GS CONNECT

It gives us immense pleasure to present an innovative approach to master current affairs. Current is a passing wind and diverse issues happen at the same time. It is to an extent chaotic. Newspapers, magazines and various other sources report the chaos per se. With our experience of current affairs we have tried to give "the current" a medium to travel. It is the syllabus of the UPSC with their components that are the medium through which the "Current is Passed" to the readers. Ever since the new syllabus of the UPSC came into existence, current has been gaining significance both at prelims as well as mains examination. This book is meant to cover current affairs and related questions arising from those events. We have not only covered the current events for their factual contents but also presented it in such a way that any question asked from that topic gets covered. Moreover, topics are also "peppered" with the relevant facts/key concepts that are related to the theme. We have also given questions for practice both, subjective and objective, so that candidates are oriented to the examination mode. It is a collection covering myriad source yet in a manageable size. To use this book we recommend you to master the components of general studies (GS) syllabus as broken into rows and columns (provided in the beginning after preface). Each cell comprising of the portion of GS becomes the connect for the current and every news subsequently covered guides the reader to the address of the syllabus. It is logical to expect that same issue may be connected to more than one topic of the syllabus. Further, the news also has some additional vistas opened for the readers by adding a box with a title **"PEPPER IT WITH"** where we expect the students to build further around the theme.

We are also trying to reach the remotest part of the country with our spirit and zeal of "Mains Answer Writing", which has been admired by students, CSE rankholders and other scholars. Continuing in line with the effort, we have started with programs like 7 Question (7Q) Challenge, Shell Points, Stock Points, Content Enrichment Booklet etc.

When it comes to evaluation, we are altogether at a different level. We are also reaching every nook and corner with this expertise for the aspirants of CSE. Now you can write a Mains Answer and get it evaluated from our Expert Team and can get Feedback. **Drop a mail at evaluation@ksgindia.com for registering yourself in our race to perfection.** Don't wait, it's your golden chance to crack this exam and fulfill your passionate dream.

Team KSG

S. No.	1	2	3	4	5	6	7	8	9	10	11
GS – I	Culture-Art Forms, Literature and Architecture from ancient to modern times.	Indian history significant events, person alities, issues and the Freedom Struggle	Post independence issues, National boundary and disputes	Indian society features, issues, globalization and diversity	Women - issues and developments	Urbanizatio n – problems and remedies	Distribution of industries andresources – India and world	Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc			
GS – II	Indian constitution- Amendments, acts and bills.	Legislative, executive and judicial processes.	Constitutional, non-constitutional, judicial, quasi-judicial, administrative and other types of bodies.	Federal structure and local bodies. Their powers and functions.	Government policies and various governance issues like transparenc, accountability and – governance	Committees and schemes.	Non-government issues, self-help groups and role of civil society	Vulnerable sections of our society and social sector issues and initiatives.	International Relation-India and other countries, various Indian and international agreements, effects of other countries on India and international institutions.		
GS – III	Various measures to boost Indian economy- planning, policies, management.	Government budgeting and issues related to budget.	Agriculture, animal husbandry and transport	Food security- measures to boost food security and food processing. Issues related to land-land reforms	Industries and infrastructure- their growth and investment model	Space and technology, IT space, robotics and computer	Disease, biotechnol- ogy and human welfare	Innovations, intellectual property, Awards, POI and other import ant aspects of S&T	Environment; government initiatives, various judgment, pollution, degradation and conservation efforts	Disaster & Disaster Management	Challenges to internal security, Various Security forces and agencies and their mandate. Cybersecurity; moneylaunderi-ng and its prevention.
GS – IV	Ethical issues related to family society, education, Corruption etc.	Ethics in public and private administration	Issues	Related laws and rules	Governance/e-Governance	Ethics in interna-tional issues	Person alities and their teachings	Other import ant topics			
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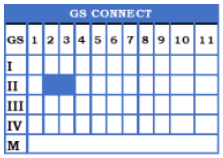
India Justice Report

News Excerpt

