18th) and South Africa (20th).

India's overall QI system ranking continues to be in the Top 10 at the 10th position, with the standardization system (under BIS) at 9th and the metrology system (under NPL-CSIR) at 21st position in the world.

### Accreditation in India

Accreditation helps establish the competence and credibility of conformity assessment bodies (CABs) which perform testing, certification, inspection, etc.

The National Accreditation System as per international standards in India is established by the Quality Council of India (QCI), a body established in 1997 jointly by the Department for Promotion of Industry & Internal Trade (DPIIT), Ministry of Commerce & Industry, and the Indian industry.

It is operated through the constituent Boards of QCI, primarily the **National Accreditation Board for Certification Bodies (NABCB)**, which provides accreditation to the certification, inspection, and validation / verification bodies, and the **National Accreditation Board for Testing & Calibration Laboratories (NABL)**, which provides accreditation to the testing, calibration and medical laboratories.

Both, NABCB and NABL are signatories to the Multilateral Recognition Arrangements of the international bodies, the International Accreditation Forum (IAF), and the International Laboratory Accreditation Cooperation (ILAC), which provides international equivalence and acceptance to reports and certificates issued under their accreditation.

# NORTHERN IRELAND PROTOCOL AND WINDSOR AGREEMENT

## Why in news?

The United Kingdom Supreme Court ruled that the Northern Ireland Protocol, which is a post-Brexit agreement that created a trade border between Northern Ireland and the rest of the UK, is lawful.

## About

After Brexit, Northern Ireland remained the UK's only constituent that shared a land border with an EU member, the Republic of Ireland. EU and UK having different product standards, checks would be necessary before goods could move from Northern Ireland to Ireland.



## Good Friday Agreement

However, the two sides have had a long history of conflict, with a hard-fought peace secured only in 1998 under the **Belfast Agreement, also called the Good Friday agreement**. Fiddling with this border was thus considered too dangerous, and it was decided the checks would be conducted

between Northern Ireland and Great Britain. This was called the Northern Ireland Protocol.

## Northern Ireland Protocol

Under the protocol, **Northern Ireland remains in the EU single market**, and trade-and-customs inspections of goods coming from Great Britain take place at its ports along the Irish Sea. This applies to goods travelling from Great Britain (England, Scotland and Wales) to Northern Ireland.

The checks apply even if the goods are due to remain in Northern Ireland. The checks made trade between Great Britain and Northern Ireland cumbersome, with food products, especially, losing out on shelf life while they waited for clearance. Some taxation and spending policies of the UK government could not be implemented in Northern Ireland because of EU rules. The sale of medicines, too, was caught between different British and EU rules.

## Windsor Agreement

The UK government under Prime Minister Rishi Sunak on February 27 reached a landmark deal with the European Union (EU) on post-Brexit trade rules that will govern Northern Ireland.

**The 'Windsor Framework' will replace the Northern Ireland Protocol**, which had proved to be among the thorniest of Brexit fall-outs, creating problems both economic and political.

The framework has two crucial aspects – the introduction of a green lane and red lane system for goods that will stay in Northern Ireland and those that will go to the EU respectively; and the 'Stormont Brake', which allows Northern Ireland lawmakers and London to veto any EU regulation they believe affects the region adversely.

## INDO-US COOPERATION

*GS-II Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

### India-U.S. space cooperation

#### Context

India and the United States agreeing to advance space collaboration in several areas, under the 'initiative on critical and emerging technology' umbrella, including human space exploration and commercial space partnership, comes at a crucial time for both countries. This follows from the eighth meeting of the U.S.-India Civil Space Joint Working Group (CSJWG), that was held recently.

#### India – U.S. spaceflight missions

In November 2022, the U.S. kicked off its Artemis programme by launching the Orion spacecraft towards the moon and bringing it safely back to earth. India itself is set to embark on its first human spaceflight mission (Gaganyaan) in 2024. The two countries have also taken significant strides in advancing the private space sector.

India could secure technologies and expertise by collaborating with an advanced spacefaring nation; the U.S. could strengthen its relationship with India on a matter that seems less controversial than others.

But it is not straightforward: certain structural factors limit the extent to which the U.S. and India can collaborate in the

short term. This is why India-U.S. cooperation can advance at a measured pace, to enable sustainable long-term civilian and military space partnerships.

#### A mismatch in interests, capabilities

The first structural factor that limits long-term India-U.S. space cooperation is the *mismatch in the two nations' interests in outer space*. The U.S. has committed to returning to the moon — and this time to stay there for the long term. Although the U.S. and its partners stress the importance of maintaining capabilities in low-earth orbit, their ambitions are firmly set on the moon. In this regard, the Artemis Program, the Artemis Accords, and the Biden administration's National Cislunar Science & Technology Strategy constitute the foundation for American ambitions beyond earth orbits.

Meanwhile, India's scientific community focuses on building the nation's capability in and under earth orbits. The Indian Space Research Organisation (ISRO) currently undertakes fewer than 10 launches each year. The Gaganyaan human spaceflight programme hopes to sustain India's human presence in space for the long term. This is not to say that India does not aim for the moon, Mars or beyond. But India's top priority is to substantially increase its

satellite and launch capabilities in earth orbits and catch up with other spacefaring nations such as China.

*The asymmetry in capabilities* is the second structural factor limiting India-U.S. space cooperation. The U.S. has the highest number of registered satellites in space. It also has a range of launch vehicles serving both commercial and national-security needs.

Private entity SpaceX, for example, managed to achieve a record 61 launches in 2022, far higher than the number of launches undertaken by any other commercial entity or country. The American private sector has also assumed the challenge of replacing the International Space Station by 2030 with many smaller stations.

**The greatest challenge for India here is lack of capacity.** The country has just over 60 satellites orbit and cannot undertake double-digit launches annually. The Indian government also opened the space industry to the private sector only in 2020. Since the U.S. already has an extensive network of partners for space cooperation, it has few technical incentives to cooperate with India.

## Solutions

The standard solution to induce long-term cooperation is to sustain the engagement between academics, the private sector and state-led entities in the two countries. Sustained engagement could also take the form of collaborating on highly specialised projects *such as the NASA-ISRO Synthetic Aperture Radar (NISAR) mission*.

But these solutions are slow and not entirely suited for the new space age, where diplomacy struggles to keep up with the rate of technological innovation. **So, India and the U.S. must find novel solutions to cooperate in the new space age** to achieve a meaningful partnership.

One form of cooperation is a partnership between state and private entities; or, as agreed in the most recent meeting, a convention of American and Indian aerospace companies to advance collaboration under the National Aeronautics and Space Administration's (NASA) Commercial Lunar Payload Services (CLPS) programme.

Such an arrangement could be taken further. India could send its astronauts to train at American private companies. This could help India reduce its dependence on Russia while ISRO builds its own astronaut training centre.

Another novel arrangement could be a consortium led by the government-owned NewSpace India Limited which involves private companies in the U.S.

This setup could accelerate India's human spaceflight programme and give the U.S. an opportunity to accommodate Indian interests in earth orbits.

## India-US high tech boost

The United States and India are taking steps to strengthen their defense partnership, officials said Tuesday, the latest sign of cooperation between the two countries in the face of an increasingly assertive China.

The plans emerged following two days of meetings in Washington between government and business officials from the two countries and include greater collaboration on military-related industries and operational coordination in the Indo-Pacific.

Key among them are cooperation on developing jet engines and military munitions technology, according to a White House fact sheet.

Specifically, it said the US government would look to expedite a review of an application by US manufacturer General Electric to build jet engines in India for use on indigenous Indian aircraft.

## Tech ties

The US and India, along with Japan and Australia, are members of the Quadrilateral Security Dialogue -- known as the Quad -- an informal group focused on security that dates back to the early 2000s.

It has become more active

in recent years as part of efforts to counter China's reach and territorial claims in the Indo-Pacific.

On the sidelines of a Quad summit in Tokyo last May, *US President Joe Biden and Indian Prime Minister Narendra Modi announced the US-India initiative on Critical and Emerging Technology (iCET)*.

The meetings this week were the first under the scheme and brought together dozens of government officials, industry CEOs and senior academics from both countries.

In addition to defense technologies, Washington and New Delhi would work to "expand international collaboration in a range of areas — including artificial intelligence, quantum technologies, and advanced wireless," the White House fact sheet said.

A major industrial part of the meetings was an agreement to develop the semiconductor industry in India, which has the educated and skilled workforce needed to become a major player in building those key components.

Additionally, the two countries pledged to help develop next generation telecommunications in India, including 5G and 6G advanced cell phone technologies.

Washington and New Delhi also agreed to enhance cooperation in space, including helping India develop astronauts, its commercial space

sector and role in planetary defense.

## Background

High technology cooperation has long been a major focus of US-India relations. Early advances in India's nuclear and space programmes in the 1950s and 1960s involved significant inputs from the US. But the **US nuclear sanctions from the 1970s steadily whittled down the extent of bilateral high-tech cooperation.**

The historic **civil nuclear**

**initiative of 2005** opened the door for renewed technological cooperation. But residual restrictions on technology transfer in Washington and Delhi's political ambivalence and bureaucratic inertia prevented the best use of the new possibilities.

**The iCET process**, which will be monitored and driven from the PMO in Delhi and the White House in Washington, will hopefully bring greater coherence to this round of India-US technological

engagement.

Lending urgency to the iCET is the growing convergence of Indian and US interests in managing the security, economic, and technological challenges presented by a rising and assertive China.

India is also looking to reduce its over dependence on Russian weapons and military technology and to produce more weapons at home in partnership with western countries.

## INDIA FRANCE PARTNERSHIP

*GS-II Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

### About

The celebration by India and France of 25 years of their strategic partnership (January 26) presents an important opportunity for both to introspect on their relations.

Signed in 1998, the time-tested strategic partnership has continued to gain momentum over shared values and aspirations of peace, stability and, most importantly, their desire for strategic autonomy.

There are no real substantive disagreements between the two nations. France has emerged as a key trading partner of India with annual trade of \$12.42 billion in 2021-22.

It is the 11th largest foreign investor in India with a cumulative investment of \$10.31 billion from April 2000

to June 2022, which represents 1.70% of the total foreign direct investment inflows into India.

### The big picture

More importantly, it has emerged as a key defence partner for India, becoming the second largest defence supplier in 2017- 2021.

France has emerged as a major strategic partner for India with crucial defence deals and increased military to military engagement.

A key example of this is the inducting of the French *Scorpene* conventional submarines, being built in India under technology transfer agreement of 2005, and the Indian Air Force having received 36 Rafale fighter jets.

The Tata group has also tied up with Airbus to manufacture C-295 tactical transport aircraft

in Vadodara, Gujarat.

This line is expected to be expanded into other civilian and military aircraft manufacturing in a joint venture with France. These relations are further fortified with the robust network of military dialogues and regularly held joint exercises — Varuna (navy), Garuda (air force), and Shakti (army).

The importance of the defence partnership was further underscored in the recent statement by the French Ambassador to India, Emmanuel Lenain — that France is a willing partner for India as it builds its national industrial base for the defence industry and for critical strategic defence projects.

As the complexities in the international geopolitical order have emerged, both countries have worked towards

a deepening and broadening of their cooperation.

France was among the first countries with which India signed a civil nuclear deal. Paris also played a critical role in limiting India's isolation in the non-proliferation order after the 1998 nuclear tests.

In a sign of expanding cooperation, France supports India's bid for permanent membership of the United Nations Security Council as well as its entry into the Nuclear Suppliers Group.

An area of importance for both is climate change, where India has supported France in the Paris Agreement expressing its strong commitment towards mitigating climate change impact. New Delhi and Paris, as part of their joint efforts on climate change, launched the International Solar Alliance in 2015.

### Maritime ties

The deepening of the strategic partnership is also visible in their maritime cooperation. India and France are resident powers of the Indian Ocean and in the Indo-

Pacific.

The importance of the Indian Ocean Region was visible during the visit of French President Emmanuel Macron's visit to New Delhi in 2018 when the leadership of both countries welcomed the "Joint Strategic Vision of India-France Cooperation in the Indian Ocean Region" which presented a blueprint for a strengthening of ties.

In operational terms, Franco-Indian joint patrolling in the Indian Ocean signals New Delhi's intent to engage with like-minded partners in expanding its footprint in the Indian Ocean.

Maritime security has further gained momentum as both countries have articulated their common vision for a free, fair and open Indo-Pacific.

As both countries share a comprehensive strategy for the Indo-Pacific (it seeks to provide comprehensive solutions for maritime security, regional cooperation, climate change adaptation), India and France in September 2022 agreed to set up an Indo-Pacific Trilateral Development Cooperation

Fund that will support sustainable innovative solutions for countries in the region.

The two partners have formed a trilateral grouping with the United Arab Emirates to ensure maritime domain awareness and security from the east coast of Africa to the far Pacific.

While there are divergences over the Ukraine crisis, there is a broad understanding of each other's position and both countries are working together to coordinate on playing a constructive role in the crisis.

It also needs to be noted that Mr. Macron and Prime Minister Narendra Modi are among the few world leaders who have maintained open communication channels with Russian President Vladimir Putin and Ukraine's President Volodymyr Zelenskyy.

Both countries share concerns over the rise of China and its aggressive behaviour, regionally and globally, and have committed to working together to ensure that there is no imbalance in the Indo-Pacific.

## ONE YEAR OF RUSSIA – UKRAINE WAR

*GS-II Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.*

### Context

A year after Russia launched its invasion of Ukraine, there are signs of escalation everywhere. The West has recently announced the supply of more advanced

weapons to Ukraine, deepening its involvement in the conflict.

The anniversary of war comes in the backdrop of Russia's withdrawal from New START treaty.

### What's the current

### status of the war?

The West has recently announced the supply of more advanced weapons to Ukraine, deepening its involvement in the conflict. In response,



Russian President Vladimir Putin has already reinforced Russian positions along the 1,000-km long frontline in Ukraine.

Ukraine, with the free flow of weapons from the West, hopes to arrest the Russian advances and begin its own offensive to regain lost land. As the war is extended, risks of a direct confrontation between Russia and the North Atlantic Treaty Organisation (NATO), both nuclear powers, are also on the rise.

Russia wanted to install a Moscow friendly regime and to take the whole of Ukraine's east and south, stretching from **Kharkiv in the northeast** through the **Donbas in the east** (which comprises Luhansk and Donetsk) to **Odesa, the Black Sea port city in the southwest**, turning the country into a land-locked rump. Russia has failed to meet any of these objectives.

Nevertheless, Russia has taken substantial portions of

Ukrainian territories, including **Mariupol**. Russia's territorial gains in Ukraine peaked in March 2022, when it controlled some 22% of pre-2014 Ukraine.

**Ukraine recaptured some land in Kharkiv and Kherson.** But still, Russia controls some 17% of Ukraine.

Focused fighting has been going on in some flashpoints along the frontline including **Bakhmut, Donetsk and Zaporizhzhia**.

### **The West's strategy**

The West's approach has been two-fold: punish Russia's economy through sanctions and thereby weaken its war machine, while arming Ukraine to counter the Russian offensive.

The Western support has played a critical part in Ukraine's resistance and counter-offensive. The **U.S. is Ukraine's biggest aid provider** — it has pledged military and financial assistance worth over \$70 billion. The EU has

pledged \$37 billion and among the EU countries, the U.K. and Germany top the list.

Last year, after Ukraine suffered a series of setbacks in Mariupol, Severodonetsk and Lysychansk, the U.S. promised the delivery of its mid-range rocket systems such as HIMARS.

Now, when Russia is preparing for another offensive, the West is coming to Ukraine's rescue once again, with more advanced weapons, including missile defence systems, armoured vehicles, tank killers, battle tanks and precision bombs.

**While the approach of arming Ukraine has been effective in at least halting the Russian advances, hurting Russia economically has been a double-edged sword.**

Sanctions on Russia, one of the top global producers of oil and gas, hit the global economy hard, worsening an inflationary crisis across the West, particularly in Europe. Russia also took a hit, but it found alternative markets for its energy exports in Asia, redrawing the global energy export landscape.

Last year, despite sanctions, Russia raised its oil output by 2% and boosted oil export earnings by 20%, to \$218 billion. Russia also raked in \$138 billion from natural gas, a nearly 80% rise over 2021 — and this was in spite of the European push to cut gas imports from Russia.

The Russian economy was estimated to have contracted by 2% in 2022, but, according to the IMF, it is expected to grow 0.3% this year and 2.1% next year. In comparison, Germany, Europe's largest economy, is expected to grow 0.1% this year, while the U.K., Ukraine's second biggest backer, is projected to contract by 0.6%.

### What's happening inside Ukraine?

The Russian invasion turned President Volodymyr Zelensky into the face of the Ukrainian resistance. Mr. Zelensky, a former television comedian, was grappling with a host of political challenges when the war began. His approval rating had fallen to 28% and his regime was accused of persecuting the former President, Petro Poroshenko, on treason charges.

Corruption was rampant. In Donbas, a civil war between Russian-speaking separatists and the Ukraine army, including the neo-Nazi brigades, had been raging since 2014. But when Ukraine survived the initial Russian thrust and continued to resist the invasion, Mr. Zelensky emerged as a hero for many. He rallied western opinion and aid. He also seized the moment to bolster his grip on power at home.

### Is there a possibility for a negotiated settlement?

According to former Israeli Prime Minister Naftali Bennett,

both sides had exchanged several drafts about a potential peace plan in March 2022, but the U.S. and the U.K. staunchly opposed Ukraine reaching any agreement with Russia. Talks collapsed in March.

In July, Turkey brokered a deal on taking out Russian and Ukrainian food grains through the Black Sea. Warring parties had also reached some prisoner exchange agreements.

But barring these, talks between the two sides are non-existent. Russia, despite the slow progress of its "special military operation", remains adamant.

Mr. Zelensky recently stated that he would not reach any agreement with Russia making territorial compromises. There is absolutely no push from the West for talks. As the crisis continues, China has stepped in with its own peace initiative, the details of which are not known to the public yet.

### Reshaped Geopolitics because of the war

#### Increased focus on Security and Defence:

The war has re-energized the Europe-US security alliance. NATO has opened its door to the proposed inclusion of Sweden and Finland, that will, once in (Turkey's approval is awaited), form the new military frontiers of the alliance against Russia.

#### Trust Deficit:

The trust deficit between Russia and the West is at an-all time high. The US-led alliance is pouring weapons into Ukraine.

Though US President seems reluctant to accept all of Ukraine's demands, including for combat aircraft including F16s, perhaps mindful of the risk of widening the war.

#### China Factor:

Moscow formalized its friendship with China in 2022 as "limitless". But China also does not want to jeopardize its Europe ties.

China has not contributed with weapons to Russia and also expressed its reservation against nuclear war.

However, the US and Europe remain concerned about Chinese arms supplies to Russia.

#### India's Stand on this war

The Ukraine war has been an opportunity to practice strategic autonomy. Adopting a neutrality India has maintained its relationship with Moscow while iterating support to global peace.

India worked around Western sanctions to buy oil from Russia. As much as 25% of India's oil purchase is now from Russia, from less than 2% before the war.

Recently, India abstained on a UNGA resolution on first

anniversary of the war, asking Russia to withdraw from its territory as the resolution had limitations in reaching the lasting goal of securing lasting peace.

India has abstained on all three votes so far on the Ukraine crisis at the UN General Assembly since Russian invasion.

But the longer the war continues, the more pressure on India from the Western alliance

to choose the “right side”. India has expressed the hope that it can use its G-20 presidency to bring peace.

### **What can be done?**

For any peace plan to succeed, two complex issues should be addressed — Ukraine’s territories and Russia’s security concerns. Right now, Russia controls swathes of Ukraine’s land and the NATO keeps arming Kyiv, sharpening

the existing contradictions.

Ukraine, given its dependence on the West, would require clearance from western capitals for any final settlement, which also means that for a lasting solution, Washington and Moscow should reach some kind of understanding. As the war enters its second year, the possibility for such an understanding is very low. The war is set to grind on.



# SOCIETY &

# SOCIAL JUSTICE

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# MISSION ANTYODAYA SURVEY

## Why in the News?

Union rural development and Panchayati raj minister Giriraj Singh on Thursday launched Mission Antyodaya Survey 2022-23, which will shed light on how government schemes have benefited rural India and what is the current economic situation of the country's villages.

The Department of Rural Development has been conducting Mission Antyodaya Survey(MAS) across all Gram Panchayats in the country since 2017-18 with the purpose of transforming

## About

The Department of Rural Development has been conducting Mission Antyodaya Survey across all Gram Panchayats in the country since 2017-18 with the purpose of transforming lives and livelihoods of people on measurable outcomes through convergence of various schemes. **Annual survey in Gram Panchayats** across the country is an important aspect of **Mission Antyodaya framework**.

The survey aims to lend support to the process of participatory planning for **Gram Panchayat Development Plan (GPDP)** which will improve service delivery, enhance citizenship, create pace for an alliance of people's institutions, and groups and improve governance at the local level. The preparation of GPDPs is a comprehensive exercise that uses both primary and secondary data for preparing the final plan document for any GP.

MA Survey presents secondary data to carry out gap analysis. MA Survey data will also serve as a key input in the preparation of block and district plans.

The village-wise survey is expected to be conducted over a period of one month involving Community Resource Persons (CRPs). The survey is being conducted to collect village level data on 183 indicators under 216 data points of 21 sectors.

The survey questions have been categorized into five stratum: (i) Panchayat Infrastructure; (ii) Panchayat Services; (iii) Village Infrastructure; (iv) Village Services; and (v) Village Practices.

A total of 26 Central Government Ministries / Departments have been consulted for finalization

of the questionnaire. The questionnaire has been translated in 13 regional languages. The Ministry, in consultation with NIC-DRD, has developed the android mobile application with geo-tag feature for 36 assets in villages. The Ministry has also set up in-house HelpDesk for smooth resolution of queries related to the questionnaire and mobile application.

## 'Mission Antyodaya'

- It was adopted in the Union Budget 2017-18.
- It is a convergence and accountability framework aiming to bring optimum use and management of resources allocated by 27 Ministries/ Department of the Government of India under various programmes for the development of rural areas.
- It is envisaged as a state-led initiative with Gram Panchayats as focal points of convergence efforts.
- The Ministry of Panchayati Raj and the Ministry of Rural Development act as the nodal agents to take the mission forward.
- It aims to eradicate poverty in its multiple dimensions among rural households.
- Annual survey in Gram Panchayats across the country is an important aspect of Mission Antyodaya framework.
- It is carried out coterminous with the People's Plan Campaign (PPC) of the Ministry of Panchayat Raj .
- Its purpose is to lend support to the process of participatory planning for the Gram Panchayat Development Plan (GPDP).
- It helps to assess the various development gaps at the gram panchayat level, by collecting data regarding the 29 subjects assigned to panchayats by the Eleventh Schedule of the Constitution.

## Objectives

Ensuring effective use of resources through convergence of various Government Schemes with Gram Panchayats as the basic unit of planning.

Work with a focused micro plan for sustainable livelihood for every deprived household.

Conduct an annual survey on measurable outcomes at Gram Panchayat level to monitor the progress in the development process across rural areas.

Supporting the process of participatory planning for Gram Panchayat Development Plan

(GPDP), which will improve service delivery, enhance citizenship, create pace for an alliance of people's institutions and groups and improve governance at the local level.

Encourages partnerships with a network of professionals, institutions and enterprises to further accelerate the transformation of rural livelihoods.

## SUKANYA SAMRIDDHI YOJANA

### Why in the News?

PM Modi congratulates India post for opening more than 10 lakh Sukanya Samriddhi Account in two days.

### About

**Scheme under Ministry of Women and Child Development**

Small deposit scheme for girl child, launched as a part of the 'Beti Bachao Beti Padhao' campaign, which would fetch an attractive interest rate and provide income tax rebate.

The scheme offers a higher interest rate than PPF.

### Benefits

Interest rate on deposits Compounded annually with option for monthly interest payouts to be calculated on balance in completed thousands.

As applicable under section 80C of the IT Act, 1961, the scheme has been extended Triple exempt benefits i.e. there will be no tax on the

amount invested, amount earned as interest and amount withdrawn.

### Eligibility

1. Only for girls below the age of 10 years with a longer lock in period.
2. The account can be opened at any India Post office or branch of authorised commercial banks.
3. Parents or legal guardians can open deposits on behalf of a girl child (including adopted girl child) for up to 2 daughters aged below 10.

Minimum of Rs 250 of initial deposit with multiple of Rs 150 thereafter with annual ceiling of Rs.150000 in a financial year.

Maximum period upto which deposits can be made 15 years from the date of opening of the account.

The account shall mature on completion of 21 years from the date of opening of account or on the marriage of Account holder whichever is earlier.

## LEPROSY

### Why in news?

The Union Health Ministry has formulated the National Strategic Plan and Roadmap for Leprosy 2023-2027 for achieving zero cases of leprosy infection by 2030.

### Leprosy

Leprosy is an ancient disease with its earliest

remains discovered at the Indus Valley Civilization. ***Despite India being declared "Leprosy Eliminated" in 2005, the country still accounts for over half (52%) of the world's new leprosy patients.***

Leprosy or **Hansen's disease** is a chronic infectious disease caused by a bacillus, Mycobacterium Leprae (m leprae), which multiplies slowly and has a long incubation period,

on an average, 5-7 years.

Symptoms may occur within 1 year but can also take as long as 20 years or even more.

It is an ancient disease and has been endemic in India. Infection can lead to involvement of the nerves, respiratory tract, skin, and eyes. The nerve damage may result in a lack of ability to feel touch, pressure, pain, heat and cold, which may lead to the loss of parts of a person's extremities from repeated injuries or infection.

An infected person may experience muscle weakness and poor eyesight. Persons affected and their families also experience stigma and discrimination. There was no effective treatment for leprosy till the discovery of Multi-drug therapy (MDT) in the 1980s. Early diagnosis and treatment may prevent damage to the soft tissues and bones of hands, feet and face. Since the introduction of MDT, the incidence and prevalence of the disease has remarkably decreased.

## National Leprosy Eradication Programme (NLEP)

National Leprosy Eradication Programme (NLEP) was launched in 1983 with the objective to eradicate the disease through early case detection, reduction in the quantum of infection in the population and reduction in sources of infection.

It is an integrated programme with convergence with other health programmes. NLEP has introduced various innovative strategic initiatives since 2016 to strengthen the programme at the sub-national level.

The government is successful in achieving prevalence rate **1 case per 10,000 population at national level in 2005**. It is a matter of great concern that India has nearly 52 per cent of the total cases of Leprosy worldwide.

## National Strategic Plan & Roadmap for Leprosy (2023-27)

The strategy and roadmap will aid in advancing the campaign against leprosy, to stop transmission, by speeding case detection efforts and maintaining a robust surveillance infrastructure.

As India is progressing towards leprosy

eradication, a need of strong Anti Microbial Resistance surveillance system is required to gear up the system. These guidelines will provide the technical guidance in developing and sustaining a robust surveillance system for AMR surveillance in leprosy patients.

**Nikusth 2.0** is an integrated portal for leprosy case management under National Leprosy Eradication Programme (NLEP). It will aid in efficient data recording, analyzing and reporting of the data in the form of indicators and a real time dashboard at center, state and district levels.

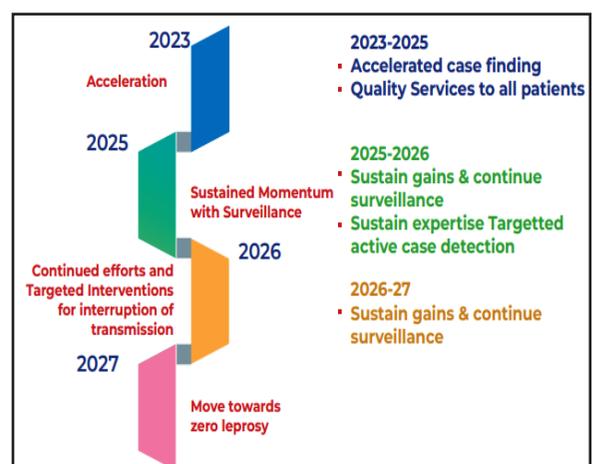
**Vision:** Leprosy free India with zero infection and disease, zero disability, zero stigma and discrimination.

**Goal:** Accelerate towards achieving Interruption of Leprosy Transmission in India.

### Specific objectives:

1. Strengthen leadership, commitment, and partnerships
2. Acceleration of Case Detection
3. Provision of Quality Services
4. Enhanced measures for Prevention of Disease, Disabilities, Stigma, Discrimination and Violation of Human Rights
5. Digitalization of Surveillance Systems

## WHO NTD Roadmap 2030





## CADAVER ORGAN TRANSPLANTS

Recently, the Ministry of Health and Family Welfare has modified National Organ Transplantation Guidelines, **allowing those above 65 years of age to receive an organ for transplantation from deceased donors.**

The Elderly can now register to receive organs from deceased donors. Previously, NOTTO (National Organ and Tissue Transplant Organisation) guidelines barred them. This violated the Right to Life of elderly. Preference will still be given to younger recipients, those above the age of 65 will not be completely barred from the process.

A patient irrespective of domicile State can register in any other State for a transplant (previously a domicile certificate was necessary). The patient will be allotted a unique ID by NOTTO upon registering. This will help in charting a 'One Nation One Policy,' for organ donation and transplantation. Health Ministry has intimated states to stop charging registration fees to patients.

### Status of Organ Donation in India:

India conducts the third-highest number of transplants in the world. Every year, an estimated 5-2 lakh people need a kidney transplant. Organs from deceased donors accounted for nearly 18% of all transplants in 2022 in the country. Telangana, Tamil Nadu, Maharashtra, Gujarat, and Karnataka account for more than 85% of the total deceased donations. A study shows over 40% of those in need of kidney transplants worldwide are over the age of 65. As per the Health Ministry, the number of organ transplants has increased by over three times from 4,990 in 2013 to 15,561 in 2022. India has an organ donation rate of about 52 per million population. **In comparison, the organ donation rate in Spain is 49.6 per million population which is the highest in the world.**

## The tweaks in policy

According to officials familiar with the matter, the guidelines are likely to undergo following changes:

### UPPER LIMIT CHANGED:

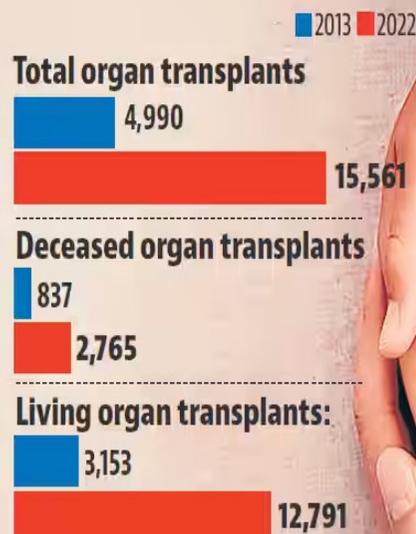
The Centre has removed the upper age limit as life expectancy has increased, and a 65-year-old is no longer considered a very old patient.

### NO DOMICILE REQUIREMENT:

A citizen can now register for organ donation in any state; previous requirement of registering in the state of domicile has been removed

### NO REGISTRATION FEES:

The Centre has asked state governments to stop taking fees to register a patient for organ transplants



Since health is a state subject, the Centre has begun consultation with states to bring them on board with the changes



# THE ROLE OF LABOUR UNIONS IN EMERGING SECTORS

*GS-I Government policies and interventions for development in various sectors and issues arising out of their design and implementation.*

## Why in the News?

There have been many reports of layoffs in the last few months, especially in emerging sectors. Layoffs have been taking place not only in India but in major economies like the U.S. too. Large, medium and small enterprises as well as start-ups have let go of dozens or even thousands of workers.

## What are the Major reasons for the lay-offs

- Impact of COVID-19 pandemic
- Decreased investment
- Decreased demand for goods and services
- Increased competition
- Changes in business strategy
- Automation and technology advancements
- Re-evaluation of company goals and priorities
- Mergers and acquisitions
- Financial difficulties
- Changes in government policies and regulations

## The Amazon story

Amazon workers at the warehouse at Staten Island called JFK8 succeeded in forming the Amazon Labour

Union.

Amazon reacted by filing numerous objections with the National Labour Relations Board, the federal body that protects the rights of private sector employees to join together.

On the other hand, employees at the warehouse near Albany voted overwhelmingly against unionisation in October 2022 as many of them were sceptical of the bargaining power of a union vis-à-vis a giant like Amazon.

## Case study of the IT sector

On the demand side, the IT and IT-enabled Services employees felt no need for trade unions as unions are typically associated with manual labour, while IT employees are associated with “elitism” and “professionalism”.

It is believed that IT employees do not need trade unions as they have competitive compensation pay packages, supposedly good conditions of work and a mechanism to address grievances. And so, they stay on and are loyal to the company and the industry.

If these conditions are violated, they switch to other organizations as they have the required skill sets (exit); hence,

labour turnover in this sector has been rather high.

They do not collectively bargain or strike or resort to legal action as middle-class employees who go to court would be stigmatized (voice). And many survive by simply keeping quiet (loyalty).

## Importance of Labour Unions in Emerging Sectors

### Job Security and Protection against Mass Lay-offs:

Labour unions play an important role in advocating for job security and protecting workers against mass layoffs, particularly in emerging sectors where layoffs may be more widespread.

### Negotiation of Severance Packages:

Labour unions can negotiate with employers to provide adequate severance packages for workers affected by mass lay-offs, helping to mitigate the financial impact of job loss.

### Support for Re-employment and Career Development:

Labour unions can provide support and resources for re-employment and career development for workers who have been laid off, helping them

to find new job opportunities and secure their financial future.

### Advocacy for Workers' Rights and Protections:

Labour unions can use their voice and influence to advocate for workers' rights and protections against mass lay-offs, working to prevent layoffs and ensure that workers are treated fairly and equitably.

### Collective Bargaining Power:

By pooling their resources and bargaining power, labour unions can negotiate with employers to secure better wages, benefits, and working

conditions for workers, making them less vulnerable to layoffs and more able to secure their financial future.

### Conclusion

Labour unions play a crucial role in emerging sectors by advocating for the rights and interests of workers.

In industries such as technology and renewable energy, where working conditions and job security may be uncertain, unions provide a voice for employees and negotiate fair wages, benefits, and working conditions.

Additionally, labour unions also work to address issues

such as diversity, equity, and inclusion in the workplace.

However, the growth of these industries has not always been met with a corresponding increase in union membership, and unions must continue to adapt to the changing landscape of work to remain relevant.

Nevertheless, the role of labour unions in emerging sectors remains critical for ensuring that the benefits of technological and economic progress are shared equitably and sustainably among all stakeholders.

## ANTIMICROBIAL RESISTANCE AND INTERNATIONAL EFFORTS

### Antimicrobial resistance

Antimicrobial Resistance (AMR) occurs *when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines* making infections harder to treat and increasing the risk of disease spread, severe illness and death.

As a result of drug resistance, antibiotics and other antimicrobial medicines become ineffective and infections become increasingly difficult or impossible to treat.

Antibiotics are becoming increasingly ineffective as drug-resistance spreads globally leading to more difficult to treat infections and death.

New antibacterials are urgently needed – for example, to treat carbapenem-resistant gram-negative bacterial infections as identified in the WHO priority pathogen list. However, *if people do not change the way antibiotics are used now, these new antibiotics will suffer the same fate as the current ones and become ineffective.*

The cost of AMR to national economies and their health systems is significant as it affects productivity of patients or their caretakers through prolonged hospital stays and the need for more expensive and intensive care.

Without effective tools for the prevention and adequate treatment of drug-resistant

infections and improved access to existing and new quality-assured antimicrobials, the number of people for whom treatment is failing or who die of infections will increase. Medical procedures, such as surgery, including caesarean sections or hip replacements, cancer chemotherapy, and organ transplantation, will become more risky.

### INTERNATIONAL EFFORTS

#### Global Action Plan on Antimicrobial Resistance (GAP)

Globally, countries committed to the framework set out in the Global Action

Plan1 (GAP) 2015 on AMR during the 2015 World Health Assembly and committed to the development and implementation of multisectoral national action plans.

It was subsequently endorsed by the Governing Bodies of the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE).

To ensure global progress, countries need to ensure costing and implementation of national action plans across sectors to ensure sustainable progress. Prior to the endorsement of the GAP in 2015, global efforts to contain AMR included the WHO global strategy for containment of Antimicrobial Resistance developed in 2001 which provides a framework of interventions to slow the emergence and reduce the spread of AMR

### **World Antimicrobial Awareness Week (WAAW)**

WAAW was previously called World Antibiotic Awareness Week. Since 2020, it has been called World Antimicrobial Awareness Week. This reflects the broadened scope of WAAW to include all antimicrobials including antibiotics, antifungals, antiparasitics and antivirals.

Held annually since 2015, WAAW is a global campaign that aims to raise awareness of antimicrobial resistance

worldwide and encourage best practices among the general public, health workers and policy makers to slow the development and spread of drug-resistant infections.

### **The Global Antimicrobial Resistance and Use Surveillance System (GLASS)**

WHO launched the Global Antimicrobial Resistance and Use Surveillance System (GLASS) in 2015 to continue filling knowledge gaps and to inform strategies at all levels.

GLASS has been conceived to progressively incorporate data from surveillance of AMR in humans, surveillance of the use of antimicrobial medicines, AMR in the food chain and in the environment.

GLASS provides a standardized approach to the collection, analysis, interpretation and sharing of data by countries, territories and areas, and monitors the status of existing and new national surveillance systems, with emphasis on representativeness and quality of data collection. Some WHO regions have established surveillance networks that provide technical support to countries and facilitate enrollment into GLASS.

### **FAO Action Plan on AMR 2021–2025**

The document outlines the FAO Action Plan on Antimicrobial Resistance

2021–2025 which serves as a roadmap for focusing global efforts to address AMR in the food and agriculture sectors.

The aim of this plan is to help accelerate progress in developing and implementing multi-sectoral National Action Plans to tackle AMR by calling attention to strategic priorities and areas of expertise for FAO support.

### **Muscat Manifesto**

The Third Global Ministerial Conference on Antimicrobial Resistance concluded in Oman, with the issue of The Muscat Manifesto, which aims to accelerate One Health actions on antimicrobial resistance to achieve the 2030 Sustainable Development Goals.

The Muscat Manifesto declaration called on the four-way alliance formed by the United Nations, made up of the World Health Organisation (WHO), Food and Agriculture Organisation (FAO), the World Organisation for Animal Health (WOAH) and their joint secretariats concerned with antimicrobial resistance, to provide the necessary sectoral technical support and guidance in setting standards and policies to implement these goals and procedures. This includes the administrative boards of these organisations setting the relevant provisions and the concerned authorities working in related human and animal health and fields.

The conference focused on three health targets: reduce the total amount of antimicrobials used in the agri-food system at least by 30-50% by 2030; eliminate use in animals and food production of antimicrobials that are medically important for human health; and ensure that by 2030 at least 60% of overall antibiotic

the effectiveness of the government's initiatives for hand hygiene and sanitation programmes such as Swachh Bharat Abhiyan, Kayakalp and Swachh Swasth Sarvatra.

The government has also attempted to increase community awareness about healthier and better food production practices, especially

promotion in livestock. It also called for scrutiny of prescriptions to assess antibiotic usage in hospitals and among doctors. Everything in these policies now needs strong implementation on the ground.

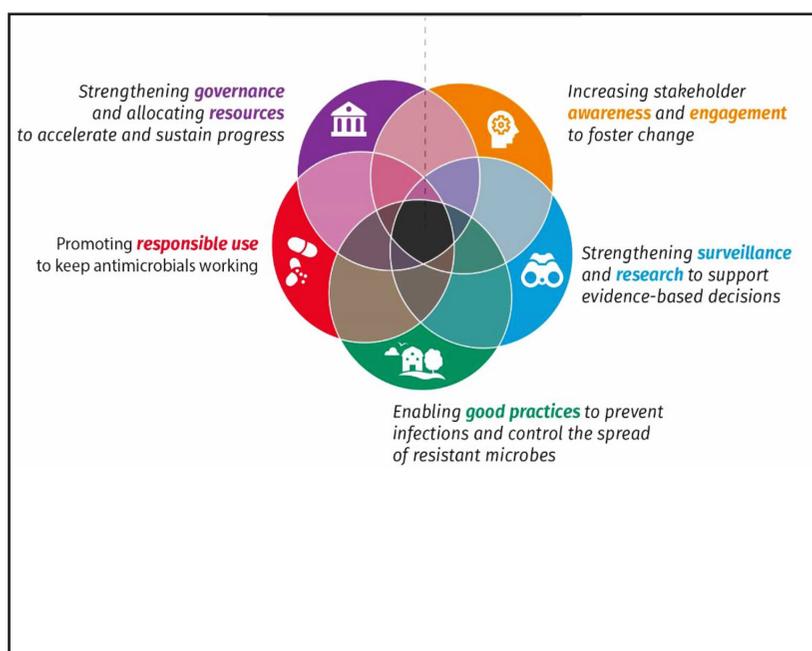
In the line with NAP-AMR three states have launched their state action plan

Kerala has launched KARSAP

Madhya Pradesh has launched MP-SAPCAR

Delhi has launched SAPCARD

**AMR Surveillance Network:** ICMR has established AMR surveillance and research network (AMRSN) in 2013, to generate evidence and capture trends and patterns of drug resistant infections in the country. This network comprises of 30 tertiary care hospitals, both private and government.



consumption in humans is from the WHO "Access" group of antibiotics.

## Efforts of India

The **National Action Plan on Antimicrobial Resistance (2017-21)** emphasised

in the animal food industry. The **National Health Policy 2017** also offered specific guidelines regarding use of antibiotics, limiting the use of antibiotics as over-the-counter medications and banning or restricting the use of antibiotics for growth

# Economic Development & Agriculture



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## FLIPPING AND REVERSE FLIPPING

### Why in news?

Economic Survey 2022-23 has suggested measures like simplifying ESOP taxation, and easier corporate laws like in the US and Singapore to accelerate reverse-flipping among startups, namely moving domicile back to India

### About

Flipping refers to the process of transferring the entire ownership of an Indian company to an overseas entity, accompanied by a transfer of intellectual property (IP) and all data hitherto owned by the Indian company. This effectively

transforms an Indian company into a 100 per cent subsidiary of a foreign entity, with the founders and investors retaining the same ownership via the foreign entity, having swapped all shares.

Reverse Flipping is the process of shifting the domicile of those companies back to India who flipped earlier. Companies reverse flip because of easy access to capital from private equity and venture capital, changes in rules regarding round-tripping, and the growing maturity of India's capital market

## GST APPELLATE TRIBUNAL

### Why in news

The Goods and Services Tax (GST) Council reached a broad consensus on the long-awaited constitution of the GST Appellate Tribunal to resolve the rising number of disputes under the 68-month old indirect tax regime that are now logging High Courts and other judicial fora.

The Council reduced the tax levy on a few items, including pencil sharpeners.

Finance Minister Nirmala Sitharaman, who chairs the Council, also announced that the Centre was releasing GST compensation dues to States amounting to 33,506 crore on Saturday.

The money comes from the exchequer's own coffers as the GST Compensation Cess Fund does not have an adequate balance, and will be recouped from future cess collections.

Goods and Services Tax Appellate Tribunal is the forum of second appeal in GST laws and the first common forum of dispute resolution between Centre and States.

The appeals against the orders in first appeals issued by the Appellate Authorities under the Central and State GST Acts lie before the GST Appellate Tribunal, which is common under the Central as well as State GST Acts.

Being a common forum, GST Appellate Tribunal will ensure that there is uniformity in redressal of disputes arising under GST, and therefore, in implementation of GST across the country.

Chapter XVIII of the CGST Act provides for the Appeal and Review Mechanism for dispute resolution under the GST Regime.

Section 109 of this Chapter under CGST Act empowers the Central Government to constitute, on the recommendation of Council, by notification, with effect from such date as may be specified therein, an Appellate Tribunal known as the Goods and Services Tax Appellate Tribunal for hearing appeals against the orders passed by the Appellate Authority or the Revisional Authority.

## CAPITAL GAINS TAX

Under the Income Tax Act, gains from the sale of capital assets, both movable and immovable, are subject to 'capital gains tax'. It covers real estate, gold, stocks, mutual funds, and various other

financial and non-financial assets. According to the Income Tax Act, if a person inherits property and does not sell it, no capital gains tax is required. However, if the person who inherited the property

decides to sell it, he or she will have to pay tax on the earnings.

**Exclusions:** The following items are not considered capital assets:

Any stock, consumables, or raw materials stored for business or profession.

Personal items held for personal use, such as clothing and furniture

Agricultural land in India's rural areas

The central government's 6½% per cent gold bonds (1977) or 7 per cent gold bonds (1980) or national defence gold bonds (1980).

Special bearer bonds (1991)

A gold deposit bond or deposit certificate issued under the Gold Deposit Scheme (1999) or the Gold Monetisation Scheme (2015).

### Short-term capital gains tax

Normally if an asset is held for less than 36 months, any gain arising from selling it is treated as a short-term capital gain (STCG). The term for immovable assets, such as real estate, buildings, and

land, has been decreased from 36 to 24 months.

### Long-term capital gains tax

If the asset is held for 36 months or more. However, Shares and equity mutual funds with a holding period of 12 months or more qualify as 'long-term'. Current tax laws state LTCG arising on the sale of listed equity shares or equity oriented mutual funds are exempt from tax if one pays Securities Transaction Tax (STT) on the sale transaction. Any of the assets listed below are considered long-term investments if you own them for more than a year:

Zero-Coupon Bonds (not dependent on whether they are quoted or not)

Units of the Unit Trust of India (UTI) (not dependent on whether they are quoted or not)

Units of equity-based mutual funds (not dependent on whether they are quoted or not)

Securities that are listed on a recognised Indian stock market. Government securities, bonds, and debentures are examples of such securities.

Preference shares or stocks held in a corporation that is listed on a recognised stock exchange in India.

## ADDITIONAL SURVEILLANCE MECHANISM (ASM)

The National Stock Exchange (NSE) placed Adani Enterprises, Adani Ports, and Ambuja Cements under the additional surveillance mechanism (ASM) in the wake of accusations of stock manipulation and fraud levelled against the group by New York-based short seller Hindenburg Research.

The ASM was introduced in 2018 with the intention to protect investors from market volatility and unusual changes in share price. It is placed on securities with surveillance concerns based on objective parameters viz. Price / Volume variation, Volatility etc. in addition to other surveillance measures. The shortlisting of securities for placing in ASM is based on criteria that are jointly decided by the Securities and Exchange Board of India (SEBI) and exchanges, covering the parameters of "high low variation, client concentration, PE,

close to close price variation, market capitalisation, volume variation, delivery percentage, and number of unique PANs". An ASM shortlisting signals to investors that the stocks have seen unusual activity. The shortlisting of securities under ASM is purely on account of market surveillance and it should not be construed as an adverse action against the concerned company / entity.

### How does it work?

For instance, the stock will be moved to a 5% price band the day it joins the ASM list; from then on, it may only move 5% up or down from the previous day's closing level. As a result of this limit violation, the stock can no longer trade on the market once this limit is violated. In addition, the investor ought to have 100% margin money

to trade the stock as of the fifth day. The selected securities will be monitored further, based on

predetermined criteria and transferred into Trade to Trade settlement once the criterion is met.

## MILLET INTERNATIONAL INITIATIVE FOR RESEARCH AND AWARENESS (MIIRA)

On the sidelines of G20 presidency, India is planning to propose the launch of a global initiative to encourage the consumption and production of millets.

The millet research programs will coordinate millet research programmes at the international level. India's plan to launch MIIRA is in line with the United Nations declaring 2023 as the International Year of Millets. For MIIRA to take off, India will contribute the "seed money" while each G20 member will later have to contribute to its budget in the form of a membership fee. The Indian Institute of Millet Research in Hyderabad will be supported as the Center of Excellence for sharing best practices, research, and technologies at the international level. The Indian Institute of Millet Research in Hyderabad will be supported as the Center of Excellence for sharing best practices,



research, and technologies at the international level. MIIRA's secretariat will be in Delhi.

### Millets

These are small-grained cereals that require less water than rice and wheat and are mainly grown in rainfed areas. Major millet crops: sorghum (jowar), pearl millet (bajra), foxtail millet (kangni/Italian millet), and finger millet (ragi/mandua). According to the Ministry of Agriculture, bajra, jowar, and ragi accounts for nearly 7% of

the gross cropped area in India making millets the "Nutri Cereals" .

India is the largest producer of millet in the world. It Accounts for 20 % of global production and 80 % of Asia's production. India, Nigeria and China are the largest producers of millets in the world, accounting for more than 55% of the global production.

### Why is the millet push so important for India and the world?

The FAO says millets are "an ideal solution for countries to increase self-sufficiency and reduce reliance on imported cereal grains" as they can grow on arid lands with minimal inputs and are resilient to changes in climate. At the launch of the IYM in December 2022, it also invoked millets ties to indigenous peoples' culture and traditions, saying they "help guarantee food security in areas where they are culturally relevant." India has long acknowledged millets' place in its history, although the nutri-cereals suffered significant reversals in area under cultivation and production as well as role in Indians' food baskets after the Green Revolution.

Millets are richer in key nutrients than cereals that are, at present, considered staple, even as they have a lower glycemic index, with obvious implications for health in terms of reduced risk of diabetes and associated ailments. They are also vastly more climate-friendly, using 70% less water than rice, whose cultivation is also a source of GHG emissions. They need 40% less energy for processing and can survive extreme heat and water scarcity, making them ideal for cropping as climate change effects intensify and foodgrains such as rice and wheat increasingly come under threat.

### Steps taken towards promoting millets

The Department of Agriculture and Farmers

Welfare on the MyGov platform has launched various competitions to raise awareness of the benefits of millets. In 2018, the Ministry of Agriculture declared millets and the two pseudo

millets — buckwheat (kuttu) and amaranth (chaulai) — as ‘Nutri Cereals’ for their “high nutritive value”.

## ELECTRONIC GOLD RECEIPTS

In order to encourage buying of electronic gold, the government announced that there would be no capital gains tax if physical gold is converted to an Electronic Gold Receipt (EGR) and vice versa. This announcement was made by Nirmala Sitharaman in the Union Budget 2023.

EGRs are digital receipts of gold issued against the amount of physical gold lying with vault providers. These receipts are issued by the vault managers and will be in accordance with SEBI (Securities and Exchange Board of India) regulations. They can be bought and sold like stocks through exchanges. EGRs allow people to invest in gold from a very small amount and also provide the option of taking delivery. One can also convert their physical gold into EGRs through a registered vault member. Under this form of gold, the trading exchange holds the underlying value of the receipt in physical gold in a vault. That means investors buy the gold in

dematerialised form and are given gold receipts instead of physical gold. The process is similar to the physical form of equity shares.

All market participants will be catered to by EGRs, so buyers and sellers on the exchange will include both individual investors and business participants along the value chain, such as importers, banks, refiners, bullion traders, jewelry manufacturers, and retailers.

### Benefits Exchange Gold Receipts (EGR)

Electronic, Effective and Transparent Platform for Bullion Trading

Efficient Price Discovery and Standardization of Gold

Assurance in the Quality of Gold

Settlement Guarantee to the Investors

Fungibility of the gold delivery.

## AGRI-STARTUP ACCELERATOR FUND

### Why in the News?

In the Budget Speech, the Finance Minister stated that an Agriculture Accelerator Fund will be set-up.

### Agri Startups

Agricultural startups in India have been gaining immense popularity in recent years as they aim to modernize and improve the traditional agricultural sector in the country.

### Productivity and innovation

The primary objectives of these startups is to increase the productivity and efficiency of Indian agriculture.

They use innovative technologies like precision farming, smart irrigation systems, and weather-based advisory services to optimize crop

yield and minimize wastage.

These technologies help farmers make informed decisions regarding seed selection, fertilizer application, and pest management.

They also provide real-time data and insights to farmers, enabling them to make informed decisions about their crops.

### Financial services

They provide access to financial services and products like microfinance and crop insurance for farmers.

These financial services allow farmers to invest in their operations and mitigate the risk of crop failure due to natural calamities or other factors.

### Logistics and supply chain

Agricultural startups in India are working to improve the supply chain and logistics of the

agricultural sector.

They are using technology to streamline the distribution of agricultural produce and reduce the number of intermediaries involved in the supply chain.

This helps to ensure that farmers receive a fair price for their produce and reduces the post-harvest losses that are common in the traditional agricultural sector.

## Significance of Agriculture Accelerator Fund

Agriculture Accelerator Fund would empower many more such agri-startups who would play a crucial role in transforming the traditional agricultural sector and helping farmers better income.

These startups are using innovative technologies, financial services, and improved supply chain systems to improve the efficiency and profitability of Indian agriculture.

With their continued growth and expansion,

the agricultural sector in India has the potential to become one of the leading agricultural producers in the world, providing numerous economic and social benefits to the country and its people.

## Benefits

It is to encourage agri-startups by young entrepreneurs in rural areas and **to increase digital infrastructure in the rural areas and boost startups** in agriculture.

The Fund will aim at bringing innovative and affordable solutions for challenges faced by farmers, and will also bring in modern technologies to transform agricultural practices, increase productivity and profitability.

The fund will work towards **implementing cost-effective solutions to address the various challenges faced by farmers** by introducing cutting-edge technologies and increasing output.

# MORGAN STANLEY CAPITAL INTERNATIONAL

## Why in news?

Global index provider MSCI has changed its weightage for four Adani Group stocks in its various widely tracked indices

## About

MSCI, or Morgan Stanley Capital International, is owned by the multinational investment management and financial services company Morgan Stanley. It is headquartered in New York

It is an investment research firm that provides stock indexes, portfolio risk and performance analytics, and governance tools to institutional investors and hedge funds.

It is a leading provider of critical decision support tools, including stock indexes, and services for the global investment community. It has over 160,000 indexes in its portfolio.

MSCI is a global provider of equity, fixed

income, real estate indexes, multi-asset portfolio analysis tools, and climate products.

## MSCI Emerging Markets Index

The MSCI Emerging Markets Index is an index created by Morgan Stanley Capital International (MSCI) designed to measure equity market performance in global emerging markets.

It consists of indices from 23 emerging economies such as Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey and the United Arab Emirates.

The Index is available for a number of regions and market segments that accounts for approximately 85% of the free float-adjusted market capitalization in each of the 23 countries

## MSCI India Index

The MSCI India Index is designed to measure the performance of the large and mid-cap segments of the Indian market.

With 113 constituents, the index covers approximately 85% of the Indian equity universe.

The index is reviewed quarterly — in February, May, August, and November — with the objective of reflecting the change in the underlying equity markets in a timely manner, while limiting undue index turnover.

## ATMANIRBHAR CLEAN PLANT PROGRAM

### Why in the News?

In order to increase domestic production, the Center plans to establish 10 “Clean Plant Centers” as the demand for fruits like apple, avocado and blueberry has increased over time. These centers will be set up under the ‘Atmanirbhar Clean Plant Program’, which was announced by the Finance Minister in the Union Budget 2023-24.

### About

The concept of Clean Plant Centres is unique in itself and does not exist in India earlier. The 10 centers will be established for fruit crops like apple, walnut, almond, grapes, mango, pomegranate, etc., and will be fully funded by the Centre.

The centers will be implemented in a PPP mode in partnership with research organizations, agriculture universities and private sector partners. The Clean Plant Centres will provide services of disease diagnostic, therapeutics, multiplying of plants and generation of mother plants.

The demand for imported planting material of various fruit plants has risen sharply over the years (for example, from 21.44 lakh apple plants in 2018 to 49.57 lakh imported in 2020). The process of importing plants is very cumbersome, as the imported plants must be kept in quarantine for two years. After the establishment of the Clean Plant Centres, this period will be reduced to six months.

### Atmanirbhar Clean Plant Program

The Program will be launched with an outlay of 2,200 crores (in the next 7 years till 2030) to boost availability of disease-free, quality planting

material for high value horticultural crops. The Program will aim to -

- Enhance the yield of horticulture crops,

- Disseminate and adopt climate resilient varieties,

- Protect the ecosystem through proactive virus and disease control measures.

The programme will be anchored by the **National Horticulture Board (NHB)** which in turn will set up Clean Plant Centers across the country and ensure the global competitiveness of the Indian horticulture sector. The centers will work with the stakeholders so that they adopt clean plant seeds and nurseries.

### Need for the Atmanirbhar Clean Plant Program

To adopt best practices - Many advanced countries like the US, Netherlands, and Israel run clean plant programmes

India is a top producer of many fruits like banana, mango, pomegranate and papaya, yet its contribution in exports is not up to the mark, sometimes owing to poor quality of the produce. For example, India's share in global banana production is 27%, but the share in exports is around 1% only.

Boost horticulture and exports. The area under horticulture in India has increased from 23.4 to 27.5 million hectares (in the last 7 years), while the production has increased from 280.9 to 333.25 MT (18.63%).

# STOCK MARKET REGULATION IN INDIA

*GS- III Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.*

## Why in news?

On February 10, the Supreme Court asked the Securities and Exchange Board of India (SEBI) and the government to produce the existing regulatory framework in place to protect investors from share market volatility. After short seller Hindenburg Research published a report in January accusing the Adani Group of stock market manipulation and accounting fraud, its shares plummeted and investors were reported to have lost lakhs of crores.

## Laws governing the market

The securities market in India is regulated by four key laws —

The Companies Act, 2013, the Securities and Exchange Board of India Act, 1992 (SEBI Act),

the Securities Contracts (Regulation) Act, 1956 (SCRA) and

the Depositories Act, 1996.

The framing of these laws reflect the evolution and development of the capital market in India.

## The Securities and Exchange Board of India Act, 1992 (SEBI Act),

The SEBI Act empowers SEBI to **protect the interests of investors** and to promote

the development of the capital/securities market, besides regulating it.

SEBI was given the power to **register intermediaries** like stock brokers, merchant bankers, portfolio managers and **regulate their functioning** by prescribing eligibility criteria, conditions to carry on activities and periodic inspections.

It also has the power to **impose penalties** such as monetary penalties, including suspending or cancelling the registration.

## The Securities Contracts (Regulation) Act, 1956 (SCRA)

The SCRA empowers SEBI to recognise (and derecognise) stock exchanges, prescribe rules and bye laws for their functioning, and regulate trading, clearing and settlement on stock exchanges.

## The Depositories Act, 1996.

As part of the development of the securities market, Parliament passed the Depositories Act and SEBI made regulations to enforce the provisions. This Act introduced and legitimised the **concept of dematerialised securities** being held in an electronic form. Today almost all the listed securities are held in dematerialised form.

SEBI set up the infrastructure for doing this by registering depositories and depository participants. The depository regulations empower SEBI to regulate functioning of depositories and depository participants by prescribing eligibility conditions, periodic inspections and powers to impose penalties including suspending or cancelling the registration as well as monetary penalties.

## Can SEBI step in to curb market volatility?

While SEBI does not interfere to prevent market volatility, exchanges have circuit filters — upper and lower — to prevent excessive volatility. But SEBI can issue directions to those who are associated with the market, and has powers to regulate trading and settlement on stock exchanges.

Using these powers, SEBI can direct stock exchanges to stop trading, totally or selectively. It can also prohibit entities or persons from buying, selling or dealing in securities, from raising funds from the market and being associated with intermediaries or listed companies.

## What are the guidelines on fund-raising?

The Companies Act, which regulates companies incorporated/registered in

India, has delegated the authority to enforce some of its provisions to SEBI, including the regulation of raising capital, corporate governance norms such as periodic disclosures, board composition, oversight management and resolution of investor grievances.

In order to regulate fund-raising activities, SEBI first brought out a set of guidelines called the **Disclosure and Investor Protection Guidelines** which were thereafter subsumed into a more comprehensive Issue of Capital and Disclosure Requirement Regulations. In order to ensure that listed companies followed corporate governance norms, SEBI notified the **Listing Obligations and Disclosure Requirements Regulations in 2015**.

Besides these regulations, the **Collective Investment Regulations** define a CIS (collective investment scheme) and provide for penal actions against those running unregistered CIS schemes. Entities involved in fund-raising through issue of capital such as merchant bankers are also regulated through specific regulations.

## Stock exchanges

A stock exchange, securities exchange, or bourse is an exchange where stockbrokers and traders can buy and sell securities, such as shares of stock, bonds and other financial instruments. Stock exchanges may also provide facilities for the issue and redemption of such securities and instruments

and capital events including the payment of income and dividends.

Securities traded on a stock exchange include stock issued by listed companies, unit trusts, derivatives, pooled investment products and bonds. Stock exchanges often function as “continuous auction” markets with buyers and sellers consummating transactions via open outcry at a central location such as the floor of the exchange or by using an electronic trading platform

The SCRA has empowered SEBI to recognise and regulate stock exchanges and later commodity exchanges in India; this was earlier done by the Union government.

In fact, the term “securities” is defined in the SCRA and **powers to declare an instrument as a security remain vested in SEBI**. The rules and regulations made by SEBI under the SCRA relate to listing of securities like equity shares, the functioning of stock exchanges including control over their management and administration.

These include **powers to determine the manner in which a settlement is done** on stock exchanges (and to keep them with the times for e.g. T+1) and recognising and regulating clearing corporations, which are central to the management of the trading system.

An important aspect of the regulation of stock exchanges is also the provision

for **arbitrating disputes** that arise between stock brokers who trade on stock exchanges and investors who are clients of such stock brokers. The Act also seeks to protect the interests of investors by creating an **Investor Protection Fund** for each stock exchange.

## Safeguards against fraud

Fraud undermines regulation and prevents a market from being fair and transparent. SEBI notified the **Prohibition of Fraudulent and Unfair Trade Practices Regulations in 1995** and the **Prohibition of Insider Trading Regulations in 1992** to prevent the two key forms of fraud, **market manipulation and insider trading**.

## Manipulation

Stock market manipulation is conduct or technique used by stock market entities to fool the investors by **artificially affecting the prices of securities**. These entities undertake various measures to falsely increase or decrease the demand for the securities to represent them as a profitable investment even when they know securities to be fundamentally flawed. Almost all the entities indulge in market manipulation for personal gains and exit their positions when their predetermined goals are achieved.

## Insider Trading

Illegal insider trading refers generally to buying or selling a

security, in breach of a fiduciary duty or other relationship of trust and confidence, on the basis of material, nonpublic information about the security. Insider trading violations may also include “tipping” such information, securities trading by the person “tipped,” and securities trading by those who misappropriate such information.

It must be noted that violation of these regulations are predicate offences that can lead to a deemed violation of the Prevention of Money Laundering Act.

**SEBI has been given powers of a civil court** to summon persons, seize documents and records, attach bank accounts and property and to carry out investigations. Using these powers, SEBI has acted against entities and individuals like Satyam, Sahara India, Ketan Parekh and Vijay Mallya.

Corporate activities include acquisition of other companies, merger of companies and buy back of shares; SEBI has notified the **Substantial Acquisition of Shares and Takeovers Regulations** to ensure that acquisitions and change of management are done only

after giving an opportunity to public shareholders to exit the company if they want to.

The wealth of investors includes a portfolio of securities. SEBI ensures protection of investors’ interests by regulating the listing and trading of equity shares and other securities, and by registering and regulating institutions handling public funds. Appeals against orders of SEBI and the stock exchanges can be made to the Securities Appellate Tribunal (SAT) comprising three members. Appeals from the SAT can be made to the Supreme Court.

# UNION BUDGET 2023-2024

Before reading into the Highlights of the Union Budget, we need to look back at the process and important facts related to the budgetary process in India.

## What is a Budget?

The Annual Financial Statement or the Statement of the Estimated Receipts and Expenditure of the Government of India in respect of each financial year is popularly known as the Budget

Till 2016, the Budget was presented to Lok Sabha in two parts, namely, the Railway Budget pertaining to Railway Finance and the General Budget

Since 2017-18, the date of presentation of Union Budget has been advanced to 1st February

India likely to grow at 10.2%. Remember that based on this estimated GDP only, all the indicators are pegged. For ex: Fiscal Deficit is 5.9 per cent of GDP.

(Nominal GDP for BE 2023-2024 has been projected at `3,01,75,065 crore assuming 10.5 % growth over the estimated Nominal GDP of `2,73,07,751 crore as per the First Advance Estimates of FY 2022-23.) So India's Economy will cross 300 Lk crores next FY.

*One should know that the budget is futuristic in the sense that it gives a direction as to what the government envisages to do. Apart from the allocation of Money to different expenditure items, it contains a theme as to how expenditure is planned and how one could expect newer possibilities of policy formulation.*

This year's Budget is the first budget of Amrit Kaal- 25 years lead up to 100<sup>th</sup> Year of Independence

## Seven priorities of this YEAR: "Saptarishi"

1. Inclusive Development
2. Reaching the Last Mile
3. Infrastructure and Investment
4. Unleashing the Potential

5. Green Growth
6. Youth Power
7. Financial Sector

## Inclusive Development: Priority 1

### A.1 Agriculture

- **Digital Public Infrastructure for Agriculture:** To be built as an open source, open standard and inter operable public good.
- **Agriculture Accelerator Fund; To encourage Agri Startups**
- **Atmanirbhar Horticulture Clean Plant Program:** Program to boost availability of disease-free, quality planting material for high value horticultural crops at an outlay of ` 2,200 crore.
- **Global Hub for Millets: 'Shree Anna';** Support for Indian Institute of Millet Research
- **Agri Credit Target now increased to 20 Lk crore**

### A.2 Health and Well Being;

- Mission to eliminate Sickle Cell Anaemia by 2047;
- **National Digital Library for Children and Adolescents**

## B. Reaching Last Mile; Priority 2

Aspirational Blocks Programme ; Building on the success of Aspirational Districts Programme Aspirational Blocks Programme has been launched.

- **Pradhan Mantri PVTG Development Mission**
  - This will saturate PVTG families and habitations with basic facilities such as safe housing, clean drinking water and sanitation, improved access to education, health and nutrition, road and telecom connectivity, and sustainable livelihood opportunities.
- **Eklavya Model Residential Schools**
- **Water for Drought Prone Region**

- 5,300 crore will be given to Upper Bhadra Project to provide sustainable micro irrigation and filling up of surface tanks for drinking water.
- **Bharat Shared Repository of Inscriptions (Bharat SHRI)**
  - ‘Bharat Shared Repository of Inscriptions’ will be set up in a digital epigraphy museum, with digitization of one lakh ancient inscriptions in the first stage.

## C. Infrastructure & Investment;

### Priority 3

- Capital investment outlay is being increased steeply for the third year in a row by 33 per cent to ` 10 lakh crore, which would be 3.3 per cent of GDP. This will be almost three times the outlay in 2019-20.
- 50-year interest free loan to state governments for one more year to spur investment in infrastructure;
- To be utilised for Scrapping old government vehicles, Urban planning reforms and actions, Financing reforms in urban local bodies to make them creditworthy for municipal bonds etc
- **Infrastructure Finance Secretariat;**
  - A new entity to provide assistance for private investments in Infra
- **Urban Infrastructure Development Fund**
  - Like the RIDF, an Urban Infrastructure Development Fund (UIDF) will be established through use of priority sector lending shortfall. This will be managed by the National Housing Bank, and will be used by public agencies to create urban infrastructure in Tier 2 and Tier 3 cities

## D. Unleashing the Potential; Priority 4

For strengthening governance; Mission Karmayogi, Jan Vishwas Bill etc will be executed.

- **Centres of Excellence for Artificial Intelligence**
  - “*Make AI in India and Make AI work for India*”, three centres of excellence for Artificial Intelligence will be set-up in top educational institutions.
- **National Data Governance Policy likely to be drafted**
- **PAN to be used as common identifier of business establishments, Unified Filing Process**
- **Vivad se Vishwas- I & II**
- **E-Courts, Entity Digilockers, Lab Grown Diamonds, 5G etc to be given focus**

## E. Green Growth: Priority 5

- **Green Hydrogen Mission**
- Our target is to reach an annual production of 5 MMT by 2030.
- Battery Energy Storage Systems with capacity of 4,000 MWH will be supported with Viability Gap Funding. A detailed framework for Pumped Storage Projects will also be formulated.
- **Green Credit Programme will be notified under the Environment (Protection) Act.**
- This will incentivize environmentally sustainable and responsive actions by companies, individuals and local bodies, and help mobilize additional resources for such activities.
- **PM-PRANAM**
  - PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth” will be launched to incentivize States and Union Territories to promote alternative fertilizers and balanced use of chemical fertilizers.
  - 500 new ‘waste to wealth’ plants under GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) scheme;
  - 5 per cent CBG mandate(Compressed

biogas (CBG) plants,) will be introduced for all organizations marketing natural and bio gas.

- **Bhartiya Prakritik Kheti Bio-Input Resource Centres;**
- **MISHTI;**
  - Mangrove plantation along the coastline and on salt pan lands, through convergence between MGNREGS, CAMPA Fund and other sources.
- **Amrit Dharohar:**
  - encourage optimal use of wetlands, enhance bio-diversity, carbon stock, eco-tourism opportunities and income generation for local communities.

## F.Youth Power: Priority 6

- **Pradhan Mantri Kaushal Vikas Yojana 4.0**
  - The scheme will also cover new age courses for Industry 4.0 like coding, AI, robotics, mechatronics, IOT, 3D printing, drones, and soft skills. To skill youth for international opportunities, 30 Skill India International Centres will be set up across different States.
- **Expansion of Skill India Digital Platform and National Apprenticeship Promotion Scheme**
- **Unity Mall**
  - Unity Mall in their state capital or most prominent tourism centre or the financial capital for promotion and sale of their own ODOPs (one district, one product), GI products and other handicraft products, and for providing space for such products of all other States.

## G. Financial Sector: Priority 7

- **National Financial Information Registry** to be set up to serve as the central repository of financial and ancillary information for facilitating efficient flow of credit, promoting financial inclusion,

and fostering financial stability.

- **Azadi Ka Amrit Mahotsav Mahila Samman Bachat Patra**
- It will offer deposit facility upto Rs 2 lakh in the name of women or girls for tenure of 2 years (up to March 2025) at fixed interest rate of 7.5 per cent with partial withdrawal option.

### GIFT IFSC;

- Delegating powers under the SEZ Act to IFSCA to avoid dual regulation.
- Setting up a single window IT system for registration and approval from IFSCA, SEZ authorities, GSTN, RBI, SEBI and IRDAI.
- Permitting acquisition financing by IFSC Banking Units of foreign bank.
- Establishing a subsidiary of EXIM Bank for trade re-financing.
- Amending IFSCA Act for statutory provisions for arbitration, ancillary services, and avoiding dual regulation under SEZ Act
- Recognizing offshore derivative instruments as valid contracts

## Tax Proposals;

Rebate limit of Personal Income Tax to be increased to Rs. 7 lakh from the current Rs. 5 lakh in the new tax regime. This new regime to be the default tax with an option to pay under old taxes too.

### New tax rates

Total Income (Rs)	Rate (per cent)
Up to 3,00,000	Nil
From 3,00,001 to 6,00,000	5
From 6,00,001 to 9,00,000	10

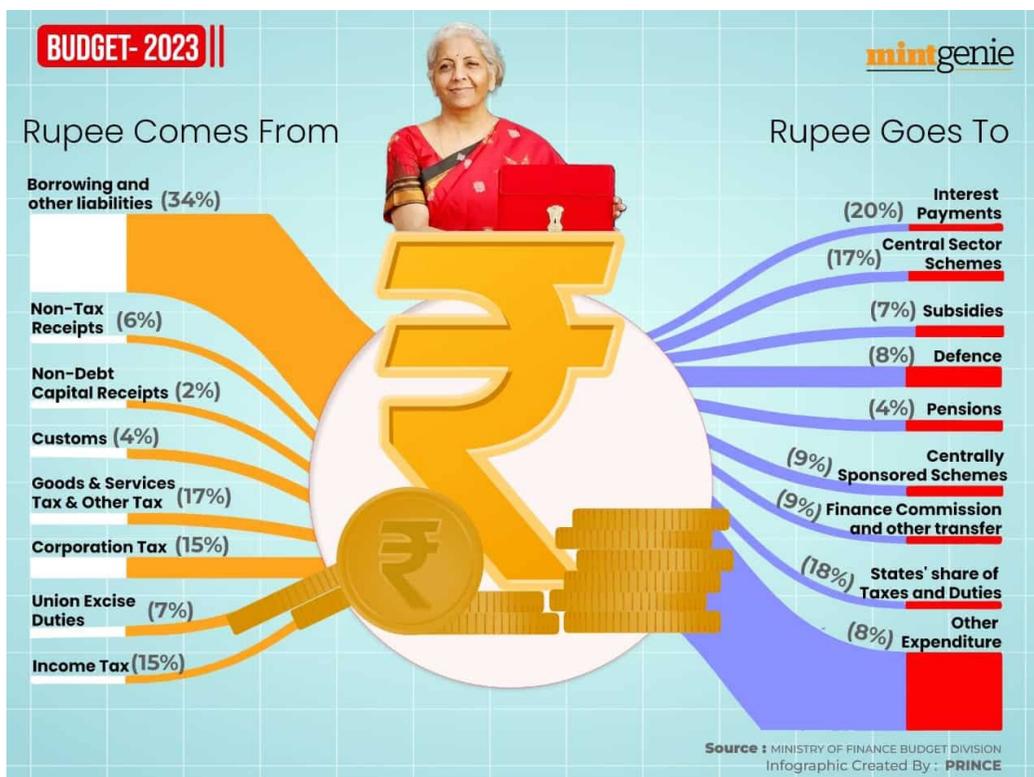
From 9,00,001 to 12,00,000	15
From 12,00,001 to 15,00,000	20
Above 15,00,000	30

Provision of a **higher limit of Rs. 2 lakh per member** for cash deposits to and loans in cash by Primary Agricultural Co-operative Societies (PACS) and Primary Co-operative Agriculture and Rural Development Banks (PCARDBs).

New co-operatives that commence manufacturing activities till 31.3.2024 shall get the benefit of a lower tax rate of 15 per cent

**Agniveer Fund** to be provided **EEE status**. The payment received from the Agniveer Corpus Fund by the Agniveers enrolled in Agnipath Scheme, 2022 proposed to be exempt from taxes.

Basic customs duty reduced on seeds used in the manufacture of **lab grown diamonds**.



Source ; Mint Paper

# GEOGRAPHY,

# ENVIRONMENT,

# BIODIVERSITY AND

# DISASTER MANAGEMENT

What's Inside?

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INDIA 'S NEWLY FOUND LITHIUM  
RESERVES

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8. MANGROVE INITIATIVE FOR SHORELINE HABITATS & TANGIBLE INCOMES – MISHTI
9. ASIATIC BLACK BEAR
10. CAPE BUFFALO
11. SNOW LEOPARD – DARMA VALLEY

## DIYODAR METEORITE

### Why in the News?

Scientists from Physical Research Laboratory (PRL), Ahmedabad, are claiming that the meteorite that crashed in two villages in Banaskantha, Gujarat on August 17, 2022, has been identified as an aubrite.

### What did Scientists find?

Researchers used reflectance spectroscopy to analyze the chunks of the meteor and found that it contained magnesium-rich pyroxene.

The team polished a few small chips (0.5–1.5 cm) from the larger fragment of the Diyodar meteorite to conduct chemical analysis.

The analysis revealed that the meteorite is a rare, unique specimen of aubrite, which is the rare achondrite group of meteorites.

The PRL group used a gamma-ray spectrometer to determine the mineral composition of aubrite. The group also classified the meteorite as a monomict breccia.

India has seen hundreds of meteorite crashes, but this is only the second recorded crash of an aubrite. The meteorite has been named the Diyodar meteorite after the taluka in which the villages are located.

### About Aubrites

Aubrites are a group of meteorites named for Aubres, a small a chondrite meteorite that fell near Nyons, France, in 1836. They are primarily composed of the **orthopyroxene** enstatite and are often called enstatite achondrites. Their igneous origin separates them from primitive enstatite

achondrites and means they originated in an asteroid.

Aubrites “are coarse-grained igneous rocks that formed” in oxygen-poor conditions, and thus “contain a variety of exotic minerals that are not found on Earth”. For example, the mineral heideite was first described in the **Basti meteorite**.

Aubrites are typically light-colored with a brownish fusion crust. Most aubrites are heavily brecciated; they are often said to look “lunar” in origin.

Aubrites are primarily composed of large white crystals of the Fe-poor, Mg-rich orthopyroxene, or enstatite, with minor phases of olivine, nickel-iron metal, and troilite, indicating a magmatic formation under extremely reducing conditions.

Aubrites contain sulfides of calcium, chromium, manganese, titanium, and sodium—all normal lithophile elements—and silicon-bearing FeNi metal. They share a similar highly reduced nature, unusual mineralogy, and oxygen-isotopic composition with enstatite chondrites.



## ICAR ADDS 28 ANIMAL BREEDS TO INDIGENOUS LIST

### Why in the news?

The Indian Council of Agricultural Research (ICAR) has registered 10 new breeds of livestock species, including cattle, buffalo, goat and pig. This has taken the total number of indigenous

breeds to 212.

### About

The registration was done by ICAR-National Bureau of Animal Genetic Resources (NBAGR).

The registration process involves identification and surveying of these breeds through visits to the native areas.

The 10 new breeds included three new cattle breeds (Kathani, Sanchori, Masilum), one buffalo breed (Purnathadi), three goat breeds (Sojat, Karauli, Gujari) and three pig breeds (Banda, Manipuri Black, Wak Chambil).

**Purnathadi buffalo** is found in the Vidarbha region of Maharashtra. The population of Kathani, a dual purpose cattle, is also distributed in the region. It possesses good draft ability and is suited to marshy land for paddy cultivation.

**Masilum** is a small-sized but well-built and sturdy cattle of Meghalaya. Well adapted to the hill ecosystem, it is reared by the Khasi and Jaintia communities for sports, manure and socio-cultural festivals. **Sanchori** is found in the Jalore district of Rajasthan. Among goats, all the three new breeds are from different regions of Rajasthan.

Of the new pig breeds, Manipuri Black is a native of Manipur, Banda is from Jharkhand and Wak Chambil is from the Garo hills of Meghalaya.

In 2010, there were only 129 indigenous breeds registered, called '**extant breeds**'. The identification and registration of indigenous breeds started only after 2010. Those breeds which are not registered or identified are called '**non-descript**'.

There is a declining trend in some of the indigenous livestock, especially cattle. In the 20th Livestock Census, while the population of exotic / crossbred cattle increased by 29.3 per cent, compared to the 2012 Census, the population of indigenous cattle declined by six per cent.

## Significance of Indigenous Breeds

Indigenous breeds are better suited to climate resilience. These are more heat tolerant, have better immunity and disease resistance.

There is a big untapped potential of the indigenous breeds of cattle as well as buffaloes that also possess key adaptability characteristics to Indian climatic conditions.

## Contribution of Livestock in the Indian Economy

The livestock sector grew at a CAGR of 7.9% during 2014-15 to 2020-21 (at constant prices), and its contribution to total agriculture GVA (at constant prices) has increased from 24.3% in 2014-15 to 30.1% in 2020-21.

Besides their monetary benefit and providing a steady stream of food and revenues for households, livestock provide employment to the rural family, act as insurance during crop failures and the number of livestock owned by a farmer determines the social status among the community.

Dairy is the single-largest agri commodity in India. It contributes 5% to the national economy and employs 80 million dairy farmers directly.

## Government Schemes Related to Livestock Sector

### Animal Husbandry Infrastructure Development Fund (AHIDF)

Under this scheme, the Central Government provides a 3% interest subvention to the borrower and credit guarantee up to 25% of total borrowing.

### National Livestock Mission (NLM)

This scheme has been restructured for 2021-22 to 2025-26. The scheme focuses on entrepreneurship development and breeds improvement in poultry, sheep, goat and piggery, including feed and fodder development.

### Livestock Health and Disease Control (LH&DC) Scheme

It is being implemented to supplement the State/UT governments efforts towards preventing, controlling and containing animal diseases of economic and zoonotic importance by vaccination.

### National Animal Disease Control Programme (NADCP)

It is being implemented to control Foot &

Mouth Disease and Brucellosis by completely vaccinating cattle, buffalo, sheep, goat and pig populations against Foot & Mouth Disease and

bovine female calves of 4-8 months of age against brucellosis.

## UNDERWATER NOISE EMISSIONS

### Why in the News?

According to a News Study, “Measuring Underwater Noise Levels Radiated by Ships in Indian Waters”, the rising Underwater Noise Emissions (UNE) from ships in the Indian waters are posing a threat to the Marine Ecosystem.

### About

The main form of energy for multiple behavioural activities of marine mammals, which include mating, communal interaction, feeding, cluster cohesion and foraging, is based on sound.

However, the sound that radiates from ships on a long-term basis affects them and results in internal injuries, loss of hearing ability, change in behavioural responses, masking, and stress. There are Acute and Chronic noise categories in the emissions.

The UNE or underwater sound pressure levels in the Indian waters are 102-115 decibels, relative to one microPascal (dB re 1µ Pa). The East Coast level is slightly higher than that of the West. There is an increase by a significant value of about 20 dB re 1µPa. Scientists have agreed to use 1µPa as the reference pressure for underwater sound.

Continuous shipping movement is identified to be a major contributor to the increase in the global ocean noise level.

### Impacts of UNE

The rising man-made (anthropogenic) underwater noise emissions (UNE) from ships in the Indian waters are posing a threat to the life of marine mammals like Bottlenose Dolphin, Manatees, Pilot Whale, Seal, and Sperm Whale.

The frequencies of ships’ underwater self-noise and machinery vibration levels are overlapping the marine species’ communication frequencies in the low-frequency range of less than 500 Hz.

This is called **masking**, which could have led to a change in the migration route of the marine species to the shallow regions and also making it difficult for them to go back to the deeper water.

### How were the underwater ambient noise levels measured?

The measurement of the ambient noise levels was carried out by **deploying a hydrophone autonomous system** around 30 nautical miles from the Goa coastline.

The depth of deployment of the sensor was 11 metres in a water depth of 22 metres. The single-channel hydrophone was deployed at different locations with an in-water depth of 18 metres

### Sounding a warning

Sound is a form of energy for marine mammals which is being denied to them by man-made noise with disastrous results for marine species, finds study.



 **250** baleen whales and 30 carcasses of the same species were found stranded in the shallow waters of Tiruchendur beach, Tamil Nadu, on January 12, 2016.

 **150** olive ridley turtles and bottlenose dolphins were found dead on Puri beach in Odisha on January 20, 2016

 **62** olive ridley turtles were found dead on Vizag-Bheemili coastal stretch in Andhra Pradesh in February 2021.

### The way out

- There is a need to develop Green Ports
- Since ocean noise levels are increasing at 0.55 dB per year, regulations are needed to reduce it by at least 3 dB in the next five years.
- Speed of ships should be less than 5 knots up to port limits
- Re-routing of shipping lanes away from foraging region of marine species is also recommended

with a deployment depth of 3 and 5 metres off Visakhapatnam port.

### Steps taken to Safeguard Marine Ecosystems

#### Global Efforts

#### Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities:

The GPA is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems.

#### MARPOL Convention (1973):

It covers pollution of the marine environment by ships from operational or accidental causes.

It lists various forms of marine pollution caused by oil, noxious liquid substances, harmful substances in packaged form, sewage and garbage from ships, etc.

#### The London Convention (1972):

Its objective is to promote the effective control

of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.

#### National Efforts

#### Wild Life Protection Act of India (1972)

It provides legal protection to many marine animals. There are a total of 31 major Marine Protected Areas in India covering coastal areas that have been notified under Wildlife Protection Act, 1972.

#### Coastal Regulation Zone (CRZ)

The CRZ notification (1991 and later versions) prohibits developmental activities and disposal of wastes in fragile coastal ecosystems.

#### Centre for Marine Living Resources and Ecology (CMLRE)

The CMLRE, an attached office of Ministry of Earth Sciences (MoES) is mandated with the management strategies development for marine living resources through ecosystem monitoring and modelling activities.

## PANGOLINS

### Why in the News?

Over 1,200 pangolins were poached and trafficked in India over the past four years from 2018 to 2022, according to a recent report released jointly by the World Wide Fund for Nature India and TRAFFIC.

The report says that 1,203 pangolins (both live and dead) were seized in 342 incidents and that the actual numbers of the animal being trafficked are likely to be far higher. Over 880 kg of pangolin derivatives and 199 live pangolins were reported in the 342 seizure incidents.

### About Pangolins

Pangolins belong to the family **Manidae**. In India, they are the **only known mammals with large keratin scales covering their skin**. They are toothless, nocturnal, live in burrows, and feed

mainly on ants and termites.

Globally there are eight pangolin species, four each in Africa and Asia. India is home to two species – **Indian pangolin** *Manis crassicaudata* and **Chinese pangolin** *Manis pentadactyla*.

**Indian pangolins** are found in Bangladesh, India, Nepal, Pakistan, and Sri Lanka. In India, the species is widely distributed and has been recorded in Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal.

**Chinese pangolins** are found in Bangladesh, Bhutan, China, Hong Kong, India, Lao People's Democratic Republic, Myanmar, Nepal, Taiwan,

China, Thailand, and Vietnam. In India, the species is reported from Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and West Bengal.

### Habitat

It is adaptable to a wide range of habitats including primary and secondary tropical forests, limestone and bamboo forests, grasslands and agricultural fields.

### Threats

- Pangolins are **reported to be among the most trafficked wild mammals globally.**
- Once known to be found in large numbers, its population is rapidly declining in its range due to habitat loss and rampant poaching for its skin, scales, and meat.
- It is traded mostly in Asia, where their scales are considered to be medicinal and their meat a delicacy.

### Importance of Pangolins

Pangolins, which act as both predators and prey, have a huge ecological significance, experts say. They feed on insects and help regulate their population.

Pangolins are “**ecosystem engineers**” that build burrows that help circulate soil organic matter, increase soil moisture and aeration, and

### World Pangolin Day

- In 2023, World Pangolin Day was celebrated on February 18. Every year the day is celebrated on the **third Saturday of February.**
- The main objective of the celebration is to create awareness about the Pangolin population decline.

affect plant community succession through their burying behaviour.

The burrows made by pangolins also get utilised as shelters by other species within their ecosystem.

Over 30 species have been reported to use the burrows made by Chinese pangolins, including mammals, birds, reptiles, and invertebrates, for different purposes.

### Protection Status:

#### IUCN Red List

**Indian Pangolin:** Endangered

**Chinese Pangolin:** Critically Endangered

In India, both Indian pangolins and Chinese pangolins are listed in **Schedule I of the Wildlife (Protection) Act, of 1972.** Therefore hunting, trade, or any other form of utilisation of the species or their body parts and derivatives is banned.

Pangolin species have been listed in **Appendix I of the Convention on International Trade in Endangered Species (CITES),** prohibiting their commercial trade

### About TRAFFIC - Trade Records Analysis of Flora and Fauna in Commerce

TRAFFIC is an organization that was established in 1976 by WWF and IUCN as a wildlife trade monitoring network to undertake data collection, analysis, and provision of recommendations to inform decision making on wildlife trade.

For over 40 years TRAFFIC performed that function as a leader in wildlife trade research, as a joint program of WWF and IUCN.

TRAFFIC became an independent non-profit organization in 2017, with WWF and IUCN sitting on its Board of Directors along with independent Board members.

TRAFFIC is renowned globally for its

expertise and influence in the wildlife trade and conservation arena, as a provider of objective and reliable information.

Its expert staff implement innovative projects

## SYRIA EARTHQUAKE

### Why in news?

The death toll due to a 7.8 magnitude earthquake that struck Turkey and Syria in the early hours of February 6 (Monday) has crossed 24,000, making it one of the most destructive disasters in decades.

### Why Is Turkey a Hotbed of Seismic Activity?

Turkey lies in a seismically active zone. It is located on the **Anatolian tectonic plate**, which is wedged between the Eurasian and African plates. On the north side, the minor Arabian plate further restricts movement.

One fault line, the North Anatolian fault (NAF) line, which is the meeting point between the Eurasian and Anatolian tectonic plates, is known to be “particularly devastating.” NAF is a right-lateral strike-slip structure in northern Turkey accommodating much of the translational motion of the Anatolia block westwards with respect to Eurasia and Africa.

Then there is the East Anatolian fault line, which is the tectonic boundary between the Anatolian plate and the northward-moving

and create new tools to deliver the mission of protecting nature and supporting sustainable development, by resolving wildlife trade challenges.

Arabian Plate.

Additionally, there is the Aegean sea plate, which is also a source of seismic activity in the region.

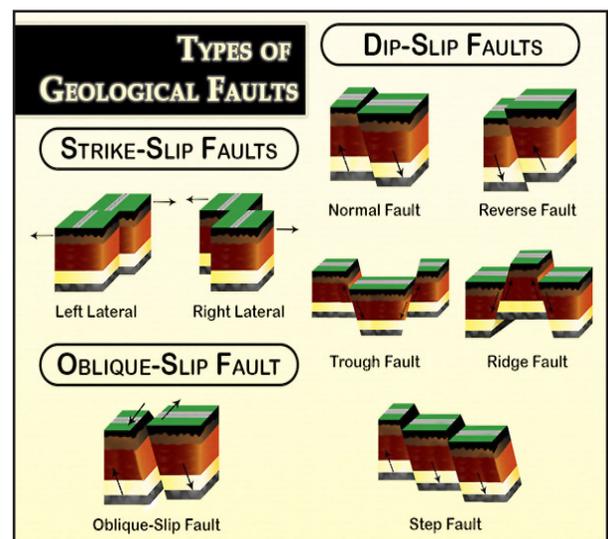
### Faults

A fault is a fracture or zone of fractures between two blocks of rock. Faults allow the blocks to move relative to each other. This movement may occur rapidly, in the form of an earthquake - or may occur slowly, in the form of creep. Faults may range in length from a few millimeters to thousands of kilometers.

### Types

**Normal fault** - a dip-slip fault in which the block above the fault has moved downward relative to the block below. This type of faulting occurs in response to extension and is often observed in the Western United States Basin and Range Province and along oceanic ridge systems.

**Reverse (thrust) fault** - a dip-slip fault in which the upper block, above the fault plane, moves up and over the lower block. This type of faulting is common in areas of compression, such as regions where one plate is being subducted under another as in Japan. When the dip angle



is shallow, a reverse fault is often described as a thrust fault.

**Strike-slip fault** - a fault on which the two blocks slide past one another. The San Andreas Fault is an example of a right lateral fault.

A left-lateral strike-slip fault is one on which

the displacement of the far block is to the left when viewed from either side.

A right-lateral strike-slip fault is one on which the displacement of the far block is to the right when viewed from either side.

# BHARATPUR SANCTUARY

## Why in news?

The Rajasthan state Forest Department has proposed to construct a zoo inside Keoladeo National Park, a World Heritage Site popularly known as Bharatpur bird sanctuary, to display a range of wetland species, including rhinos, water buffaloes, crocs, dolphins and exotic species.

## About

The purpose of this zoo, called **Wetland ex-situ Conservation Establishment (WESCE)**, says the **Detailed Project Report (DPR)** of the Rajasthan Forestry and Biodiversity Development Project (RFBDP), is “to rejuvenate the bio-diversity of Keoladeo National Park, thereby boosting its outstanding universal values.”

The Rs 15-crore WESCE plan for Bharatpur is part of the ambitious RFBDP for which Agence Française de Développement (AFD), the overseas development arm of the French government, has agreed to fund up to Rs 1,200 crore over eight years.

Bharatpur bird sanctuary is situated at Rajasthan, on the fringe of Thar desert. It is also known as Keoladeo National Park because of a temple of Keoladeo (Lord Shiva) in the midst of this park. It was formerly a hunting ground of Maharajas of Bharatpur, a princely state of India under the ruling of British Empire. After independence, it got the status of a National Park on 10th March, 1982 and accepted as World Heritage Site in 1985.

The park is home to over 370 species of birds and animals such as the basking python, painted storks, deer, nilgai and more.

Noted Indian ornithologist and naturalist Salim Ali used his influence to garner government support to create Keoladeo National Park.

It was also known as the breeding ground for the rare and elusive to spot Siberian crane



## Central Zoo Authority (CZA)

Central Zoo Authority (CZA) was established as a statutory body under the Ministry of Environment & Forests by the Government of India in the year 1992.

The main objective of this Authority is to complement and strengthen the national effort in conservation of rich biodiversity of the country, particularly the fauna.

Other objectives of this Authority include enforcing minimum standards and norms for upkeep and healthcare of animals in Indian zoos and to control mushrooming of unplanned and ill-conceived. For the overall management of the animals housed in the Indian zoos, standards and norms for appropriate housing, upkeep, health care, diet etc.

The Zoos in India are managed as per the provisions of the Wild Life (Protection) Act, 1972 and guided by the National Zoo Policy, 1998.

# LITHIUM IN JAMMU AND KASHMIR

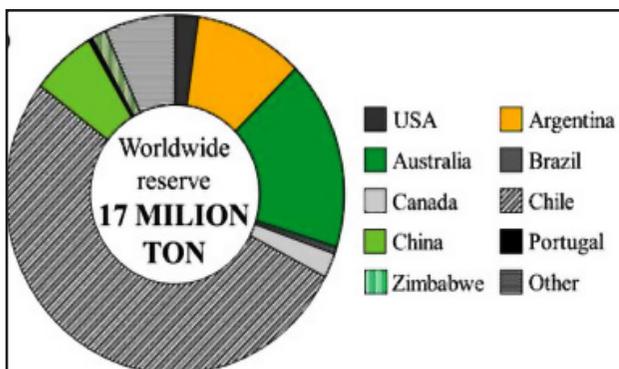
## Why in news?

The Geological Survey of India (GSI) has established “inferred” lithium resources of 5.9 million tonnes in Salal-Haimana area of Reasi District of Jammu and Kashmir. These resources have been established as part of the “Reasi Sersandu-Kherikot-Rahotkot-Darabi” mineral block, where prospecting has been ongoing since 2021-22.

## About

### Lithium

- It is a delicate, white-silver alkali metal.
- It is the least dense metal and the least dense solid element under typical conditions.
- As with all alkali metals, Li must be stored under a vacuum, in an inert atmosphere, or an inert liquid such as mineral oil or pure kerosene.
- It has a shiny sheen when cut, but damp air quickly corrodes it to a dull silvery grey, then a black patina.
- It never occurs freely in nature, but only in (usually ionic) compounds, such as pegmatitic minerals, which were once the main source of Li.
- Due to its solubility as an ion, it is present in ocean water and is commonly obtained from brines.
- Li metal is isolated electrolytically from a mixture of lithium chloride and potassium chloride.



## Uses:

Lithium is an important component of electrochemical cells used in batteries of EVs,



Laptops, Mobiles etc.

It is also used in thermonuclear reactions.

It is used to make alloys with aluminium and magnesium, improving their strength and making them lighter.

Magnesium-lithium alloy - for armour plating.

Aluminum-lithium alloys - in aircraft, bicycle frames and high-speed trains.

## Major Global Lithium Reserves:

### Lithium Triangle

Argentina, Bolivia, and Chile make up the “lithium triangle.” The three countries, along with Peru, contain about 67% of proven lithium reserves and produce about half of the global supply, according to the U.S. Geological Survey.

### Lithium reserves in India

The recently discovered lithium deposit is estimated to be 5.9 million tonnes in the Salal-Haimana area of the Reasi District of Jammu & Kashmir (UT), making it one of the largest deposits of lithium in the world.

Earlier, researchers at the Atomic Minerals

Directorate (under India's Atomic Energy Commission) estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in Southern Karnataka's Mandya district.

### Inferred Resources

The "inferred" mineral resource is a resource for which quantity, grade and mineral content are estimated only with a low level of confidence.

It is based on information gathered from locations such as outcrops, trenches, pits, workings and drill holes that may be of limited or uncertain quality, and also of lower reliability from geological evidence.

It is based on the classification from United Nations International Framework Classification for Reserves/Resources – Solid Fuels and Mineral Commodities of 1997 (UNFC-1997).

## MANGROVE INITIATIVE FOR SHORELINE HABITATS & TANGIBLE INCOMES – MISHTI

The Union Budget 2023-24 announced a new initiative for mangrove plantations along the coastline and on salt pan lands - MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes).

The Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) scheme is a new programme that will facilitate mangrove plantation along India's coastline and on salt pan lands. The programme will operate through "convergence between MGNREGS, Campa Fund and other sources. This new programme will aim at intensive afforestation of coastal mangrove forests. India has such forests on both its Eastern and Western coasts with the Sundarbans in Bengal being one of the largest mangrove forests on the planet.

Mangrove forests — consisting of trees and shrub that live in intertidal water in coastal areas — host diverse marine life. They also support a rich food web, with molluscs and algae-filled substrate acting as a breeding ground for small fish, mud crabs and shrimps, thus providing a livelihood to local artisanal fishers. They act as effective carbon stores, holding up to four times the amount of carbon as other forested ecosystems. Mangrove forests capture vast amounts of carbon dioxide



from the atmosphere and their preservation can both aid in removal of carbon from the atmosphere and prevent the release of the same upon their destruction.

### The current state of the mangroves

South Asia houses some of the most extensive areas of mangroves globally, while Indonesia hosts one-fifth of the overall amount. India holds around 3 per cent of South Asia's mangrove population. Besides the Sundarbans in West Bengal, the Andaman region, the Kachchh and Jamnagar areas in Gujarat too have substantial mangrove cover.

Between 2010 and 2020, around 600 sq km of mangroves were lost of which more than 62 per cent was due to direct human impacts, the Global Mangrove Alliance said in its 2022 report.

According to India State of Forest Report

(ISFR) 2021, India's total mangrove cover is 4,992 km<sup>2</sup> (0.15% of total geographical area). India lost 40% of its mangrove cover during the last century with Kerala losing 95% of its mangroves in the last 3 decades.

## Importance of Mangroves

**Protection of coastlines:** As climate change increases the incidence of extreme weather events across the world, mangrove plantations have shown to make coastal lands resilient, preventing flooding, land erosion and acting as a buffer for cyclones.

**Reducing coastal erosion:** Their dense roots bind and build soils, and the above-ground roots slow down water flow and result in sediment deposits, reducing coastal erosion.

**Act as excellent carbon sinks:** Mangrove trees can grow in saline waters, and can sequester up to four times more carbon than

tropical rainforests. Mangroves cover only about 0.1 per cent of the planet's surface. Yet, they can potentially store up to 10 times more carbon per hectare (ha) than terrestrial forests.

**Support services:** They also support a rich food web, with molluscs and algae-filled substrate acting as a breeding ground for small fish, mud crabs and shrimps, thus providing a livelihood to local artisanal fishers.

## Mangrove Alliance for Climate (MAC)

Launched at the 27th session of Conference of Parties (COP27) UN climate summit, with India as a partner. An initiative led by the United Arab Emirates (UAE) and Indonesia, the Mangrove Alliance for Climate (MAC) includes India, Sri Lanka, Australia, Japan, and Spain. It seeks to educate and spread awareness worldwide on the role of mangroves in curbing global warming and its potential as a solution for climate change.

## ASIATIC BLACK BEAR

The Kashmir Valley has bucked the trend of Asiatic black bear (*Ursus thibetanus*) attacks on humans rarely reported throughout the animal's global range, a new study has revealed. The conversion of the bear's natural habitat to orchards and farmlands is the primary reason for the ursine attacks over the past 30 years. Other reasons include the India-Pakistan border fencing which blocks the movement of the animal and a new generation of people who are not familiar with co-existing with large predators.

Asiatic black bear is also called Himalayan bear, Tibetan bear, or moon bear. It has a glossy black (sometimes brownish) coat with a whitish mark shaped like a crescent moon on the chest. Its long, coarse neck and shoulder hair forms a modified mane. It is omnivorous, eating insects, fruit, nuts, bees and honey, small mammals, and birds as well as carrion. It occasionally attacks domestic animals. They are generally nocturnal, sleeping in caves or tree hollows during the day.

During the summer the Asiatic black bear lives mainly in forested hills and mountains at elevations

**Common Name:** Asiatic Black Bear

**Scientific Name:** *Ursus thibetanus*

**Lifespan in the Wild:** Upto 25 years

**Weight:** Males: Upto 200 kg  
Females: Upto 100 kg

**Length:** 140-170 cm

**Cubs per Litter:** Two to four

**IUCN STATUS:** LC - NT - **VU** - EN - CR - EW - EX  
Vulnerable

**Major threats to Asiatic black bears:** climate change, habitat loss and poaching for body parts.

**CONSERVATION MEASURES:** Protected under CITES Appendix I and Schedule II of the Indian Wildlife Protection Act.

**Estimated population of the Asiatic black bears is 50,000**

**GEOGRAPHIC RANGE:** Jammu & Kashmir, Assam, Sikkim, Arunachal Pradesh

**ASIATIC BLACK BEAR:** Crescent moon shaped patch on chest most distinguishable physical feature.

WILDLIFE SOS

up to 3,600 metres (11,800 feet). Becoming fat by fall, it spends the winter at elevations of 1,500 metres (5,000 feet) or less and may sleep for much

of the time. An adult male weighs 100–200 kg (220–440 pounds), a female about half as much; its length averages about 130–190 cm (51–75 inches), in addition to a 7–10-cm (3–4-inch) tail. Asiatic black bears may live as long as 25 years in the wild and up to 39 years in captivity.

**IUCN status** – Vulnerable; All Indian Bear species are listed under Appendix I in CITES and Schedule I of the Wildlife (Protection) Act, 1972. This provides complete protection to the species from hunting and trade.

**Distribution**

Afghanistan; Bangladesh; Bhutan; Cambodia; China; India; Iran, Islamic Republic of; Japan; Korea, Democratic People’s Republic of; Korea, Republic of; Lao People’s Democratic Republic; Myanmar; Nepal; Pakistan; Russian

**ASIATIC BLACK BEAR**  
Crescent moon shaped patch on chest most distinguishable physical feature.  
Population in the wild: 50,000

**HIMALAYAN BROWN BEAR**  
Largest of the four bears. Hibernate during most part of winter when their heartbeat can slow down to 10 beats/minute.  
Population in the wild: 500-700

**SLOTH BEAR**  
Long muzzle most predominant physical feature. The cubs are seen riding on the mother’s backs which is unique only to sloth bears, among all bears.  
Population in the wild: 6,000-10,000

**SUN BEAR**  
Extremely long tongue, longest of all bear species. Also, they are the smallest of the world’s 8 bear species.  
Population in the wild: Approximately 1,000

**BEARS OF INDIA**

Federation; Taiwan, Province of China; Thailand; Vietnam

**CAPE BUFFALO**

According to recent studies the Cape Buffalo populations were less genetically variable or diverse in the extreme southern part of their range. This means that there had been more interbreeding among them.

African buffalo occur in Sub-Saharan Africa. They prefer a habitat with dense cover, such as reeds and thickets, but can also be found in open woodland, montane grasslands and forest, savannas, and moist lowland rainforests.



During the dry season, males leave the herd and form, bachelor groups. Two types of bachelor herds occur: ones made of males aged 4 to 7 years and those of males 12 years or older. During the wet season, the younger bulls rejoin a herd to mate

with the females. They stay with them throughout the season to protect the calves.

African buffalo have a strictly herbivorous (graminivorous, florivorous) diet. They feed on a wide variety of grasses, sedges, leaves, and other plants. African buffalo are polygynandries

(promiscuous) meaning that both males and females' mate with multiple partners. They mate and give birth only during the rainy seasons. Cows usually reproduce every two years. They

give birth to a single calf after a gestation period of 11.5 months. Males become reproductively mature when they are 4 to 6 years old.

IUCN Red list: Near Threatened (NT)

## SNOW LEOPARD – DARMA VALLEY

A snow leopard has been sighted for the first time at a height of about 11,120 feet in the Darma valley in Uttarakhand's Pithoragarh district.

Snow leopards are also known as "Ghost of Mountains". They act as an indicator of the health of the mountain ecosystem in which they live, due to their position as the top predator in the food web. They are listed as vulnerable on the International Union for Conservation of Nature's (IUCN) Red List. They are listed in appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and Schedule-I of the Indian Wildlife Protection Act, 1972.

They have a vast but fragmented distribution across the mountainous landscape of central Asia, which covers different parts of the Himalayas such as Ladakh, Himachal Pradesh, Uttarakhand, and Sikkim.

### Government initiatives:

The Government of India has identified the snow leopard as a flagship species for the high-altitude Himalayas.

India is also party to the Global Snow Leopard and Ecosystem Protection (GSLEP) Programme since 2013.

**HimalSanrakshak:** It is a community volunteer programme, to protect snow leopards, launched in October 2020.

In 2019, First National Protocol was also launched on Snow Leopard Population Assessment which has been very useful for monitoring populations.

**SECURE Himalaya:** Global Environment Facility (GEF)-United Nations Development Programme (UNDP) funded the project on conservation of high altitude biodiversity and reducing the dependency of local communities

on the natural ecosystem.

**Project Snow Leopard (PSL):** It was launched in 2009 to promote an inclusive and participatory approach to conserve snow leopards and their habitat.

Snow Leopard is on the list of 21 critically endangered species for the recovery programme of the Ministry of Environment Forest & Climate Change.

Snow Leopard conservation breeding programme is undertaken at Padmaja Naidu Himalayan Zoological Park, Darjeeling, West Bengal.



# INDIA 'S NEWLY FOUND LITHIUM RESERVES

*GS- I Distribution of key natural resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India).*

## Why in the news?

The discovery of 5.9 million tonnes inferred resources of lithium by Geological Survey of India in the Salal-Haimana area of Reasi district, Jammu & Kashmir has been received as a game-changer in India's impending transition to a green economy. The term 'inferred' refers to the 'preliminary exploration stage', the second of a four-step process.

## What are Inferred Resources?

The "inferred" mineral resource is a resource for which quantity, grade and mineral content are estimated only with a low level of confidence.

It is based on information gathered from locations such as outcrops, trenches, pits, workings and drill holes that may be of limited or uncertain quality, and also of lower reliability from geological evidence.

It is based on the classification from United Nations International Framework Classification for Reserves/Resources – Solid Fuels and Mineral Commodities of 1997 (UNFC-1997).

## About Lithium

### Properties

It is a soft, silvery-white metal that heads group 1, the alkali metals group, of the

### UNFC-1997

UNFC-1997 is a system for the classification and reporting of reserves and resources of solid fuels and mineral commodities and provides a standardized, internationally recognized system for the reporting of reserves and resources.

It promotes transparency and consistency in the reporting of mineral and energy assets and ensures that geological, engineering, and economic information is used consistently. It provides a basis for comparing reserves and resources data between countries and regions which is widely used by governments, industry, and financial institutions around the world.

According to UNFC-1997, there are four stages of exploration for any mineral deposit:

- ◆ Reconnaissance (G4)
- ◆ Preliminary exploration (G3)
- ◆ General Exploration (G2)
- ◆ Detailed Exploration (G1)

periodic table of the elements.

### Features:

It has the lowest density of all metals.

It is the lightest of the solid elements.

It reacts vigorously with water.

It has a body-centered cubic crystal structure.

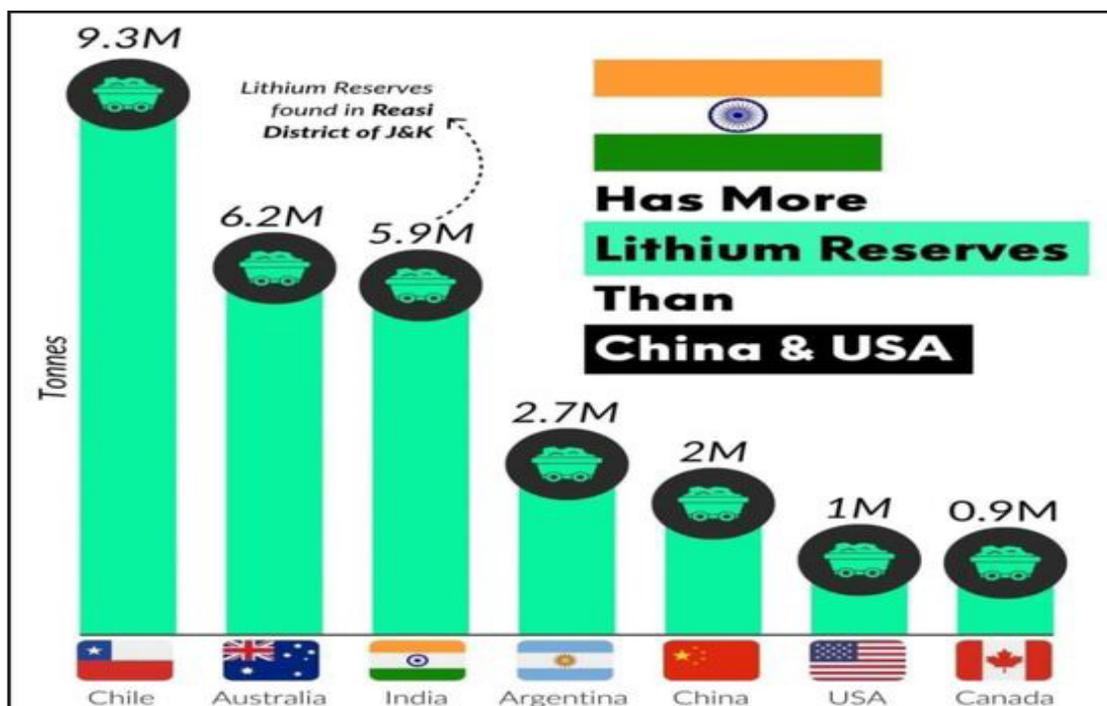
### Extraction

Lithium can be extracted in different ways, depending on the type of the deposit — generally either through solar

evaporation of large brine pools, or from hard-rock extraction of the ore.

### Occurrence

Lithium does not occur as a metal in nature but is found combined in small amounts in igneous rocks.



Lithium is found in brine deposits and as salts in mineral springs. Its concentration in seawater is 0.1 part per million (ppm).

Major Reserves: Lithium reserves are concentrated in the **lithium triangle in South America – Argentina, Bolivia & Chile**, with 50% of the deposits concentrated in these regions.

Lithium Triangle: Chile, Argentina, Bolivia.

**Earlier, Chile > Australia > Argentina are top countries with Li reserves.**

India now has the third **largest resource** of lithium globally, but it will take time to convert it to reserves.

## Uses

Lithium is important in rechargeable batteries for mobile phones, laptops, digital cameras, and electric vehicles.

It is also used in some non-rechargeable batteries for things like heart pacemakers, toys, and clocks.

Lithium metal is made into alloys with aluminium and magnesium, improving their strength and making them lighter.

Lithium oxide is used in special glasses and glass ceramics.

Lithium stearate is used as an all-purpose and high-temperature lubricant.

Lithium carbonate is used in drugs to treat manic depression

## Applications of lithium

The most important use of lithium is in rechargeable batteries for mobile phones, laptops, digital cameras and electric vehicles (EVs). Lithium is often dubbed as “white gold” for electric vehicles.

Lithium metal is made into alloys with aluminium and magnesium, improving their strength and making them lighter. Aluminium-lithium alloys are used in aircraft, bicycle frames and high-speed trains.

Lithium has no known biological role. It is toxic, except in very small doses.

## Significance of the Discovery

### Crucial for a green economy

Lithium-ion batteries are used in wind turbines, solar panels, and electric vehicles, all of which are crucial in a green economy.

### Sustainable supply of critical metal amidst the increased global demand

The World Economic Forum (WEF) has warned of

global lithium shortages due to rising demand for EVs and rechargeable batteries, which is estimated to reach 2 billion by 2050.

The world's supply of lithium is under strain due to the concentration of resources in a few locations with 54% of the world's Lithium reserves are found in Argentina, Bolivia and Chile.

The International Energy Agency (IEA) predicts that the world could face lithium shortages by 2025.

A World Bank study suggests that the demand for critical metals such as lithium (Li) and cobalt is expected to rise by nearly 500% by 2050. The global electric vehicle market is projected to reach \$823.75 billion by 2030.

It will register a Compounded Annual Growth Rate (CAGR) of 18.2% from 2021 to 2030. At the same time, India's EV market is projected to register a CAGR of 23.76% by 2028. Hence, this discovery will enable India to secure its critical mineral supplies and build self-sufficiency in this sector.

### **Boost the domestic battery-manufacturing industry**

India currently imports all of its Li from Australia and Argentina and 70% of its Li-ion cell requirement from China and Hong Kong.

The lithium reserves in J&K could boost the domestic battery-manufacturing industry.

If the perceived size of the mineral reserves in J&K is borne out by further exploration, India could jump ahead of China vis-à-vis its Li stockpile.

### **Support to India's ambitious plans**

The J&K reserves will also help advance the Indian government's ambitious plan of 30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three-wheelers by 2030 for the automobile industry.

They will also strengthen India's National Mission on Transformative Mobility and Battery Storage as well.

### **Geostrategic significance**

Critical mineral dependencies constitute a major geostrategic concern in the transition to net-zero carbon energy systems. China currently controls 77% of the global lithium-ion battery manufacturing capacity and is home to six of the world's 10 manufacturing companies.

The growing geopolitical rivalry with China complicates India's security considerations. This is especially relevant in light of the longstanding, and recently escalating, territorial and border disputes.

To reduce dependence on China, the Indian government and industry are pushing for a 'Rare Earths Mission' to exploit the country's critical mineral reserves.

Country's critical mineral reserves accounted for 6% of the world's rare-earths' reserves prior to the discovery of Li in J&K. The new discovery has more geostrategic implications considering the geopolitical sensitivity of its wider location.

### **Challenges with Lithium Mining**

There are some associated challenges with the mining of lithium. They are as follows.

#### **Environmental Impact:**

It can have adverse impacts on the environment, water, soil and air pollution. Extracting lithium from its ore is highly water-intensive, taking about 2.2 million litres of water for one tonne of lithium.

#### **Impact on Himalayan Ecosystem:**

The Himalayas are a highly fragile and eco-sensitive region and the recent Joshimath subsidence shows, it is vulnerable to long-term adverse consequences of unplanned development works.

#### **Loss of Biodiversity:**

The Himalayan region between J&K is an eco-sensitive region, and mining could lead to a significant loss of biodiversity.

#### **Effect on River Systems:**

The Himalayas are a source of so many rivers, any mining activity is going to pollute the entire riparian ecosystem.

#### **Food Security Issues:**

Mining and processing

lithium can further jeopardise food security through its excessive carbon emissions, water, and land use methods. In Chile, 500,000 gallons of water yield one tonne of lithium.

### **Local Water Basic Contamination:**

In areas that already struggle with clean water availability and accessibility, lithium water-mining techniques could cause local water basins to be contaminated, and use an already scarce water supply meant for rural communities, livestock, and crops.

### **Geopolitical concerns:**

Union territory of J&K (previously a state) has been the site of historical cross-border tensions between India and Pakistan, domestic insurgency, and terrorism. So, this new discovery has geostrategic implications considering the geopolitical sensitivity of its wider location.

### **Conclusion**

Before moving forward with lithium mining projects there is a need for fair and thorough assessments of its effects on agricultural production because this sector

is already susceptible to climate change.

The automotive industry, from two-wheelers to passenger cars and commercial vehicles, is shifting toward electric motion.

Therefore if lithium is extracted in a sustainable and inclusive manner, the deposits could be a game changer for India as it lacks in traditional energy resources other than coal.



# SCIENCE & TECHNOLOGY

## What's Inside?

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# KEY TRIALS FOR GAGANYAAN CONDUCTED

## Why in the News?

The Indian Space Research Organisation (ISRO), along with the Indian Navy, has conducted an important trial for the Gaganyaan, human space flight mission.

## About

It carried out initial recovery trials of the Crew Module in the Navy's Water Survival Test Facility (WSTF) in Kochi. These trials are part of the preparation for crew module recovery operations for the Gaganyaan mission.

A Crew Module Recovery Model (CMRM), that simulates the mass, center of gravity, outer dimensions, and externals of the actual Crew Module at touchdown, was used for the trials. The sequence of operations required for the recovery of the Crew Module were carried out as part of the trials.

According to ISRO, as the safe recovery of the crew is the final step to be accomplished for any successful human spaceflight, it is of paramount importance and it has to be carried out with the minimum lapse of time.

The project envisages demonstration of human spaceflight capability by launching a crew of three members to an orbit of 400 km for a three-day mission and bringing them back safely to earth, by landing in Indian waters.

## About Gaganyaan Mission

The Gaganyaan project envisages demonstration of human spaceflight capability by launching a crew of three members to an orbit of 400 km for a three day mission and bringing them back safely to earth, by landing in Indian sea waters.

The first trial (uncrewed flight) for Gaganyaan is being planned by the end of 2023 or early 2024. This will be followed by sending Vyom Mitra, a humanoid and then with the crew onboard.

ISRO's first human spaceflight mission will be the first of ISRO's human spaceflight missions. The US, Russia and China are the only three countries to have conducted human spaceflights yet.

Gaganyaan will be Launched by ISRO's Geosynchronous Satellite Launch Vehicle GSLV Mk III (3 stages heavy-lift vehicle).

## Significance of the Gaganyaan mission

### India's aim of Self-reliance:

It will help India in achieving self-reliance, in line with the vision of Atma Nirbhar Bharat and also boost the capacity development in launching satellites under the Make in India Initiative. It will reduce India's dependence on foreign cooperation in this direction.

### R&D and robotic programme:

It will also enhance the research and development (R&D) at science and technology levels especially in the space sector. It is in line with India's progress towards a sustained and affordable human and robotic programme to explore the solar system and beyond.

### Focus on regional needs:

Gaganyaan will focus on regional needs because one International Space Station (ISS) may not be enough to cater to global requirements.

### Strengthening international partnerships:

The programme will strengthen international partnerships and global security through the sharing of challenging and peaceful goals.

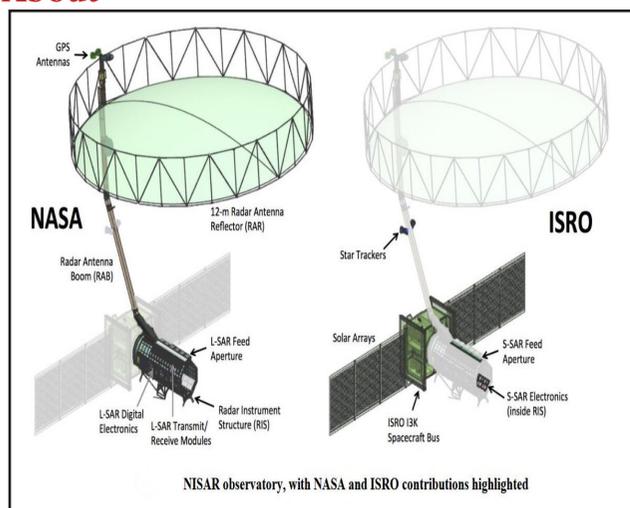
# NISAR MISSION

## Why in the News?

The NISAR satellite is all set to arrive in India as recently, the satellite got a send-off ceremony at NASA.

The SUV-size satellite will be shipped to India in a special cargo container flight later in February 2023 for a possible launch in 2024 from Satish Dhawan Space Centre in Andhra Pradesh.

## About



NISAR is an Earth-observation satellite that stands for (NASA-ISRO Synthetic Aperture Radar).

It is Jointly developed by the National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation under a partnership agreement signed in 2014.

It will scan the **globe every 12 days** over the course of its **three-year mission** of imaging the Earth's land, ice sheets and sea ice to give an unprecedented view of the planet. It is a **Low Earth Orbit (LEO) observatory**.

## Features of NISAR

It is a 2,800 kilograms satellite consisting of both L-band and S-band Synthetic Aperture Radar (SAR) instruments, which makes it a **dual-frequency imaging radar satellite**.

While NASA has provided the **L-band radar**, GPS, a high-capacity solid-state recorder to store data, and a payload data subsystem, **ISRO** has provided the **S-band radar**, the **GSLV launch system and spacecraft**.

Another important component of the satellite is its large 39-foot stationary antenna reflector. The reflector will be used to focus "the radar signals emitted and received by the upward-facing feed on the instrument structure.

## Objectives of the Mission

NISAR will observe subtle changes in Earth's surfaces, helping researchers better understand the causes and consequences of such phenomena.

It will spot warning signs of natural disasters, such as volcanic eruptions, earthquakes and landslides.

The satellite will also measure groundwater levels, track flow rates of glaciers and ice sheets, and monitor the planet's forest and agricultural regions, which can improve our understanding of carbon exchange.

ISRO will use NISAR for a variety of purposes including agricultural mapping, and monitoring of glaciers in the Himalayas, landslide-prone areas and changes in the coastline.

By using synthetic aperture radar (SAR), NISAR will produce high-resolution images. SAR is capable of penetrating clouds and can collect data day and night regardless of the weather conditions.

## Expected Benefits of NISAR

**Earth Science:** NISAR will provide a wealth of data and information about the Earth's surface changes, natural hazards, and ecosystem disturbances, helping to advance our understanding of Earth system processes and climate change.

**Disaster Management:** The mission will provide critical information to help manage

natural disasters such as earthquakes, tsunamis, and volcanic eruptions, enabling faster response times and better risk assessments.

**Agriculture:** NISAR data will be used to improve agriculture management and food security by providing information about crop growth, soil moisture, and land-use changes.

**Infrastructure Monitoring:** The mission will provide data for infrastructure monitoring and management, such as monitoring of oil spills, urbanization, and deforestation.

**Climate Change:** NISAR will help to monitor and understand the impacts of climate change on the Earth's land surface, including melting glaciers, sea-level rise, and changes in carbon storage.

## IIT-M TO SET UP NATIONAL CENTRE FOR LAB-GROWN DIAMONDS

### Why in the News?

FM also announced a grant to IITs to facilitate the growth of Lab-Grown Diamonds in India.

About

Finance Minister Nirmala Sitharaman announced in the budget 2023-24, the government's proposal to focus on lab-grown diamonds by reducing the Customs duty on the seeds used in lab-grown diamond manufacturing.

This will encourage the indigenous production of LGD seeds, machines and to reduce import dependency.

### Lab-Grown Diamonds

Lab-grown diamonds (LGD) are diamonds that are produced in laboratories, using specific technology which mimics the geological processes that grow natural diamonds.

### Production Process of LGDs

LGDs are mostly manufactured through two processes – high pressure, high temperature (HPHT) method or Chemical Vapour Deposition (CVD) method.

**High pressure, high temperature (HPHT) method:**

HPHT method requires extremely heavy presses that can produce up to 730,000 psi of pressure under extremely high temperatures (at least 1500 celsius).

Usually **graphite** is used as the “diamond seed” and when subjected to these extreme conditions, the relatively inexpensive form of carbon turns into one of the most expensive carbon forms.

**Chemical Vapor Deposition (CVD) method:**

A thin slice of diamond seed is placed in a sealed chamber and heated to around 800 degrees celsius, and then the chamber is filled with other carbon rich gases such as methane.

The gases are ionised into plasma using microwaves, lasers, and other techniques. The ionisation breaks down the gases and allows the carbon to merge with the diamond seed, growing the diamond up layer by layer.

Both HPHT and CVD methods of growing diamonds artificially begin with a seed — a slice of another diamond.

### Applications

LGDs have basic properties similar to natural diamonds, including their optical dispersion, which provide them the signature diamond sheen. However, since they are created in controlled environments, many of their properties can be enhanced for various purposes.

LGDs are most often used for industrial purposes, in machines and tools. Their hardness and extra strength make them ideal for use as cutters.

Pure synthetic diamonds have **high thermal conductivity, but negligible electrical conductivity**. This combination is invaluable for **electronics** where such diamonds can be used as a heat spreader for high-power laser diodes, laser arrays and high-power transistors

# MOON DUST AS SOLAR SHIELD

## Why in the News?

Recently, a team of Researchers have published a study titled- “Dust as a Solar Shield”, proposing that launching Moon Dust into the stratosphere can slow down Global-Warming.

## About

It is said that a summerless year followed the volcanic eruption of Mt. Tambora in 1816 which released sulphates and other aerosols into the stratosphere that cooled the atmosphere.

This has encouraged people to examine the possibility of using similar methods artificially to slow down global warming.

## Moon dust coolers

In a recent paper published in the PLoS Climate journal, researchers from the U.S. have proposed the idea of launching tonnes of dust from the moon to a point in space where the gravitational forces of the earth and the Sun cancel each other out.

Launching the dust to such a point will ensure that the dust will be stationed there which helps cast a shadow on earth and reduce sunlight to offset carbon emissions.

Aerosols in the stratosphere, particularly those which are radiation-scattering such as sulphates, have a cooling effect.

It is to be noted that the summerless year which followed the 1816 eruption significantly affected crop yields worldwide causing disease and starvation.

Additionally, various climate models also have confirmed that dimming the amount of incoming sunlight with stratospheric aerosols will have similar implications on crop yield.

A few studies however have argued that such droughts would not be as harmful and that the GDPs of the countries will be positively affected by such solar radiation management (SRM).

## Solar radiation management (SRM)

Solar radiation management (SRM) is a type of **climate engineering** that aims to reduce or slow down global warming by reflecting sunlight.

The proposed methods of SRM include increasing the planetary albedo by:

Placing reflective balloons, sunshades, or mirrors in space.

Injecting heat-deflecting aerosols directly into Earth’s stratosphere to bounce more of the Sun’s heat back into space.

Marine Cloud Brightening involves introducing saltwater particles from the ocean up into the cloud layer to increase the reflectivity of clouds.

Adopting surface-based approaches like whitening roofs, growing more reflective crops, etc.

Adopting restorative methods such as protecting natural heat reflectors like sea ice, snow and glaciers with engineering projects.

SRM is said to be a fast and inexpensive approach to slowing down global warming.

## Concerns

There is still uncertainty about the potential changes in rainfall patterns as a result of blocking sunlight which can have unintended consequences in the form of drought and crop losses.

These methods are best when adopted at the continental scale and not at the regional scale. Thus these measures cannot offset the adverse effects of heatwaves and droughts regionally.

Various natural and social scientists have raised concerns about SRM techniques and governance.

There are also concerns regarding the aerosol-loading approach that there will be a rebound effect once spraying stops and the aerosols are washed out of the atmosphere.

# NEXT-GENERATION ENERGY STORAGE DEVICES

## Why in news?’

Researchers at the Lawrence Berkeley Lab, California, have developed a promising material for energy storage. Polymer film capacitors made with this ‘polysulphate compound’ can store large quantities of electricity.

## About

The researchers have developed a polymer film capacitor using polysulphates.

Polysulphates have outstanding dielectric properties, especially at high electric fields and temperatures.

Several commercial and lab-generated polymers are known for their dielectric properties, but polysulphates had never been considered. The marriage between polysulphates and dielectrics is one of the novelties here

This compound has been synthesised using ‘click chemistry’ — a means of getting two materials to bind together — for which three scientists received the 2022 Nobel Prize in Chemistry.

## Polymer film capacitor

Film capacitors, plastic film capacitors, film dielectric capacitors, or polymer film capacitors, generically called film caps as well as power film capacitors, are electrical capacitors with an insulating plastic film as the dielectric, sometimes combined with paper as carrier of the electrodes.

Capacitors, like batteries, are energy storage devices. Polymer film capacitors are known to be good storage devices, accounting for over half the high-voltage capacitor market, owing to their light weight, low cost and mechanical flexibility. However, their performance suffers with increase in voltage and temperature.

The most used film materials are polypropylene, polyester, followed by the other dielectric materials, including polyphenylene sulfide and paper.

Polymer-based film capacitors can deliver higher energy density under harsh thermal and electrical conditions

## Polysulphates

Polysulfates, made from a near-perfect click chemistry reaction, have emerged as a promising class of material for flexible, lightweight, heat-resistance dielectric film capacitors with outstanding energy storage capacity. They are strong contenders to the state-of-the-art polymer dielectrics to improve the energy efficiency of integrated power systems in electric vehicles by mass and volume reductions.

Sulfur(VI) fluoride exchange (SuFEx) catalysis is the near-perfect click chemistry reaction which is used to synthesize polysulphates.

## Click Chemistry

It is a minimalistic form of chemistry in which molecular building blocks can quickly and efficiently snap together.

It is a type of straightforward chemistry that is trustworthy, where reactions happen rapidly and undesirable byproducts are avoided.

Barry Sharpless developed the idea of “click chemistry” around the year 2000.

He discovered that it is simpler to link smaller molecules with entire carbon frameworks than it is to force carbon atoms, the building blocks of organic matter, to bond with one another.

## Significance of Click Chemistry

In the context of the **pharmaceutical sector**, click chemistry is particularly significant.

In the case of conventional chemical reactions, **nanoparticle research** was difficult or impossible, but click chemistry can illustrate its immense potential.

**Development of synthetic DNA** can be done with help of research in Click Chemistry.

It also has **therapeutic applications**. For example, research has shown that some polymers made by living organisms interfere with the body’s attempts to attack certain cancer tumors.

# CHANDRAYAAN-3

## Why in the News?

The Indian Space Research Organisation (ISRO) has successfully conducted the flight acceptance hot test of the CE-20 cryogenic engine that will power the Cryogenic Upper Stage of the LVM3 launch vehicle for the Chandrayaan-3 mission.

## About

The test was successfully conducted on February 24, at the ISRO Propulsion Complex, Mahendragiri in Tamil Nadu.

ISRO said, the hot test was carried out for a planned duration of 25 seconds at the High Altitude Test Facility.

All the propulsion parameters during the test were found satisfactory and closely matched with predictions.

The cryogenic engine will be further integrated with the propellant tanks, stage structures and associated fluid lines to realize the fully-integrated flight cryogenic stage.

## Chandrayaan-3 Mission

Chandrayaan-3 is a follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface.

It consists of Lander and Rover configuration.

It will be launched by GSLV MkIII from SDSC, Sriharikota.

The propulsion module will carry the lander and rover configuration till 100km lunar orbit.

The propulsion module has Spectro-polarimetry of HAbitable Planet Earth (SHAPE) payload to study the spectral and polarimetric measurements of Earth from lunar orbit.

“Chandrayaan-3 consists of an indigenous Lander module (LM), Propulsion module (PM), and a Rover with the objective of developing and demonstrating new technologies required for Interplanetary missions.

The Lander will have the capability to soft land at a specified lunar site and deploy the Rover which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility.

The Lander and the Rover have scientific payloads to carry out experiments on the lunar surface.

## Major Modules of Chandrayaan-3 Interplanetary Mission

- The propulsion module
- The lander module
- A rover
- **Lander Payloads**
  - Chandra’s Surface Thermophysical Experiment (ChaSTE) to measure the thermal conductivity and temperature
  - Instrument for Lunar Seismic Activity (ILSA) for measuring the seismicity around the landing site
  - Langmuir Probe (LP) to estimate the plasma density and its variations
  - A passive Laser Retroreflector Array from NASA is accommodated for lunar laser ranging studies.
- **Rover Payloads**
  - Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscope (LIBS) for deriving the elemental composition in the vicinity of landing site.

## Launch Vehicle Mark 3 (LVM3)

The Launch Vehicle Mark 3 (LVM3) is ISRO’s newest medium-heavy lift launch vehicle, the heaviest rocket currently in use by the space agency.

Formerly called the Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III), the rocket is designed to mainly launch satellites into

geostationary orbit at 35,000km.

The LVM3 will go everywhere —GEO, MEO, LEO as well as missions to the moon as against only to a specific orbit.

The LVM3 is capable of lifting much heavier satellites than the GSLV Mk II with a bigger cryogenic upper stage and a larger first stage.

## What will Chandrayaan-3 do on the Moon?

The mission is aimed at better understanding the Moon's composition.

ISRO has laid out three main objectives for the mission, which include

Demonstrating a safe and soft landing on the lunar surface

Demonstrating the rover's roving capabilities on the moon

Performing in-situ scientific observations.

The mission's Chandra Surface Thermophysical Experiment (ChaSTE) will measure the thermal conductivity and temperature, while the Instrument for Lunar Seismic Activity (ILSA) will measure

the seismicity around the landing site.

The Langmuir Probe (LP) will estimate the plasma density and its variations and a passive Laser Retroreflector Array from NASA is accommodated on the mission for lunar laser ranging studies.

## Reasons For Targeting Lunar South Pole of the Moon For Exploration?

The best connection to Earth's early history and civilization is made by the Moon.

The exploration will provide an unaltered historical record of the conditions in the inner Solar System.

The shadow-covered portion of the lunar surface at the South Pole is significantly bigger than at the North Pole, which makes it particularly interesting.

In addition, places around it that are always in the shadows can have the possibility of presence of water.

A fossil record of the early Solar System can also be found in cold trap craters near the South Pole.

# BIOTIN

## Why in news?

While biotin (vitamin B7) is being promoted by several companies as a sure shot remedy for healthy hair and nail growth, leading dermatologists in Delhi have cautioned users that there is no scientific evidence to prove this claim and its indiscriminate use could be detrimental to one's health.

## About

Biotin, a **B7 vitamin**, is an essential nutrient that is naturally present in some foods and available as a dietary supplement

Biotin is a **coenzyme** for five carboxylase enzymes, which are involved in the catabolism of amino acids and fatty acids, synthesis of fatty acids, and gluconeogenesis.

Biotin also plays **key roles** in histone modifications, gene regulation (by modifying the

activity of transcription factors), and cell signaling

Many foods contain some biotin. Foods that contain the most biotin include organ meats, eggs, fish, meat, seeds, nuts, and certain vegetables (such as sweet potatoes) . The biotin content of food can vary;

Biotin, synthesized in plants, is essential to plant growth and development. Bacteria also synthesize biotin. **Humans, other mammals, and birds cannot synthesize biotin de novo** and therefore must obtain this essential micronutrient from material synthesized from dietary sources

## Deficiency

Primary biotin deficiency, meaning deficiency as a consequence of too little biotin in the diet, is rare, because biotin is contained in so many foods.

Subclinical deficiency can cause mild symptoms, such as hair thinning, brittle fingernails, or skin rash, typically on the face.

Aside from inadequate dietary intake (rare), deficiency of biotin can be caused by a genetic

disorder that affects biotin metabolism. The most common among these is biotinidase deficiency. Low activity of this enzyme causes a failure to recycle biotin from biocytin

## MUONS

### Why in news?

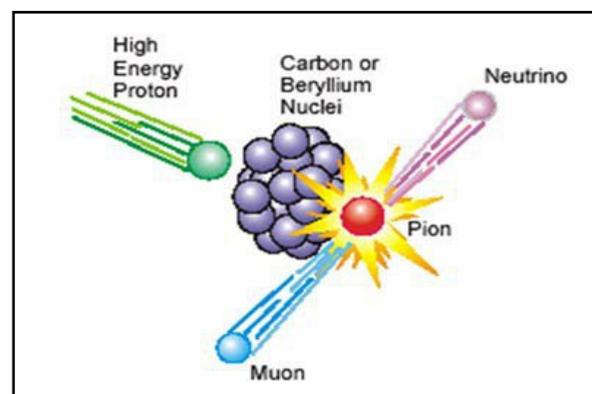
Researchers are examining the fortress wall of Xi'an, an ancient city in China, by using tiny outer space particles that can penetrate hundreds of metres of stone surfaces. Known as muons, these particles have helped them find small density anomalies, which are potential safety hazards, inside the wall

### About

The muon is one of the fundamental subatomic particles, the most basic building blocks of the universe as described in the Standard Model of particle physics. Muons are similar to electrons but weigh more than 207 times as much.

The muon is part of the **lepton group**

QUARKS	<b>UP</b> mass 2.3 MeV/c <sup>2</sup> charge 2/3 spin 1/2 <b>u</b>	<b>CHARM</b> 1,275 GeV/c <sup>2</sup> 2/3 <b>c</b>	<b>TOP</b> 173,07 GeV/c <sup>2</sup> 2/3 <b>t</b>	<b>GLUON</b> 0 0 1 <b>g</b>	<b>HIGGS BOSON</b> 126 GeV/c <sup>2</sup> 0 0 0 <b>H</b>
	<b>DOWN</b> 4,8 MeV/c <sup>2</sup> -1/3 1/2 <b>d</b>	<b>STRANGE</b> 95 MeV/c <sup>2</sup> -1/3 1/2 <b>s</b>	<b>BOTTOM</b> 4,18 GeV/c <sup>2</sup> -1/3 1/2 <b>b</b>	<b>PHOTON</b> 0 0 1 <b>γ</b>	
	<b>ELECTRON</b> 0,511 MeV/c <sup>2</sup> -1 1/2 <b>e</b>	<b>MUON</b> 105,7 MeV/c <sup>2</sup> -1 1/2 <b>μ</b>	<b>TAU</b> 1,777 GeV/c <sup>2</sup> -1 1/2 <b>τ</b>	<b>Z BOSON</b> 91,2 GeV/c <sup>2</sup> 0 1 <b>Z</b>	
LEPTONS	<b>ELECTRON NEUTRINO</b> <2,2 eV/c <sup>2</sup> 0 1/2 <b>ν<sub>e</sub></b>	<b>MUON NEUTRINO</b> <0,17 MeV/c <sup>2</sup> 0 1/2 <b>ν<sub>μ</sub></b>	<b>TAU NEUTRINO</b> <15,5 MeV/c <sup>2</sup> 0 1/2 <b>ν<sub>τ</sub></b>	<b>W BOSON</b> 80,4 GeV/c <sup>2</sup> ±1 1 <b>W</b>	<b>GAUGE BOSONS</b>



The muon was discovered as a constituent of cosmic-ray particle “showers”

A muon is relatively unstable, with a lifetime of only 2.2 microseconds before it decays by the weak force into an electron and two kinds of neutrinos.

muons in cosmic radiation are extremely penetrating and can travel thousands of metres below the Earth's surface.

### Fermion

A fermion is a category of elementary particles. They are very small and very light. Fermions can be thought of as the building blocks of matter because atoms are made up of fermions. Fundamental fermions (fermions that are not made up of anything else) are either quarks or leptons

### Leptons

Leptons are elementary particles with spin 1/2 (a fermion) that are not affected by strong nuclear force. They are a family of particles that are different from the other known family of fermions, the quarks.

Electrons are a well-known example that are found in ordinary matter. There are six leptons: the electron, muon, and tau particles and their associated neutrinos

### Quarks

Neutrons and protons are not the original fundamental particles. Neutrons and protons are made up of quarks, which are held together by gluons. Quarks interact with all of the fundamental forces

Cosmic rays from the Sun makes muons:

The photons in the cosmic rays crash into air molecules. Pions are made in the crash. The pions undergo atomic decay into neutrinos and muons.

## Muography

Muography is conceptually similar to X-ray but capable of scanning much larger and wider structures, owing to the penetration power of muons. As these high-energy particles are naturally produced and ubiquitous, all one needs to do is place a muon detector underneath, within or near the object of interest.

The detector then tracks the number of muons

going through the object from different directions, to form a three-dimensional image.

Muography uses muons by tracking the number of muons that pass through the target volume to determine the density of the inaccessible internal structure. Muography is a technique similar in principle to radiography (imaging with X-rays) but capable of surveying much larger objects

Apart from archaeology, muography has found use in customs security, internal imaging of volcanoes and others

Muography is also being used by researchers to analyse Mount Vesuvius, a volcano in Italy.

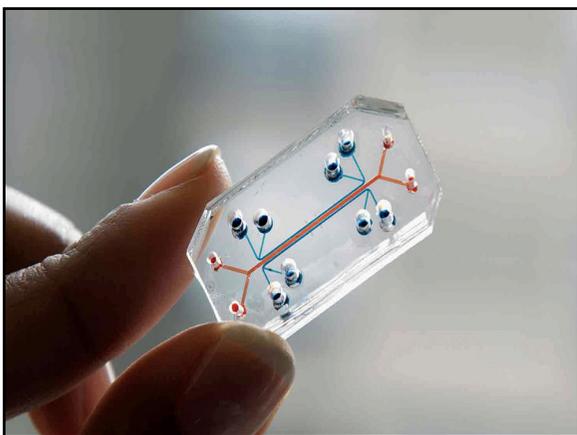
# ORGAN ON A CHIP

## Why in the News?

The FDA Modernization Act 2.0, signed by President Biden, allows clinical trial leaders to use animal trial alternatives instead of traditional animal modelling for drug and biological development. The move is expected to boost the research and development of organ chips.

## About

Organ-on-a-Chips refers to a micro-engineered biomimetic system that reflects the



structural and functional characteristics of human tissue. It is also known as micro physiological systems or “tissue chips”.

It is small devices containing human cells that are used to mimic the environment in human

organs, including blood flow and breathing movements, serving as synthetic environments in which to test new drugs.

It involves biomaterial technology, cell biology, and engineering combined together in a miniaturized platform.

## Applications

It has attracted substantial interest in recent years due to its numerous applications, especially in precision medicine, drug development, and screening.

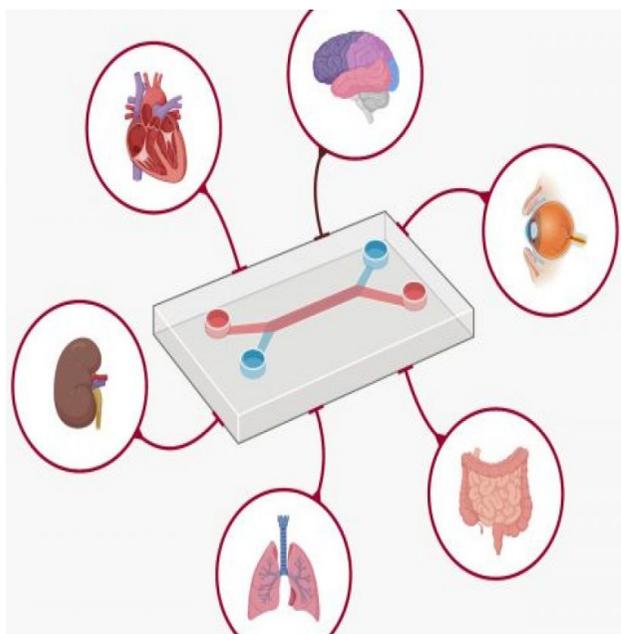
It can replicate key aspects of human physiology, providing insights into the studied organ function and disease pathophysiology.

Moreover, these can accurately be used in drug discovery for personalized medicine.

## Importance

Organ-on-chip (OoC) is a concept of great interest all around the globe, due to the importance of its applications in the biomedical field. It is very important for drug development and the effects that they have on different organs.

Drugs are mostly tested on animals, which in some cases give inaccurate data or raise ethical concerns from organizations such as People for the Ethical Treatment of Animals (PETA). This led to researchers searching for new ways to allow



testing on human cells.

These devices present useful substitutes for traditional preclinical cell culture methods and can reduce the use of in vivo animal studies. They are free from ethical issues associated with [the use of] animal models.

## Developments

### Across globe

Donald E. Ingber, a professor of bioengineering and director of the Wyss Institute at Harvard University, and his colleagues developed the first human organ-on-chip model in 2010.

It was a ‘lung on a chip’ that mimicked biochemical aspects of the lung and its breathing motions. Ingber’s group went on to develop more human organs-on-chips.

In 2014, members of Wyss Institute launched a start-up called Emulate Inc. to commercialize their technology. The group has since created several different chips, including the bone marrow, epithelial barrier, lung, gut, kidney, and vagina.

Scientists also formed consortia to encourage research in this field, such as the European Organ-on-Chip Society.

### Organs on a chip in India

Researchers in India are also developing organ-on-a-chip models, including a skin-on-chip model, which is being tested for studying skin irritation and toxicity, and a retina-on-chip model.

### Issues and Challenges

India’s regulators lack exposure to researchers’ issues while academicians don’t fully understand regulatory requirements. There are bureaucratic hurdles as well. Examples of the “inflexible heads of expenditures in government grants” and the delay in releasing money for sanctioned grants.

There is still a reluctance on the part of the industries in [using this] for preclinical research due to the lack of experienced personnel”.

### Suggestions

The researchers hope to see larger consortia with diverse experts from academia, industries, and regulators come together to be able to compare India’s organ-on-chip efforts with those of the West.

There is a need for multidisciplinary knowledge from the biomedical and engineering fields to understand and realize OoCs.

## QUASICRYSTALS

### Why in news?

Scientists have discovered a third natural source of quasicrystals in the Sand Hills of north central Nebraska, USA.

### Quasicrystals

A **crystal** is a solid whose atoms are arranged in a “highly ordered” repeating pattern. These patterns are called crystal systems. If a mineral has its atoms arranged in one of them, then that

mineral is a crystal.

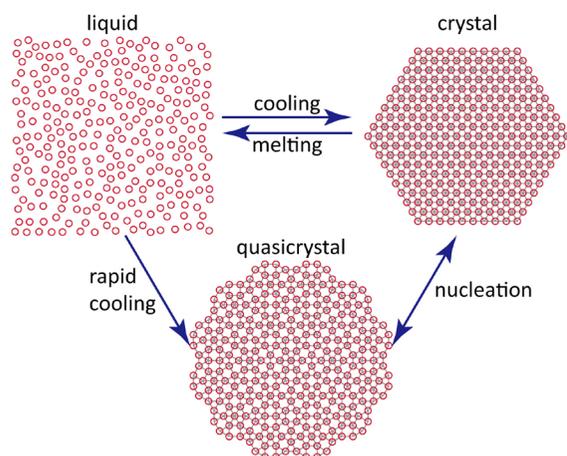
A **quasiperiodic crystal**, or quasicrystal, is a structure that is ordered but not periodic. A quasicrystalline pattern can continuously fill all available space, but it lacks translational symmetry.

In crystals, atoms are arranged in a repeating pattern. In quasicrystals, they are still ordered but the pattern is not periodic: it doesn’t repeat.

Like crystals, quasicrystals contain an ordered

structure, but the patterns are subtle and do not recur at precisely regular intervals. Rather, quasicrystals appear to be formed from two different structures assembled in a nonrepeating array, the three-dimensional equivalent of a tile floor made from two shapes of tile and having an orientational order but no repetition.

## Properties of QuasiCrystals



The electrical and thermal conductivities of the best ordered quasicrystals are surprisingly low, more similar to semiconductors than to metallic alloys.

All quasicrystals are hard and brittle.

They are reported to have nonstick behavior and superior corrosion resistance.

## Sources of Quasicrystals

The first natural quasicrystal found was as microscopic grains in a fragment of the **Khatyrka meteorite** lying in the Koryak mountains of Russia.

The second time scientists found natural quasicrystals in the remains of the **Trinity test of the Manhattan Project**.

Recently in the Sand Hills dunes in northern Nebraska, where scientists found **silicate glass** which is a dodecagonal quasicrystal, rare even for quasicrystals.

## Applications of Quasicrystals

They are used in surgical instruments, LED lights and nonstick frying pans.

They have poor heat conductivity, which makes them good insulators.

They are used in infrared detectors, selective absorbers for solar photothermal converters, and active elements for thermoelectric devices.

# CAR T-CELL THERAPY

Cancer is one of the leading causes of death worldwide. Over the years, a number of conventional cytotoxic approaches for neoplastic diseases has been developed.

However, due to their limited effectiveness in accordance with the heterogeneity of cancer cells, there is a constant search for therapeutic approaches with improved outcome, such as immunotherapy that utilizes and enhances the normal capacity of the patient's immune system.

Chimeric Antigen Receptor (CAR) T-cell therapy involves genetic modification of patient's autologous T-cells to express a CAR specific for a tumor antigen, following by ex vivo cell expansion and re-infusion back to the patient.

CARs are fusion proteins of a selected single-chain fragment variable from a specific monoclonal antibody and one or more T-cell receptor intracellular signaling domains.

This T-cell genetic modification may occur either via viral-based gene transfer methods or nonviral methods, such as DNA-based transposons, CRISPR/ Cas9 technology or direct transfer of in vitro transcribed-mRNA by electroporation.

## GOOGLE BARD

Google has finally decided to answer the challenge and threat posed by Microsoft-backed OpenAI and its AI chatbot, ChatGPT. The search giant confirmed it will soon start public testing for a new AI chatbot of its own called Bard, based on the company's Language Model for Dialogue Application or LaMDA.

Bard is based on LaMDA and Google's own conversational AI chatbot. It is what Pichai termed an "experimental conversational AI service," and Google will be "opening it up to trusted testers ahead of making it more widely available to the public in the coming weeks."

If you are wondering how to sign up for it now, keep in mind that it's not yet publicly available. Given Google has taken such a slow and cautious approach with LaMDA – it has been in testing for nearly two years – the Bard rollout is actually

quite fast in comparison.

Google is also hosting an AI event on Wednesday, where more details and confirmations will be revealed.

However, Google has also said that the model is currently a "lightweight" version of LaMDA, and the one being "requires significantly less computing power, enabling us to scale to more users, allowing for more feedback." Remember running these models also requires significant computing power. For instance, ChatGPT is powered by Microsoft's Azure Cloud services.

This also explains why the service often runs into errors at times, because too many people are accessing it.

Google says it will look at external feedback, along with "internal testing to make sure Bard's responses meet a high bar for quality, safety and groundedness in real-world information." So yes, Bard is now in a testing phase.

## SICKLE CELL ANAEMIA

In 1910, a physician named James Herrick wrote of discovering unusual red blood cells in an anaemic student from Granada, Spain.

Unusual, because unlike their usual globular structure with an indented center – like a doughnut with a hole – these blood cells were shaped like a sickle, similar to the letter C.

This was the first description of sickle cell anaemia in western medical literature.

Haemoglobin which is tasked with carrying oxygen to all parts of the body has four protein subunits — two alpha and two beta.

In some people, mutations in the gene that creates the beta subunits impact the shape of the blood cell and distort it to look like a sickle.

A round red blood cell can move easily through blood vessels because of its shape but sickle red blood cells end up slowing and even

blocking, the blood flow. Moreover, sickle cells die early, resulting in a shortage of red blood cells that deprive the body of oxygen.

These obstructions and shortages may cause chronic anaemia, pain, fatigue, acute chest syndrome, stroke, and a host of other serious health complications.

Without treatment, quality of life is compromised and severe cases can become fatal in the initial years of life.

Sickle cell anaemia is a genetic disorder, making complete "elimination" a challenge that requires a major scientific breakthrough.

The only cure comes in the form of gene therapy and stem cell transplants — both costly and still in developmental stages.

In gene therapy, the DNA inside the haemoglobin gene is edited to stop the disease

while in stem cell transplants, the bone marrow affected by sickle cell anaemia is replaced with healthy bone marrow from a donor.

Both interventions are currently being tested in clinical trials globally.

Blood transfusion, wherein red blood cells are removed from donated blood and given to a patient, is also a trusted treatment in the absence of permanent cures.

But challenges include a scarcity of donors, fears around safe supply of blood, risk of infection etc.

### What has India done so far?

The Indian Council of Medical Research and the National Rural Health Mission in different States are undertaking outreach programmes for better management and control of the disease.

The Ministry of Tribal Affairs launched a portal wherein people can register themselves if they have the disease or the trait, in order to

collate all information related to SCA among tribal groups.

The National Health Mission guideline on Hemoglobinopathies also identifies “establishing services at the community level for pre-marital and preconception screening backed by genetic counselling services” as a strategy for addressing SCA.

Genetic counselling involves creating awareness and advising two carriers about the risks of having biological children.

In pre-marital counselling, partners are provided with the knowledge of how their sickle genes could affect the newborn baby.

They are “free to choose the path which is most comfortable to them... the genetic counsellor will not tell the patient what to do”, the Chhattisgarh government’s manual on SCA states.

### ADD GOALS and Targets

## SAND BATTERIES

In the village of Kankaanpaa, Finland has built the first fully functional “sand battery” capable of storing green energy for several months. The issue of year-round supply can also be resolved with the batteries.

### About Sand batteries

Sand or sand-like materials are used as the storage medium in “sand batteries,” which are high-temperature thermal energy storage systems. In the form of heat, sand retains energy.

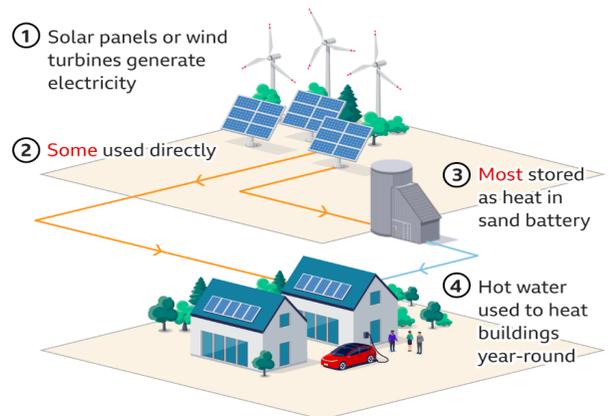
Sand is a particularly efficient heat-storage material that can hold heat for months at a time.

Its major function is to act as an overflow wind and solar energy storage with high power and high capacity.

The energy is converted to heat, which can be used to heat buildings or to supply hot steam and high-temperature process heat to sectors of the economy that are frequently dependent on fossil fuels.

By ensuring that there is always a method

### How sand batteries work



BBC

to benefit from clean energy, even if there is a significant surplus, the sand battery aids in the ambitious upscaling of renewable energy production.

### How does a Sand battery work?

The heat is kept in a steel silo that holds 100 tonnes of sand.

With conventional ovens and an air-to-water heat exchanger, resistors are utilized as an electric air heater.

Water and a mechanical pipe make up the heat exchanger.

Sand traps heat at a temperature of about 500 degrees Celsius (the same process that makes electric fires work).

Sand is at the centre and far from the boundary, preventing the loss of heat from the core.

It may persist for days or weeks.

The reservoir can hold temperatures up to 600 degrees Celsius and prevent heat losses over time since it is so well insulated from the outside environment.

It has a heat storage capacity of up to 8 megawatt-hours.

Sand batteries have a large capacity for thermal energy storage and can help with clean energy solutions.

## A NEW KIND OF ICE: 'AMORPHOUS' SOLID, WATER 'FROZEN IN TIME'

Recently Scientists have created a new type of ice that matches the density and structure of water, perhaps opening a door to studying water's mysterious properties. The ice is called medium-density amorphous ice. Amorphous ice (non-crystalline or "vitreous" ice) is an amorphous solid form of water.

Normally, when water freezes, it crystallizes and its molecules are arranged into the familiar hexagonal, solid structure that we call ice. Amorphous ice lacks long-range order in its

molecular arrangement. Amorphous ice is produced either by rapid cooling of liquid water (so the molecules do not have enough time to form a crystal lattice), or by compressing ordinary ice at low temperatures. Although almost all water ice on Earth is the familiar crystalline ice Ih, amorphous ice dominates in the depths of interstellar medium, making this likely the most common structure for H<sub>2</sub>O in the universe at large.

Amorphous ice may be formed when liquid water is cooled to its glass transition temperature (about 136 K or -137 °C) in milliseconds to prevent the spontaneous nucleation of crystals. Pressure is another important factor in the formation of amorphous ice, and changes in pressure may cause one form to convert into another. Cryoprotectants can be added to water to lower its freezing point (like antifreeze) and increase viscosity, which inhibits the formation of crystals.





# SECURITY

What's Inside?

1. MUNICH SECURITY CONFERENCE
2. FEATHERING
3. MQ-9B DRONE
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## MUNICH SECURITY CONFERENCE

### Why in news?

Billionaire investor George Soros said that the allegations levied by US short-seller Hindenburg Research against the Adani Group threaten to hurt investor confidence in India and might weaken Prime Minister Narendra Modi's hold on the government. "Modi and business tycoon Adani are close allies; their fate is intertwined," Soros said while giving a speech at the Munich Security Conference (MSC).

### What is the Munich Security Conference?

The Munich Security Conference is the world's leading forum for **debating international security policy**. It is a venue for diplomatic initiatives to address the world's most pressing security concerns.

The MSC's objective is to build trust and to contribute to the **peaceful resolution of conflicts** by sustaining a continuous, curated and informal dialogue within the international security community.

The MSC was founded by a German official and publisher Ewald-Heinrich von Kleist at the

peak of the Cold War (1947-1991). **Starting in 1963**, the conference initially only focused on military issues and was mainly attended by western countries and their high-profile officials, who "came together to display a united front in their struggle with Soviet communism.

After the end of the Cold War, the conference expanded its agenda that went beyond defence and security matters to include issues such as climate change and migration. It also started to invite leaders from eastern nations, including Russia, India and China.

The conference seeks to promote trust and contribute to the peaceful resolution of conflicts by facilitating ongoing, curated, yet informal dialogue within the international security community.

Since its inception, **it has been cancelled only twice**. Once in 1991 when the first Gulf War broke out and then in 1997 as a result of the retirement of Kleist-Schmenzin.

Almost one year after Russia's invasion of Ukraine, the MSC 2023 also provided an opportunity to take stock of alliance cohesion and political commitment to the rules-based international order.

## FEATHERING

### Why in news?

A preliminary report by the Aircraft Accident Investigation Commission of Nepal on the crash of a Yeti Airlines ATR 72-500 on January 15 in Pokhara says that the propellers of the plane were found in an unusual "feathered" position.

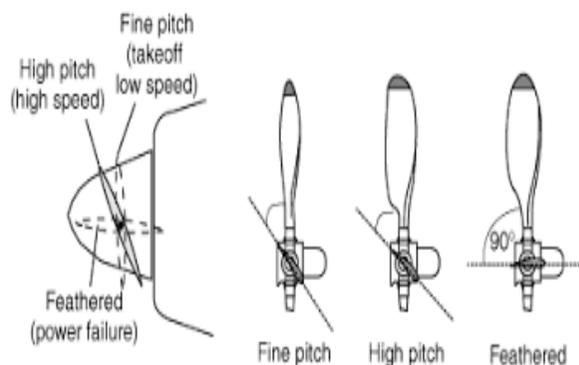
### About

During engine failure or an engine shutdown mid-air, a pilot flying an aircraft with variable-pitch propellers is able to change the pitch/ angle of the propeller blades so that they slice the airflow in a more or less parallel motion — like a knife — and not hit the air flatly.

This has the effect of reducing the 'drag',

increasing the gliding distance, and preventing airspeed from decaying below unsafe limits. This is called the 'feathering' of propellers.

In fact, 'feathering' is part of the checklist if the crew, faced with an emergency, of such aircraft is planning a forced landing.





‘Windmilling’ propellers, unless ‘feathered’, can worsen an emergency during an engine failure at low heights. However, if the aircraft is quite high, the ‘windmilling’ nature of propellers, rotated by the force of air, can in fact help restart a failed engine. There are specific checklists for this.

## Propeller

Propeller is a device with a central hub and radiating blades placed so that each forms part of a helical (spiral) surface. By its rotation in water or air, a propeller produces thrust owing to aerodynamic or fluid forces acting upon the blades and gives forward motion to a ship or aircraft.

### Various types of Propeller Engines

**Fixed-pitch propeller:** As the name suggests, the angle or pitch at which the propeller blades meet the airflow is fixed. The blade angle or pitch cannot be changed.

**Adjustable-pitch propeller:** In this type,

the propeller pitch can be changed but only on the ground, physically — not while the aircraft is in flight.

**Variable-pitch propeller:** Both the fixed-pitch and adjustable-pitch propeller types have their limitations. Pilots wanted different propeller pitches for takeoff, climb, cruise, etc. — a small blade pitch is ideal for takeoff, medium pitch for climb and high pitch for cruise. They also wanted propellers whose pitch could be changed from the cockpit during the flight.

This was achieved by the variable-pitch propeller. As the name suggests, the propeller pitch could be changed by the pilot from the cockpit to suit flight conditions.

**Constant-speed propeller:** This is a more advanced variable-pitch propeller, in which the blade pitch changes automatically to maintain a constant aircraft speed.

## MQ-9B DRONE

The killing of Al-Qaeda leader Ayman al-Zawahiri with the Hellfire missiles fired through the MQ-9 Predators (also called Reapers) once again made this US flying machine the cynosure of military attention.

With reports emerging of India being in an advanced stage of negotiations to procure 30 MQ-9B Predators, let’s find out what these Predator drones are all about.

Predator drones were conceived in the early 1990s for aerial reconnaissance and forward observation roles after the failure of GNAT 750 in operations over Bosnia and Herzegovina in 1993 and 1994.

GNAT 750 suffered from several technical issues and RQ-1 Predator came as its more capable and enhanced version replacement for medium-altitude tactical reconnaissance.

By 1995, it too was operating over Bosnia and Herzegovina and later saw combat in the US war in Afghanistan, Iraq, Pakistan, the 2011 Libyan civil war, and the 2014 intervention in Syria.

By 1999, the US Airforce (USAF) felt the need for more advanced versions, so General Atomics began work on the Predator B, which entered operations in 2007 as the MQ-9 Reaper, as the replacement of the original Predator.

It is operated by the CIA and the USAF, which describes Predator as a “Tier II” MALE UAS (medium-altitude, long-endurance unmanned aircraft system).

The MQ-9B has two variants — SkyGuardian and its sibling SeaGuardian. The Indian Navy has been operating the MQ-9B Sea Guardian since 2020.

According to the General Atomics, MQ-9B Sea Guardian can carry up to 12,500 lb (5,670 kg) and has fuel capacity of 6,000 lb (2,721 kg).

The drone can operate at over 40,000 feet, giving the Indian military surveillance capacity in the high-altitude Himalayan border areas.

The Predator also has the maximum endurance of 40 hours, making it useful for long-hour surveillance.



Moreover, MQ-9B Sea Guardian can support land, maritime surveillance, anti-submarine warfare, anti-surface warfare, strike, electronic warfare and expeditionary roles.

The MQ-9B Sea Guardian is also capable of automatic take-offs and landings.

The MQ-9 and other UAVs are referred to as remotely piloted vehicles/aircraft (RPV/RPA) by the USAF.

The aircraft is monitored and controlled by aircrew in the Ground Control Station (GCS) and is popularly called in the US as the first hunter-killer UAV.

## SSLV D2

In its second development flight on , the Small Satellite Launch Vehicle (SSLV-D2) was launched successfully from the first launch pad at the Satish Dhawan Space Centre SHAR, Sriharikota, Andhra Pradesh.

It will place the Indian Space Research Organisation (ISRO) earth observation satellite EOS-07 and two co-passenger satellites — Janus-1 and AzaadiSat2 developed by start-ups, in a 450-km circular orbit around the Earth.

The mission of ISRO's smallest vehicle — scheduled for 9.18 am — lasted around 15 minutes. It was ISRO's first launch of 2023.

The new vehicle was developed to capture the emerging small and micro satellite commercial market, with launches offered on demand.

The rocket can be assembled by a small team in only a few days, compared to the six months and around 600 people it takes for ISRO's workhorse PSLV.

The launch vehicle uses three solid stages followed by a liquid-fuel-based Velocity Trimming Module (VTM) to place satellites in orbit.

The vehicle's first development flight that took place last August after repeated delays due to the pandemic, failed to place the satellites in precise orbit.

This was because of excessive vibration sensed by accelerometers during the second stage

separation, which made the on-board system 'think' that the sensors were faulty.

For the second flight, structural changes have been made to the equipment bay, along with changes in the separation mechanism for stage 2, and logic changes for the on-board system.

A new vehicle is declared operational by the space agency after it completes two successful development flights.

The last vehicle to be declared operational was the GSLV Mk III, now called LVM 3, when it carried Chandrayaan-2 in 2019.

Janus-1 is a technology demonstrator satellite built by United States-based Antaris and its Indian partners XDLinks and Ananth Technologies.

A satellite bus is the main structure of a satellite on which the payloads — which can be used for multiple applications such as earth observation, signal monitoring, or ship tracking — rest.

The company aims to make satellite buses of different sizes, for satellites weighing around 100 kg.

Janus-1, which weighs only 10.2 kg, is a six-unit cube satellite with five payloads on board — two from Singapore, and one each from Kenya, Australia, and Indonesia. The entire satellite was built in 10 months, less than half the time it usually takes to manufacture satellites of this size, according to Gandupalli.



## EXERCISE TARKASH

Sixth edition of joint exercise TARKASH recently concluded by The National Security Guard (NSG) and US Special Operations Forces (SOF).

The exercise for the first time included “Chemical, Biological, Radiological and Nuclear (CBRN) terror response” in its drill. The objective was to rapidly neutralise the terrorists, rescue the hostages safely and deactivate the chemical weapons being carried by the terrorists.

### **Chemical, Biological, Radiological and Nuclear (CBRN) Weapons:**

CBRN weapons have the capability of creating mass casualties as well as mass disruption and therefore, are classified as weapons of mass destruction. According to a 2005 study, the range of these weapons is quite extensive. Chemical weapons include mustard gas (damages the respiratory tract, skin, and eyes) and nerve agents (victims rapidly become unconscious, have breathing difficulties, and may die). Biological agents like anthrax (causes fever, malaise, cough, and shock. Death can be within 36 hours), botulinum toxin (leads to paralysis of respiratory muscles) and plague are some examples of biochemical weapons. Radiological weapons

include weaponised radioactive waste and dirty bombs as well as nuclear weapons.



# CHALLENGES TO SECURE INDIA'S LAND BORDERS

*GS-III Security challenges and their management in border areas - linkages of organized crime with terrorism.*

## Context

India's significant border challenge is that it has contested borders with Pakistan and China and both of them have a strategic nexus directed against India.

## India's borders

India's borders are



unique due to the variety of terrains through which these borders pass, namely deserts, mountains, glaciers and forests. It is obvious that managing such large borders in diverse terrain conditions poses myriad challenges.

India shares borders with the countries as below:-

### Bangladesh:

4096.70 kms running along West Bengal, Assam, Meghalaya, Tripura and Mizoram.

### Pakistan:

3323 kms running along Gujarat, Rajasthan, Punjab, Union Territory of Jammu & Kashmir and Union Territory of Ladakh.

### China:

3488 kms running along Arunachal Pradesh, Sikkim, Uttarakhand, Himachal Pradesh and Union Territory of Ladakh.

### Nepal:

1751 kms running along

Uttarakhand, Uttar Pradesh, Bihar, West Bengal and Sikkim.

### Bhutan:

699 kms running along Sikkim, West Bengal, Assam and Arunachal Pradesh.

### Myanmar:

1643 kms running along Arunachal Pradesh, Nagaland, Manipur and Mizoram.

### Afghanistan:

106 kms running along Union Territory of Ladakh.

## India's Border disputes

### With China:

It is along the LAC with China that India faces the toughest border challenge.

India has disputed borders with China in Ladakh, Middle Sector, and in Arunachal Pradesh.

Despite many levels of talks, very little progress has been made to resolve the dispute.

China is using the dispute against India, whom it sees as its competitor in Asia, to moderate its strategic behaviour and advance its national goals and aspirations.

### With Pakistan:

#### Issue of Drugs:

Drugs smuggling from Pakistan is another major challenge for our paramilitary forces and state police. Punjab, a strategic border state, has been the target of drug smuggling for many years now.

### Terrorism:

Terrorism emanating from territories under Pakistan's control remains a core concern in bilateral relations.

## China-Pakistan Economic Corridor (CPEC):

The CPEC is a collection of infrastructure projects that have been under construction throughout Pakistan beginning 2013.

The CPEC is part of China's larger Belt and Road Initiative.

India has protested the project from its inception since it passes through large chunks of Pakistan-occupied Kashmir.



## Along Bangladesh, Nepal, Bhutan and Myanmar:

India's border management with our other neighbours—Bangladesh, Nepal, Bhutan and Myanmar—poses different kinds of challenges.

Here, the principal objective is to secure our borders against elements hostile to the country and putting in place systems that are able to interdict such elements while facilitating legitimate trade.

### India's strategy to tackle border disputes Construction activities:

As part of the strategy to secure the borders as also to create infrastructure in the border areas of the country, several initiatives have been undertaken by the Border Management Division.

#### These include:

Construction of fence, floodlighting, roads, Border Out Posts (BOPs), Company Operating Bases (COBs) and

Deployment of technological solutions along the India-Pakistan, India-Bangladesh, India-China, India-Nepal, India-Bhutan and India-Myanmar borders.

## Other:

Projects like Trans-Arunachal Highway will help in mounting an effective and speedy response against an aggression by the China.

The Border Roads Organisation (BRO) completed more than 100 projects in border areas, the majority of which were close to the border with China.

India is speeding up work on the Nimu-Padam-Darcha axis which is going to help troops move to Ladakh from other parts of the country.

However, this will take time; until then we have to be prepared to deal with its aggression along LAC in an 'Armed Coexistence' scenario.

### Deployment of troops & surveillance:

The Indian Army and the BSF are deployed in multiple layers to form an anti-infiltration grid.

The border fence and deployment of other surveillance devices has helped in reducing infiltrations.

The surgical strikes launched by our armed forces in the wake of terrorist attacks supported by Pakistan's ISI have succeeded in sending the message of firm resolve to deal with the menace of terrorism and proxy wars.

## Drugs Challenge:

Drones have proved to be an effective tool in smuggling drugs across the border.

It will take more than mere vigilance on the border to deal with this menace.

Improving our intelligence network within the state to nab the drug dealers on our side of the border must be the main priority of our security forces.

### Along Bangladesh, Nepal, Bhutan and Myanmar borders:

Our borders with these countries are guarded primarily by paramilitary forces, and they have to deal with smuggling and trafficking of humans, drugs, arms, illegal migration and movement of suspected insurgents.

Porous borders with Bangladesh and Myanmar and open borders with Nepal pose challenges in dealing with these nefarious activities.

### The way forward

To establish close coordination between security forces on both sides, real-time sharing of intelligence, and working towards economic prosperity on either side of the border.



# HISTORY



# ART & CULTURE



## What's Inside?

1. PROJECT ELLORA
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## SANGAM AGE PUSHED TO 800 BCE

### Why in the News?

In the latest development, the Sangam age has been pushed to 800 BCE based on the archaeological findings in Keladi along the Vaigai river, about 13 km from Madurai.

### About

K. Amarnath Ramakrishna, who discovered Keeladi and led the first two seasons of excavations between 2014 and 2016, submitted his 982-page report to ASI Director General V. Vidyavathi recently.

Based on the results of stratigraphy of the cultural deposits found in the first two phases, the period of the Sangam era archaeological site has been placed between the 8th century BCE to 3rd century CE.

Sangam age was believed to be between 300 BCE to 300 CE. The new report repositions the Sangam age between 800 BCE and 300 CE. The ASI report, which studied only 2% of the site, has further pushed the Sangam age to 800 BCE.

### Sangam Age

The period roughly between the 3rd century B.C. and 3rd century A.D. in South India (the area lying to the south of river Krishna and Tungabhadra) is known as Sangam Period.

It has been named after the Sangam academies held during that period that flourished under the royal patronage of the Pandya kings of Madurai.

At the sangams eminent scholars assembled and functioned as the board of censors and the choicest literature was rendered in the nature of anthologies. These literary works were the earliest specimens of Dravidian literature.

According to the Tamil legends, there were three Sangams (Academy of Tamil poets) held in the ancient South India popularly called **Muchchangam**.

The First Sangam, is believed to be held at Madurai, attended by gods and legendary sages. No literary work of this Sangam is available.

The Second Sangam was held at Kapadapuram, only Tolkappiyam survives from this.

The Third Sangam was also held at Madurai. A few of these Tamil literary works have survived and are a useful source to reconstruct the history of the Sangam period.

### Sangam Literature

Major sources giving details of Sangam Age are the Sangam literature includes Tolkappiyam, Ettutogai, Pattuppattu, Pathinenkilkanakku, and two epics named – Silappathikaram and Manimegalai .

### Links to Indus Valley

The unearthed Keeladi artefacts have led academics to describe the site as part of the Vaigai Valley Civilisation. The findings have also invited comparisons with the Indus Valley Civilisation while acknowledging the cultural gap of 1,000 years between the two places. Till now, the gap is filled with **Iron Age** material in south India, which serve as residual links.

However, some of the symbols found in pot sherds of Keeladi bear a close resemblance to Indus Valley signs. A lot of digging and study has to be done to establish the links between these two civilisations.

TNSDA affirms that Keeladi has all the characteristics of an urban civilisation, with brick structures, luxury items and proof of internal and external trade. It comes across as an industrious and advanced civilisation and has given evidence of urban life and settlements in Tamil Nadu during the Early Historic Period. Keeladi has also added to the credibility of Sangam Literature.

## 150 YEARS OF CALCUTTA TRAMS

### Why in the News?

Kolkata's iconic tram service celebrated 150 years since the first tram was flagged off. The celebration saw tram enthusiasts from as far away as Germany and Australia come to the city for a historic "Tramjatra" festival, organised by the West Bengal Transport Department.

### History of trams

The first trams entered service in the then British capital of **Calcutta** in 1873. The horse-drawn trams plied on a 3.8 km route between Sealdah and Armenian Ghat Street.

In 1874, the first horse-drawn trams emerged in Mumbai, plying on two routes – Colaba to Pydhonie via Crawford Market, and Bori Bunder to Pydhonie.

Nasik would be the third city in India which saw trams – a four-horse-driven tram (with two cabins) that would travel a distance of around 8 km.

In 1880, trams re-emerged in **Calcutta**, when Lord Ripon inaugurated a new, longer, metre-gauge route, this time with **steam locomotives**.

However, Mumbai, Nasik or Patna would never switch to steam locomotives. Forest trams were opened in Cochin in 1907 and later in the

princely state of Bhavangar in 1926.

**Electric trams** : In 1895, Madras (present-day Chennai) saw **India's first electric tramways** enter service with seven cars and it was later introduced in Calcutta.

By the 1960s, tramways, which were once seen as a revolutionary development in urban transport, had all but vanished in India.

### Tramjatra Event

Tramjatra (tram's journey) is a moving tram carnival that was started back in 1996 jointly by enthusiasts from Melbourne and Kolkata. At the time, **Kolkata, the only Indian city where the tram still runs**, was home to about two dozen routes. The 2023 event, therefore, will be more about impressing the West Bengal government to preserve the tram.

Tramjatra is essentially an international collaboration of trammies, artists, environmentalists, and tram-loving communities. It seeks to educate people, particularly the younger generation, about climate change, air pollution, and sustainable development objectives with a focus on green mobility and Kolkata's tram legacy.

## PROJECT ELLORA

### Why in news?

Microsoft researchers under this project have been working toward creating digital ecosystems for Indian languages that do not have enough presence online.

### About

#### ELLORA: Enabling Low Resource Languages

ELLORA's core aim is to make sure these languages — which have very few written resources, let alone any digital presence at all — are not left behind when it comes to some of the advances that language technology is witnessing these days thanks to the use of artificial intelligence (AI)

and advanced natural language models. More importantly, a digital presence could help some of these languages survive the threat of extinction.

Microsoft Research (MSR) has chosen to focus on three of these for now.

**Gondi** with close to three million speakers in Madhya Pradesh, Maharashtra, Chhattisgarh, Andhra Pradesh and Telangana,

Mundari which is spoken in Jharkhand, Odisha and West Bengal, as well as

**Idu Mishmi** from Arunachal Pradesh.

## GRISHNESHWAR TEMPLE

### Why in news?

Former U.S. Secretary of State Hillary Clinton visited the historic Ellora Caves in Maharashtra's Aurangabad district during her two-day private visit here. She also visited the Grishneshwar temple.

### About

#### Grishneshwar temple

Grishneshwar Jyotirlinga Temple, sometimes referred to as the **Ghrneshwar** or Ghushmeshwar Temple, is one of the shrines dedicated to **Lord Shiva**



It is one of the twelve **jyotirlinga temples**. Maharashtra has three Jyotirlingas, Bhimashankar,

Trimbakeshwar, and Grishneshwar

This pilgrimage site is located in **Ellora**, less than a kilometer from Ellora Caves

The temple structure was **destroyed by the Delhi Sultanate** in 13th and 14th-century.

The temple went through several rounds of rebuilding followed by re-destruction during the Mughal-Maratha conflict. It was **rebuilt in the current form** in the 18th century under the sponsorship of queen **Ahilyabai Holkar of Indore**, after the fall of the Mughal Empire.

The Grishneshwar temple is an illustration of **maratha temple architectural style** and structure.

The temple, built of **red rocks**, is composed of a **five-tier shikara**. The temple was re-constructed by **Maloji Bhosale of Verul**, (grandfather of Chhatrapati Shivaji Maharaj) in the 16th century and later again by queen Ahilyabai Holkar in the 18th century.

### Jyotirlinga

The 12 jyotirlinga temples are Somnath, Mallikarjuna, Mahakaleshwar, Omkareshwar, Baidyanath, Bhimashankar, Ramanathaswamy, Nageshwar, Kashi Vishwanath, Trimbakeshwar, Kedarnath, and Grishneshwar.

## YUVA SANGAM PORTAL

The Yuva Sangam registration portal was launched in New Delhi.

The Yuva Sangam is an initiative of Prime Minister Narendra Modi to build close ties between the youth of the North East Region and rest of India under the spirit of Ek Bharat Shreshtha Bharat.

Under the initiative over 20 thousand youth will travel across the country and gain a unique opportunity of cross-cultural learning.

On this occasion, Minister of DoNER, Culture and Tourism G. Kishan Reddy said that the Yuva Sangam program will work to connect the youth of my Northeast with the whole country.

He added that the program is an opportunity for the youth of the North East to explore the country.

Mr. Reddy stressed that this Wide Cultural Exchange Program will also give an opportunity to the country's youth to celebrate the ancient culture and natural diversity of India. He said that out of one thousand, 300 students will be from the North East region.

Addressing the event, Information and Broadcasting Minister Anurag Singh Thakur expressed confidence that through 'Ek Bharat Shreshtha Bharat, Yuva Sangam', the youth of 18

years to 30 years will get an opportunity to see different states of the country, to understand their art, culture and languages.

Union Minister of Education and Skill Development and Entrepreneurship Dharmendra Pradhan launched the Yuva Sangam portal.

The Yuva Sangam will focus on conducting exposure tours of the youth comprising of students & off-campus youngsters from North Eastern States to other states & vice versa.

It will provide an immersive, multidimensional experience of various facets-under four broad areas of Paryatan (Tourism), Parampara (Traditions), Pragati (Development) and Paraspar Sampark (People-to-people connect).

“In line with the spirit of `Ek Bharat, Shrestha Bharat`,

Yuva Sangam will strengthen people-to-people bonds, mainstream the vibrant culture of our north-eastern states and bring immense exposure and opportunities for knowledge exchanges, especially for our youth in the north-east,”

## DRAFT GEO-HERITAGE SITES AND GEO-RELICS BILL

The Bill is aimed at providing for the declaration, preservation, protection and maintenance of geo-heritage sites and geo-relics of national importance, for geological studies, education, research and awareness purposes

According to a 2016 press release by the Ministry of Mines, the Geological Survey of India (GSI) declares geo-heritage sites/ national geological monuments for protection and maintenance.

The GSI or the respective state governments take necessary measures to protect these sites.

Coming under the Ministry of Mines, the GSI was established in 1851 to investigate and assess coal and other mineral resources of the country through regional-level exploration.

The draft bill defines Geoheritage sites as “sites containing geo-relics and phenomena, stratigraphic type sections, geological structures and geomorphic landforms including caves, natural rock-sculptures of national and international interest; and includes such portion of land adjoining the site,” that may be required for their conservation or to access to such sites.

And, a Geo-relic is defined as “any relic or material of a geological significance or interest like sediments, rocks, minerals, meteorite or fossils”.

The GSI will have the power to acquire geo-relics “for its preservation and maintenance”.

The 32 geo-heritage sites spread across 13 states include the Volcanogenic bedded Barytes of Mangampeta in Cuddapah district of Andhra Pradesh, the Akal Fossil Wood Park in Jaisalmer, Rajasthan and others.

The Bill states that despite identifying these sites, there are concerns over their preservation.

Due to the absence of any legislation in the country for the protection, preservation and maintenance of the geoheritage sites, these are increasingly threatened with destruction not only by the natural causes of decay but also by population pressure and changing social and economic conditions which is aggravating the situation.

Provision is made for compensation to the owner or occupier of land who incurs loss or damage from the land due to the exercise of any power under this Act.

The market value of any property will be ascertained in accordance with the principles set out in the RFCTLARR Act.

The Bill imposes a prohibition on construction, reconstruction, repair or renovation of any building within the geoheritage site area or utilisation of such area in any other manner, except for construction for preservation and maintenance of geoheritage site or any public work essential to the public.

## WORLD'S FIRST LIVING HERITAGE UNIVERSITY

Visva-Bharati University, founded by Rabindranath Tagore in 1921, is set to become the world's first "living heritage university". The university is expected to receive the heritage tag from UNESCO in April or May 2023. Normally heritage tag is given to a dead monument. For the first time in the world, a living university which is functioning is going to get the heritage tag from UNESCO.

It is located in Shantiniketan, West Bengal, India. When founded in 1921, it was named after Nobel Laureate Rabindranath Tagore until Visva-Bharati Society was registered as an organization in May 1922. Rabindranath believed in open-air education and introduced that system at the university, which prevails to date.

According to UNESCO, in 1922, Visva-Bharati was inaugurated as a Centre for Culture with

exploration into the arts, language, humanities, music and these are reflected in diverse institutes that continue in their educational programmes like including Hindi studies, Sino-Asian studies, humanities, fine arts, and music. They are based on the founding principles of excellence in culture and culture studies. Until Independence, it was a college and the institution was given the status of Central University in 1951 through a Central Act. The structures within the institutes of Visva-Bharati University are diverse in architectural expression.

Examples include the Kalo Bari (a mud structure with coal tar finish and sculpture panels), Mastermoshai studio (a single-story structure built for the first principal of Kala Bhavan, Nandalal Bose), Murals and paintings on Cheena and Hindi Bhavan.

## SANSAD RATNA AWARDS

Prime Minister recently congratulated Members of Parliament who will be conferred the Sansad Ratna Awards 2023.

### About

Inspired by the teachings of former President APJ Abdul Kalam, the Sansad Ratna Awards were started in 2010 to recognise and felicitate the top-performing MPs on the basis of their work in the legislative body.

The jury committee composed of eminent Parliamentarians and members of civil society decides awardees based on an MP's cumulative performance in Parliament judged by a number of questions asked, private members' Bills introduced, debates initiated, attendance, funds utilised, etc.

The Sansad Ratna Awards are not given by the Government of India but by the Prime Point Foundation.

### TREATY OF ALINAGAR

The Treaty of Alinagar, signed in 1757, was a reluctant agreement signed by Bengal's Nawab Siraj-Ud-Daula with the English East India Company.

### About

The treaty of Alinagar (changed name of Calcutta) was signed between Robert Clive of the British East India Company and the Nawab of Bengal, Mirza Muhammad Siraj-Ud-Daula.

The Nawab would recognize all the provisions of Mughal Emperor Farrukh Siyar's farman of 1717.

All British goods that passed through Bengal would be exempt from duties.

The British would not be hindered from fortifying Calcutta, as well as mint coins in Calcutta.

The signing of the treaty was one of the events leading up to the famous Battle of Plassey.

The Nawab was defeated and killed by Clive and his allies.

### Significance of the treaty

The Treaty strengthened the position of the British in Bengal.

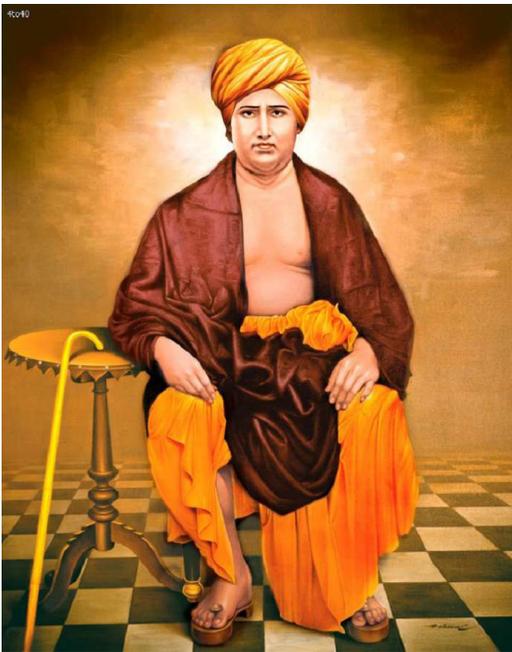
It laid foundations for the Battle of Plassey.  
It set the stage for British colonial expansion

in India, turning what was an economic enterprise into an imperial one.

## DAYANAND SARASWATHI

Swami Dayanand Saraswati was born on 12th February 1824 in Tankara, Gujarat in a Brahmin family. His parents, Lalji Tiwari and Yashodhabai were orthodox Brahmin. He was earlier named Mool Shankar Tiwari as he was born during Mool Nakshatra. He wandered as an ascetic for fifteen years (1845-60) in search of truth. Dayananda's views were published in his famous work, Satyarth Prakash (The True Exposition).

### Contribution to the Society:



He was an Indian philosopher, social leader and founder of the Arya Samaj. Arya Samaj is a reform movement of Vedic dharma and he was the first to give the call for Swaraj as “India for Indian” in 1876. He was a self-taught man and a great leader of India leaving a significant impact on Indian society. During his life, he made a prominent name for himself and was known among a wide array of Princes and the public.

The first Arya Samaj unit was formally set up by him at Mumbai (then Bombay) in 1875 and later the headquarters of the Samaj were established at Lahore. His vision of India included

a classless and casteless society, a united India (religiously, socially and nationally), and an India free from foreign rule, with Aryan religion being the common religion of all.

He took inspiration from the Vedas and considered them to be ‘India’s Rock of Ages’, the infallible and the true original seed of Hinduism. He gave the slogan “Back to the Vedas”. He subscribed to the Vedic notion of chaturvarna system in which a person was not born in any caste but was identified as a brahmin, kshatriya, vaishya or shudra according to the occupation the person followed.

### Contribution to the Education System:

He introduced a complete overhaul of the education system and is often considered as one of the visionaries of modern India. The DAV (Dayanand Anglo Vedic) schools came into existence in 1886 to realize the vision of Swami Dayanand Saraswati. The first DAV School was established at Lahore with Mahatma Hansarj as the headmaster.

### Arya Samaj

It aims to reestablish the Vedas, the earliest Hindu scriptures, as revealed truth. He rejected all later accretions to the Vedas as degenerate but, in his own interpretation, included much post-Vedic thought. During the 1920s and early 1930s tension grew around a number of issues. Muslims were angered by “music-before-mosque”, by the cow protection movement, and by the efforts of the Arya Samaj to bring back to the Hindu fold (shuddhi) those who had recently converted to Islam. The Arya Samaj has always had its largest following in western and northern India.

The Samaj opposes worship of murtis (images), animal sacrifice, shraddha (rituals on behalf of ancestors), basing caste upon birth rather than upon merit, untouchability, child marriage,

pilgrimages, priestly craft, and temple offerings. It upholds the infallibility of the Vedas, the doctrines of karma (the accumulated effect of past deeds) and samsara (the process of death and rebirth), the sanctity of the cow, the importance of the samskaras (individual sacraments), the efficacy

of Vedic oblations to the fire, and programs of social reform. It has worked to further female education and intercaste marriage, has built missions, orphanages, and homes for widows, has established a network of schools and colleges, and has undertaken famine relief and medical work.

## MANIPUR'S SHUMANG LEELA

Shumang Leela is a traditional form of theatre in Manipur where the roles of women are all played by men, called Nupi Shabis.

In the case of women's theatre groups, the roles of men are played by women.

### About Shumang Leela

'Shumang' means 'open courtyard' and 'Leela' means play and the literal meaning of Shumang Leela is "play of the open courtyard".

It started as a comic genre presented before the kings and noblemen.

It attempts to preserve and promote humanism, brotherhood, tolerance, confidence, devotion, truth and justice through its performances.

It is a powerful medium for mass education besides giving entertainment and relaxation.

It has been trying to focus on the issues of moral values, unity and integrity.

## UROOSI

### Why in the News?

A Mughal-era architectural feature called Uroosi is one of Kashmir's answers to the seismic threat it faces.

### About

The devastating earthquake in Turkey, has brought back Srinagar's realisation that the city is on the National Center for Seismology's Zone-V, meaning it is at a very high risk for earthquakes.

One way of saving lives in case of a natural calamity is to reconnect with older methods of architecture and construction. Uroosi, a Mughal-era home architectural element, is one such.

Uroosi are wooden shutters used as partition walls within homes, instead of concrete walls.

Uroosi's work includes octagonal and decagonal ornamental pillars too.

Uroosi is one such, where wooden shutters could be rolled up to make one room or rolled down from hanging grooves in ceiling chambers, to partition the space into separate areas.

Uroosi is believed to be a Persian term meaning 'hidden bride'.

It bears a resemblance to Japan's houses where wooden walls are used as partition walls. It has the ability to absorb seismic shocks and withstand them.

Jalali House is a landmark in Srinagar that has this architectural element.

Dhajji Diwari or 'patchwork quilt wall' in Persian, is another indigenous technique of earthquake-resistant construction. A criss-cross of thin timber frames is filled with mud mortar, stone, and ballast, but this too is waning in Srinagar.



## “BEYOND BASKETBALL” - MIKE KRZYZEWSKI

“Beyond Basketball: Coach K’s Keywords for Success” is a book written by Mike Krzyzewski, the head coach of the Duke University men’s basketball team. The book discusses Krzyzewski’s philosophy on basketball and life. It is a highly inspirational book that provides valuable insights into the mindset and strategies of one of the most successful coaches in college basketball history. Krzyzewski’s emphasis on character, leadership, and teamwork makes this book a must-read for anyone looking to excel not just in basketball, but in all aspects of life.

“You have to adapt what you do based on who you are”.

“Do you let it beat you or do you use it to make you better?”

“In adverse circumstances, you must remind yourself that this day is not your last. You will get through it, but can you use it to get better?”

“As a leader and a career-oriented individual, you must take care not to allow one aspect of your life to so consume you that you neglect the others”.

“One way to avoid getting into a rut is to ensure that you are not doing the same thing over and over each year”.

“When approaching new challenges, it is imperative that you have the support of those who love you most”.

“No matter how successful you believe yourself to be, you can never feel as if you’ve reached the absolute pinnacle. There are always new and wonderful challenges out there, and part of maintaining success is knowing when you need to accept them”.

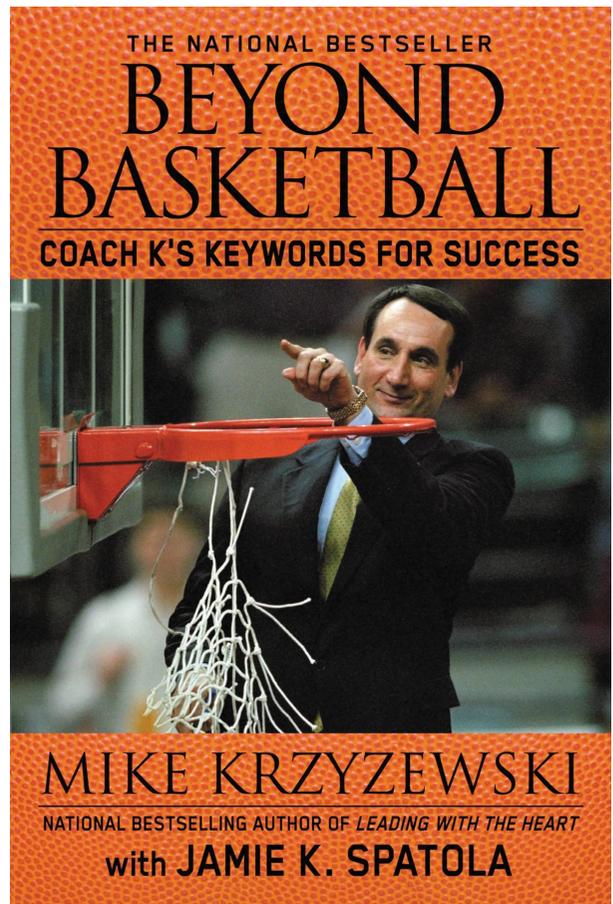
“Communication must be taught and practised in order to bring everyone together as one”.

“Always surround yourself with individuals who will help to enable your courage when it is lacking from within”.

“Courage is the capacity to confront what can be imagined”.

“Define your own success and failure; only you know whether or not you have given it your all”.

“The persistent pursuit of excellence determines winners, not the score of the game”.



“To be excellent, you must be yourself. Do the very best that you can do. In giving your best every day, improvement will come naturally. Giving your all makes you better; it’s that simple”.

“One of the biggest lessons I have learned in my life is that failure is a natural result of breaking out of your comfort zone”.

“Each failure is not its own entity but a stepping-stone on a path to something greater. It was never a destination, but I had to pass through failure to be successful at what I was attempting to do. In order to change what you believe to be your limits, you have to try new things or raise your old limits to a new level”.

“A person is never more comfortable than when they are with their family, which is why I try to create a family atmosphere with my team and encourage people in other businesses to do the same with their employees and organization”.

“In life, there are not many absolutes, but when you have a great friend, that is absolute”.

“To help turn fundamentals into a habit requires intensive, intelligent, and repetitive action”.

“I constantly remind myself of the most basic formula of teaching: you hear, you forget; you see, you remember; you do, you understand. And when you truly understand, that is when the basics become habitual”.

“If you want to strive for excellence, you must embrace continual work on fundamentals”.

“I always remind myself that you learn forever and from everyone”.

“In basketball and in life, I have always maintained the philosophy of ‘next play,’ meaning, whatever you have just done is not nearly as important as what you are doing right now. It is about what’s next. To waste time lamenting a mistake or celebrating success is distracting and can leave you and your team unprepared for what you are about to face. It robs you of the ability to do your best at that moment and to give your full concentration”.

“When you are passionate, you always have your destination in sight and you are not distracted by obstacles”.

“Sharing your passion with those who love you can provide you with the support you need to overcome obstacles along the way”.

“Ultimately, having pressure on you is a healthy thing. If you are never put under pressure situations, you are not testing your limits and you will never see how far you can go. You are just playing it safe”.

“Even when it feels like the pressure is on, never fear the result of your best effort”.

Jimmy Valvano once told, ‘A person does not become whole until he or she becomes a part of something bigger than himself or herself’.

“If your standards are low, it is easy to meet those standards every single day, every single year. But if your standard is to be the best, there will be days when you fall short of that goal. It is okay to not win every game. The only problem would be if you allow a loss or a failure to change your standards. Keep your standards intact, keep the bar set high, and continue to try your very best every day to meet those standards. If you do that, you can always be proud of the work that you do”.

*BY,*

*J.J Deepak*

# PRACTICE QUESTIONS

## 1. Consider the following statements:

- 1) The word budget is mentioned only once and is in art 112 of the constitution.
- 2) India has prepared outcome budget in the past whereas it is yet to introduce gender budgeting.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

## 2. Consider the following statements regarding lab grown diamonds.

- 1) These are produced using specific technology which mimics the geological processes that grow natural diamonds.
- 2) The diamond simulants such as Moissanite, Cubic Zirconia (CZ), White Sapphire, YAG, and others are used to make them look like natural diamonds.

Which of the given above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

## 3. *Turnersuchus hingleyae*, an ancient

animal whose fossil is recently discovered is a/an

- a) Sea cow
- b) Crocodile
- c) Dinosaur
- d) Star fish

## 4. Yaya Tso Lake, recently seen in news is located in

- a) Ladakh
- b) Jammu and Kashmir
- c) Himachal Pradesh
- d) Uttarakhand

## 5. Consider the following statements with respect to RPA (Representation of the People Act), 1951.

- 1) A candidate can contest from a maximum of four constituencies.
- 2) If elected from more than one constituency, the candidate has to choose within 30 days of the declaration of the result.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

## 6. With reference to Indian judiciary, consider the following statements:

- 1) Any retired judge of the Supreme Court of India can be called back to sit and act as a Supreme Court judge by the Chief Justice of India with prior permission of the President of India.
- 2) A High Court in India has the power to review its own judgement as the Supreme Court does.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

7. Lamu archipelago recently seen in news is in which ocean?

- a) Indian ocean
- b) Pacific ocean
- c) Atlantic ocean
- d) Southern ocean

8. Consider the following statements about space debris.

- 1) USA contributes the most in space debris followed by Russia.
- 2) 'Project NETRA' is an early warning system in space to detect debris and other hazards to Indian satellites.

Which of the statements given above

is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

9. With reference to bio fertiliser consider the following statements.

- 1) Bio fertiliser is recommended under integrated Nutrient management strategies for Organic use in all crops.
- 2) Bio fertilisers notified under Fertiliser control order act 1985.

Select the correct answer from the given code.

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

10. Shyama Prasad Mukherjee Rurban Mission (SPMRM) is implemented by which of the following ministry.

- a) Ministry of rural development
- b) Ministry of urban development
- c) Ministry of Panchayati raj
- d) Ministry of tribal affairs

11. A Global land look report released by

which of the following organisation.

- a) UNEP
- b) UNCCD
- c) WMO
- d) IBPES

12. Recently “Making India a Global Powerhouse on Farm Machinery Industry” report released by which of the following organisation.

- a) Department of agriculture and farmer welfare
- b) NITI Aayog
- c) National council of applied economic research
- d) Indian council of agriculture research institute

13. Recently the term BARD sometimes in news related to which of the following.

- a) Ransomware
- b) Generative AI
- c) Microbes
- d) Cryptocurrency

14. Low-Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID) technology is associated with

- a) Exploring rare earth metals.
- b) Detecting unidentified flying object
- c) Helping humans to land on Mars
- d) Observing climate change

15. Hydrogen for Heritage Project, which is sometimes seen in the news, is related to

- a) To make hydrogen as a power source for heritage complexes.
- b) To run hydrogen-powered trains in historic, narrow-gauge routes.
- c) To make hydrogen buses for Site visits from the officials of the Archaeological Survey of India.
- d) To create hydrogen cells at low cost for road transportation.

16. With reference to ‘Green debt securities’, consider the following statements

- 1) It is defined by The Energy and Resource Institute (TERI) as one that is issued for the purpose of raising capital to be used for the cause of furthering energy efficiency.
- 2) Green debt securities are further divided into three colours namely blue, white and magenta based on their utility.

Select the correct answer from the given code.

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

17. Consider the following statements regarding Gaganyaan.

- 1) Gaganyaan will circle Earth at a low-earth-orbit at an altitude of 300-400 km from earth for 5-7 days.
- 2) GSLV Mk-III the three-stage heavy-lift launch vehicle will be used for carrying the orbital module.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

18. Consider the following statements regarding Bio-fertilizers.

- 1) Biofertilizers are microorganism-containing substances that, when added to soil, increase fertility and promote plant growth.
- 2) Biofertilizers are live microbial products which does not contain any nutrients.

Which of the statement(s) given above is/are incorrect?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

19. 'CAR T Cell therapy' which is recently seen in news is used to treat

- a) Tuberculosis
- b) Cancer
- c) Organ transplant
- d) Hepatitis B

20. Which of the following countries together form the Lithium triangle?

- 1) Argentina
- 2) Chile
- 3) Bolivia
- 4) Brazil

Select the correct answer using the code given below:

- a) 1, 2 and 3 only
- b) 2, 3 and 4 only
- c) 1, 3 and 4 only
- d) 1, 2 and 4 only

21. Which of the following statements best describes the term seismic gap?

- a) Part of an active fault that has experienced little or no seismic activity for a long period.
- b) Gap between two earthquake sites experiencing tremors simultaneously
- c) Distance between the focus and the epicenter in an earthquake zone
- d) None of the above

22. Motihari-Amlekhgunj Pipeline recently seen in news is a joint initiative of India and which country?

- a) Russia
- b) Nepal
- c) Srilanka
- d) Iran

23. Which of the following statements is incorrect regarding Lymphatic Filariasis (LF)?

- a) It is commonly known as elephantiasis which is a neglected tropical disease.

- b) Infection acquired in childhood causes hidden damage to the lymphatic system.
- c) In India, Anti-filarial drugs are administered through Mass Drug Administration campaign.
- d) None of the above

24. 'Biomarker' is generally used as an indicator of

- a) Health of an ecosystem
- b) Diseases in an organism
- c) Size of a biome
- d) Acidity of a soil

25. Which of the following agencies released the report "Global Sea level rise and Implications"?

- a) Green Peace
- b) World Bank
- c) The World Economic Forum
- d) World Meteorological Organisation

26. Consider the following statements regarding snow leopard.

- 1) They prey upon bharala and mountain ibex.
- 2) IUCN classifies snow leopard as endangered species.
- 3) Hemis is the snow leopard capital of the world.

Which of the above statements is/are correct?

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

27. Consider the following statements regarding Leprosy

- 1) Leprosy is a chronic bacterial infection, which affects skin, nerves, lungs and eyes.
- 2) Leprosy, was declared eradicated in India
- 3) India accounts for more than 50% of world's new leprosy patients

Which of the above statements is/are correct?

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

28. Which of the following is/are the functions of Indo Tibetan Border Police

- 1) Detection and prevention of border violations in northern borders
- 2) Check illegal immigration and trans-border smuggling.
- 3) Provide security to sensitive installations and threatened VIPs
- 4) Restore and preserve order in any area in the event of a disturbance.

Select the correct answer from the given code.

- a) 1, 2 and 3 only
- b) 2, 3 and 4 only
- c) 1 and 4 only
- d) 1, 2, 3 and 4

29. Consider the following statements

- 1) The date of election of the Deputy Speaker is fixed by the President.
- 2) The constitution has mentioned that the deputy speaker should be elected within 6 months so often

as the office of deputy speaker becomes vacant.

Which of the statement(s) given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

30. "Schedule M norms" which is recently seen in news is related to

- a) Good manufacturing process for pharmaceuticals
- b) Framework to indicate economic growth progress
- c) Solid waste management
- d) None of the Above

31. Among the following crops, which one is the most important anthropogenic source of both methane and nitrous oxide?

- a) Cotton
- b) Rice
- c) Sugarcane
- d) Wheat

32. Recently India started its first cross border Real time payment system connectivity with which of the following country

- a) UK
- b) UAE
- c) Singapore
- d) USA

33. Maithon reservoir is situated in which of the following multipurpose project

- a) Bhakranangal

- b) Damodar valley project
- c) Hirakud
- d) Gandisagar

34. Consider the following statements

- 1) Chinese pangolin found only in China and Myanmar
- 2) Indian pangolin listed under endangered category of IUCN list

Select the correct answer from the given code.

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

35. Wagner Group' seen in news often is a/are

- a) Cybercrime group
- b) Private military organization
- c) Business lobbyists
- d) Paramedics involved in rescue operations

36. 'Operation Golden Dawn' recently seen in the news is related to

- a) Drug trafficking
- b) Illegal wildlife trade
- c) Counterfeit currency
- d) Gold smuggling

37. Which organization endorsed the "Declaration on Social Justice for

**Equitable Globalization?"**

- a) Organisation for Economic Co-operation and Development
- b) World Health Organization
- c) International Labour Organisation
- d) International Monetary Fund

**38. Consider the following statements regarding "Anamorphic projection technology:"**

- 1) Anamorphic projection creates an illusion of reality.
- 2) It involves projecting on a large surface a distorted image with the use of optical devices such as mirrors or lenses.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**39. Consider the following statements:**

- 1) Pursuant to the report of H.N. Sanyal Committee, the Contempt of Courts Act, 1971 was passed.
- 2) The Constitution of India empowers the Supreme Court and the High Courts to punish for contempt of themselves.
- 3) The Constitution of India defines Civil Contempt and Criminal Contempt.
- 4) In India, the Parliament is vested

with the powers to make laws on Contempt of Court.

Which of the above statements is/are correct?

- a) 1 and 2 only
- b) 1, 2 and 4 only
- c) 3 and 4 only
- d) 3 only

**40. Consider the following statements regarding New START treaty**

- 1) It is a nuclear arms reduction treaty between the United States and the Russian Federation
- 2) The treaty calls for the abolition of nuclear missile development in both countries.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**41. Consider the following statements regarding "Sansad Ratna Awards".**

- 1) They seek to recognise and felicitate the top-performing MLAs on the basis of their work in the legislative body.
- 2) Factors of the decision is based on questions asked, private members' Bills introduced, debates initiated, attendance, funds utilised, etc.

Select the correct answer from the given code.

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

42. To which region belongs the forms of folk performances - Khel, Lavani, Goudhal and Tamasha?

- a) West Bengal
- b) Bihar
- c) Maharashtra
- d) Kerala

43. Mad cow disease, a fatal infection that affects the central nervous system of adult cattle has been recently spread in which of the following country?

- a) India
- b) Nepal
- c) Thailand
- d) Brazil

44. Adi Ganga river is found in which of the following state?

- a) Uttarakhand
- b) Bihar
- c) West Bengal
- d) Sikkim

45. Consider the following statements:

- 1) In the tropical zone, the western sections of the oceans are warmer than the eastern sections owing to the influence of trade winds.
- 2) In the temperate zone, westerlies make the eastern sections of oceans warmer than the western sections.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

46. Under the Indian Constitution, concentration of wealth violates

- a) The Right to Equality
- b) The Directive Principles of State Policy
- c) The Right to Freedom
- d) The Concept of Welfare

47. Which one of the following is likely to be the most inflationary in its effects?

- a) Repayment of public debt
- b) Borrowing from the public to finance a budget deficit
- c) Borrowing from the banks to finance a budget deficit
- d) Creation of new money to finance a budget deficit

48. "The experiment will employ a trio of spacecraft flying in formation in the shape of an equilateral triangle that has sides one million kilometres long,

with lasers shining between the craft.”  
The experiment in question refers to

- a) Voyager-2
- b) New Horizons
- c) LISA Pathfinder
- d) Evolved LISA

**49. Consider the following statements**

- 1) Silent valley national park is situated in Anaimalai hills of western ghats
- 2) Kunti river is originated in silent valley national park

Select the correct answer from the given code.

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

**50. Which of the following is/are the exclusive power(s) of Lok Sabha?**

- 1) To ratify the declaration of Emergency
- 2) To pass a motion of no-confidence against the Council of Ministers.
- 3) To impeach the President of India

Select the correct answer from the given code.

- a) 1 and 2 only
- b) 2 only
- c) 1 and 3 only
- d) 3 only

**Answers:**

1.	D	2.	C	3.	B	4.	A	5.	D	6.	A	7.	A	8.	B	9.	C	10.	A
11.	B	12.	C	13.	B	14.	C	15.	B	16.	D	17.	C	18.	D	19.	B	20.	A
21.	A	22.	B	23.	D	24.	B	25.	D	26.	A	27.	D	28.	D	29.	D	30.	A
31.	B	32.	C	33.	B	34.	B	35.	B	36.	D	37.	C	38.	C	39.	B	40.	A
41.	B	42.	C	43.	D	44.	C	45.	C	46.	B	47.	D	48.	D	49.	B	50.	B

# FACT SHEET

## GENERAL STUDIES – I

### SOCIETY

- ◆ Globally, it took the earth more than 1 million years to add 300+ million people, while a billion were added in the last 13 years.
- ◆ India has one of the youngest populations in the world, as 27% of the country's population belongs to the age group of 15-29 years.
- ◆ The demographic dividend of India, comprising the working-age population (between 15 to 64 years) is 67% (or 80 crores) of the total population.
- ◆ The period from 2020 to 2050 is considered to be the 'Golden period of the Indian Economy' due to its demography.

## GENERAL STUDIES – II

### POLITY

“Death Penalty in India Report” is published by ‘Project 39A’ which is a criminal law reforms advocacy group at the National Law University, Delhi. It is inspired by Article 39A of the Constitution of India which provides for free legal aid to the poor & weaker sections of society and ensures justice for all. Highlights of the Death Penalty in India Report, 2022:

- ◆ The trial courts across the country imposed 165 death sentences in 2022, which is the highest in a single year in the last two decades.
- ◆ Also, 539 prisoners were on death row by the end of 2022, which was the highest since 2016.
- ◆ The large death row population signals the continued imposition of a high number of death sentences by trial courts with a low rate of disposal by appellate courts.
- ◆ The highest number of people on death row were in the states of Uttar Pradesh (100), Gujarat (61), Jharkhand (46), Maharashtra (39) & Madhya Pradesh (31).

### HEALTH

- ◆ As per WHO, the burden of mental health problems in India is 2443 disability-adjusted life years (DALYs) per 10,000 population and the resultant economic loss is estimated to be \$1 trillion between 2012-2030.
- ◆ Malnutrition exacerbates the magnitude of the public health crises India faces and it is India's most serious challenge and concern.
- ◆ As per the National Family Health Survey-5 data, every 2<sup>nd</sup> Indian woman is anaemic, every 3<sup>rd</sup> child is stunted and malnourished, and every 5<sup>th</sup> child is wasted.

## EDUCATION

The 2<sup>nd</sup> edition of the foundational literacy and numeracy (FLN) report was released.

### Key findings:

- ✦ The top-scoring regions are Kerala and West Bengal among small and large states, respectively.
- ✦ Lakshadweep and Mizoram are top-scoring regions in the Union Territory and Northeast state categories respectively.
- ✦ There was a huge gap between Kerala and the rest of the States in the Index.
- ✦ Out of the five pillars, it has been observed that states have performed particularly low in the Governance aspect.
- ✦ Girl child is at a double disadvantage when compared to her male counterparts.

## CHILDREN

- ✦ The Global Threat Assessment report 2021, by 'WeProtect' Global Alliance, said COVID-19 had created a 'perfect storm' of conditions that fuelled a rise in child sexual exploitation and online abuse across the globe.
- ✦ The findings show that in the past two years, the reporting of child sexual exploitation and online abuse has reached its highest level.
- ✦ Child labour has decreased by 38% globally in the last decade, according to International Labour Organization (ILO). But over 152 million children are still in the grip of this social evil, the eradication of which is one of the UN Sustainable Goals.
- ✦ According to UNICEF, India has over 30 million orphaned and abandoned children.
- ✦ 80% of working children live in India's villages, where most of them work in agriculture.

## INTERNATIONAL RELATIONS

- ✦ The G20 holds a strategic role in securing future global economic growth and prosperity as the G20 members represent over 80% of the global GDP, about 75% of international trade and close to 60% of the world's population.
- ✦ Shanghai Cooperation Organisation (SCO) member states have a population of nearly 1.5 billion people. It represents 20% of the global GDP.
- ✦ The BIMSTEC region is home to roughly 22% of the global population with a combined GDP of over \$2.7 trillion.

## GENERAL STUDIES – III

### ECONOMY

- ✦ India is now the 5<sup>th</sup> largest world economy – leaving behind the UK.
- ✦ The Centre for Economics and Business Research (CEBR) predicted that by 2035, India's economy would reach \$10 trillion and become the world's 3<sup>rd</sup> largest by 2037.

- ✦ According to World Bank, extreme poverty levels are to reach 150 million people by 2021 (around 9.5% of the global population). Extreme poverty is defined by the World Bank as living below \$1.90 per day.
- ✦ Currently, about 1/3<sup>rd</sup> of the Indian population is estimated to have entered the middle class, with poverty declining to about 16%.
- ✦ Importance of MGNREGA during the Pandemic: A study conducted on the impact of MGNREGA during the COVID-19 pandemic has revealed that wages earned under the Act helped compensate somewhere between 20% and 80% of the income loss incurred because of the lockdown.

## INDIA'S STARTUP ECOSYSTEM

- ✦ India is the 3<sup>rd</sup> largest startup ecosystem in the world.
- ✦ One in every 10 global unicorns is claimed by India.
- ✦ India had only 4 unicorns in 2014 which has increased to more than 100 unicorns in 2022.
- ✦ Around 4000 patents were globally filed by India in 2014. It has reached approximately 15,000 in 2022.
- ✦ India's Global Innovation Index ranking has also improved significantly, from 81 in 2014 to 40 in 2022, although it lags significantly behind the U.S. and China.

## INFRASTRUCTURE

- ✦ According to the latest report of the Central Pollution Control Board, Sewage Treatment Plants (STPs) in India are able to treat a little more than a third of the sewage generated per day.
- ✦ India generated 72,000 MLD (million litres per day) whereas the installed capacity of STPs was 32,000 MLD (44%).
- ✦ Maharashtra, Gujarat, Uttar Pradesh, Delhi and Karnataka account for 60% of the total installed treatment capacity of the country.

## ENERGY SECTOR

- ✦ As of today, India is consuming about 9000 billion units of energy for various purposes.
- ✦ About 47% of the total energy is sourced from coal and lignite, 31% from crude oil, about 15% from electricity (hydro, nuclear and other renewable sources) and 8% from natural gas.
- ✦ Today, India is the world's third largest producer of renewable energy, with about 42 per cent of our installed electricity capacity coming from non-fossil fuel sources.
- ✦ Based on a commitment to address the global climate crisis, India has promised to source nearly half its energy from non-fossil fuel sources by 2030.
- ✦ With 500 GW of installed capacity to generate electricity from non-fossil fuel sources by 2030, cleaner fuel will comprise 50% of the installed capacity mix.
- ✦ India is the world's third-biggest oil importing and consuming nation.

## AGRICULTURE

- ◆ As per the Agriculture Census 2015-16 released in 2018, Small and marginal farmers account for 86% of all farmers in India but own just 47% of the total crop area.
- ◆ As per the Economic Survey 2022-23, 65% of India's population lives in rural areas and 47% of the population is dependent on agriculture for livelihood.
- ◆ Contrary to the common perception about the predominance of agriculture in the rural economy, about two-thirds of rural income is now generated in non-agricultural activities.
- ◆ According to the Economic Survey, the agriculture sector has grown at an average annual growth rate of 4.6% in the past six years. However, agriculture and rural incomes are under stress for several reasons.

## ENVIRONMENT

- ◆ According to the 'State of World Mangroves 2022' report by the Global Mangrove Alliance, the total mangrove cover of the world is around 14.7 million hectares.
- ◆ About 40% of the world's mangrove cover is found in South East Asia and South Asia.
- ◆ Mangroves hold up to 4 times more the amount of carbon than other ecosystems.
- ◆ The loss of even 1% of remaining mangroves could lead to the loss of 0.23 Gigatons of CO<sub>2</sub> equivalent, equal to over 520 million barrels of oil.

## MANGROVE COVER IN INDIA

- ◆ According to the India State of Forest Report, 2021, the mangrove cover in India is around 5,000 sq. km, which is 0.15% of the country's total geographical area.
- ◆ In India, Mangroves are distributed across 9 States and 3 Union Territories with West Bengal having the highest mangrove cover.
- ◆ West Bengal accounts for the highest 42% of India's mangrove cover, followed by Gujarat at 23% and Andaman and Nicobar Islands at 12%.
- ◆ Sundarbans in West Bengal is the largest mangrove forest region in the world. The 2<sup>nd</sup> largest mangrove forest in India is Bhitarkanika in Odisha.

- 1. The open prison model adopted in Rajasthan, with convicts staying on community land without high walls or strict surveillance, has promoted a reformatory form of punishment. It is premised on the humane concept that a wrongdoer does not simply cease to be a living human being just because he commits crimes. In contrast, Retributive justice focuses on punishing an offender. As minimum-security facilities, open prisons need 92% less staff than closed jails, and incur monthly costs of only 500 per prisoner; no reports of prisoner escapes or repeat offences. Overall, open prisons can offer a more ethical approach to imprisonment by promoting rehabilitation, reducing overcrowding, improving human rights, and potentially reducing costs.*
- 2. Tihar jail is installing artificial intelligence (AI)-powered CCTV cameras to monitor inmates and fight crime. It showcases a classic example of the use of technology in prison but at the same time, it raises questions about privacy.*
- 3. Section 33(7) of the Representation of the People Act permits an individual to contest an election from two constituencies simultaneously. A petition was filed that sought to declare this provision invalid as it violated the 'One person, one vote, one candidate, one constituency' dictum of democracy. Recently, the Supreme Court refused to discard this provision by saying that it is an issue concerning political democracy and it is for the Parliament to decide.*
- 4. India's Unified Payments Interface (UPI) and Singapore's PayNow have been officially connected which facilitates a "real-time payment linkage". Singapore became the first country with which India has launched cross-border Person to Person (P2P) payment facilities. This sort of payment linkage is expected to ease financial transactions for the Indian diaspora, especially the migrant workers or students and also extend the benefits of digitalisation and fintech to the common man in the form of low-cost money transfers between Singapore and India.*
- 5. Telangana state has been recognized as one of the leading states in India for its initiatives towards the environment. Hyderabad, along with Mumbai, is to be listed as 'Tree Cities of the World-2021' by Arbor Day Foundation and FAO. Hyderabad has also been awarded the overall 'World Green City Award 2022'. It also generated employment opportunities in the state. The Haritha Haram program has created thousands of jobs in the nurseries, and the Vehicle Scrapage Policy has generated employment opportunities in the automobile sector.*
- 6. The Geological Survey of India (GSI) has announced that Lithium inferred resources of 5.9 million tonnes have been discovered in the Salal-Haimana area of Reasi district, Jammu & Kashmir. Lithium is one of the most important components for manufacturing Lithium-ion batteries which are extensively used in wind turbines, solar panels, and electric vehicles, all of which are critical for the green economy. As per the World Bank, the demand for critical metals like lithium (Li) and cobalt is expected to increase by almost 500% by 2050. At present, India imports all of its lithium from Australia and Argentina and about 70% of its Li-Ion cells from China and Hong Kong. Domestic lithium reserves will help provide momentum to the Government's ambitious plan of 30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three-wheelers by 2030 for the automobile industry and help strengthen India's National Mission on Transformative Mobility and Battery Storage.*

7. *Turkey and Syria were hit by two large earthquakes of magnitude 7.8 and 7.5. More than 17000 lives were lost. It was further followed by nearly 200 aftershocks. It has resulted in large-scale deaths and devastation. It is highlighted that the region lies at the confluence of three tectonic plates (the Arabian Plate, the Anatolian Plate, and the Eurasian Plate). It is recommended that such tectonically sensitive regions should be well-prepared through measures like strict building codes and earthquake proofing.*
8. *According to new research, the Earth's inner core has stopped spinning faster than its surface and may now be rotating slower.*
9. *Dr. Hari Balakrishnan has been awarded the 2023 Marconi Prize. He is a Professor at the Massachusetts Institute of Technology (MIT). He has been cited "for fundamental contributions to wired and wireless networking, mobile sensing, and distributed systems". The Marconi Prize is an annual award that recognizes individuals who have made significant contributions to the field of communications and information technology. It is named after Guglielmo Marconi, an Italian inventor and pioneer in the development of wireless communication. The Marconi Prize is one of the most prestigious awards in the field of telecommunications and is often referred to as the "Nobel Prize of Telecommunications."*
10. *Teja red chilli has become a hot property in many nations and the export of this variety of red chilli is estimated to increase from the present 2,000 crores per annum in the coming year. Teja Red Chilli which is also known as S-17 is one of the hottest varieties of red chillies produced in India. Teja chilli is a fine variety of Guntur chilli which is mostly produced in the southern states of India. They are famous for their culinary, medicinal and other purposes like making pepper spray. Teja red chilli is being exported extensively to China, Bangladesh and a few other south Asian countries from the Khammam district, Telangana.*
11. *The National Highway leading to Sinthan Top was reopened. Sinthan Top is a mountain pass located in the Anantnag district of Jammu and Kashmir. It connects Kashmir to the Chenab Valley in the Jammu region. Sinthan Top is also an offbeat tourist destination that attracts tourists from all over the country, especially in the winter months.*
12. *Microsoft's Project Ellora (Enabling Low Resource Languages) launched in 2015 aims to bring 'rare' Indian languages such as Gondi, and Mundari online. Under the project, researchers are building digital resources of the languages, so as to preserve them. Researchers are taking the help of AI and the local community in the data collection process; researchers hope to create a dataset that is both accurate and culturally relevant.*
13. *Delhi Commission for Protection of Child Rights (DCPCR) launched 'Bal Mitra', a WhatsApp Chatbot to provide communication support to children and parents in Delhi. It will include complaint registration, searching for information and tracking complaint status, seeking information on admissions, and providing authentic information on various matters related to children and their rights. This initiative is an example of how technology can help in securing child's rights and creating awareness.*

14. Meta together with the IT Ministry has launched the 'Digital Suraksha campaign' and G20 'Stay Safe Online campaign' to educate the youth about misinformation. It is aimed at offering a safer and more inclusive internet to Indians. Under the program, Meta will create and distribute resources in multiple Indian languages via various channels to raise awareness about how to stay safe online. Also, Digital literacy will be provided to 10,000 students across various Delhi schools and colleges on topics such as cyberbullying, sextortion, trolling, identity theft and how to safely browse the internet.
15. The government's effort to increase middle-class well-being and reduce poverty can be articulated through the '4S framework.'
16. Sampannata (Enrichment) through inflation control and loans e.g., more liquidity in the market for growth, and lower EMIs.
17. Surakshit Bhavishya (Securing a healthy future) through affordable healthcare and quality education e.g., affordable generic medicine, Ayushman Bharat.
18. Shreshtha Jeevan (A better life) through improved infrastructure and connectivity e.g., increase in road connectivity, CapEx expenditure, and lower mobile data rates.
19. Saralta (Hassle-free existence) through a cashless digital payment ecosystem and paperless certificate authentication with DigiLocker.
20. Saudi Arabia is set to send its first woman astronaut, Rayyana Barnawi, on a 10-day mission to the International Space Station (ISS) later this year, aboard a SpaceX Dragon. It shows progressive gender reforms even in one of the most conservative countries.
21. Salman Rushdie recently released a new novel "Victory City", a fictionalized story of the Vijayanagara Kingdom (1336 AD - 1646 AD). It is founded by Harihara I of the Sangama dynasty, Vijayanagara expanded from a strategic position on the banks of the Tungabhadra River with Hampi as its capital. The kingdom reached its peak under Krishna Deva Raya (reign 1509-1529), a period in which it enjoyed military superiority to its rival kingdoms such as the Bahmani Sultanate, the Golconda Sultanate, and the Gajapatis of Odisha.
22. Chennai couple Dinesh Kshatriyan and Janaganandhini Ramaswamy are using Non-Fungible Tokens (NFTs) to make their baby carbon-neutral. They acquired two acres of land in their village and have planted a thousand trees, to offset their baby's future carbon emissions with a food forest, which will continue to grow with their child, providing a constant reminder of love and hope. This will be made possible through an NFT, called NOVA which will also be the "digital name" of their baby. Last February, the couple made news as they married in a Harry Potter-themed Metaverse. This shows how technology is changing the tradition of marriage and is an example of efforts towards carbon mitigation.
23. In Kenya, the World Agroforestry Centre is helping the government to adapt to climate-smart agricultural actions like management of land, crops, livestock, aquaculture and capture fisheries to balance near-term food security and livelihood needs with priorities for adaptation and mitigation.
24. Norway's Patients' Rights Act sets out the right to receive care within specific timeframes. The majority of consultations in Norway take place at the primary care level in the municipalities. Patients are referred to specialized healthcare if their general practitioners determine a need.

## TERMS IN NEWS

1. **Nostro Account** => refers to a bank account that a bank holds in a foreign currency. A bank, through a Nostro Account, holds the currency of the country where the funds are held i.e., Nostro accounts are denominated in foreign currencies. Nostro Accounts are generally used to simplify foreign exchange and trade transactions between countries. The word “Nostro” is derived from the Latin word that means “ours”.
2. **Vostro account** => The word “Vostro” is derived from the Latin word that means “yours”. A Vostro account refers to an account that a correspondent bank holds on behalf of another bank. Vostro account helps to enable a foreign correspondent bank to act as an agent or an intermediary for a domestic bank. Services provided by a Vostro account include wire transfers, withdrawals, and deposits for customers in countries where the domestic bank does not have a physical presence.
3. **Example:** If an Indian bank maintains an account in the US with dollars, such an account, maintained in a foreign currency at a foreign centre is called Nostro Account for that concerned Indian bank. The American bank which is holding dollars from the concerned Indian bank will refer to the same account as a Vostro Account.
4. **Bail Bond** => a written promise, signed by the offender or a person who gives surety of the offender’s presence in the court when called upon, to pay a certain amount fixed by a court or police officer. Such an amount paid on execution of the bond can be given back once the case ends with some administrative cost deductions.
5. **Blue-Green Infrastructure** => refers to a network that provides the “ingredients” for solving urban and climatic challenges through a combination of infrastructure, ecological restoration and urban design to connect people with nature. Blue indicates water bodies such as rivers and tanks. Green indicates trees, parks, and gardens.
6. **Knowledge Republic** => refers to a society or community that places a high value on knowledge and prioritizes the acquisition, dissemination, and application of knowledge as a key aspect of its functioning and growth. In the Knowledge Republic, education is the currency, and knowledge is the wealth that fuels progress. Greek philosopher Socrates believed that the pursuit of knowledge was the highest calling of the individual, and that ignorance was the root of all evil.

## RELEVANT QUOTES

1. “Our scientific power has outrun our spiritual power. We have guided missiles and misguided men”- Martin Luther King Jr.
2. “Economic growth without investment in human development is unsustainable and unethical” - Amartya Sen.
3. “If conservation of nature goes wrong, nothing else will go right” - MS Swaminathan.
4. “When the whole world is silent, even one voice becomes powerful” - Malala.
5. “Ignited mind of the youth is the most powerful resource on the earth. I am convinced that the youth power, if properly directed and controlled, could bring about transformational changes in humanity for its progress, meeting its challenges, and bring peace and prosperity.” Dr. APJ Abdul Kalam.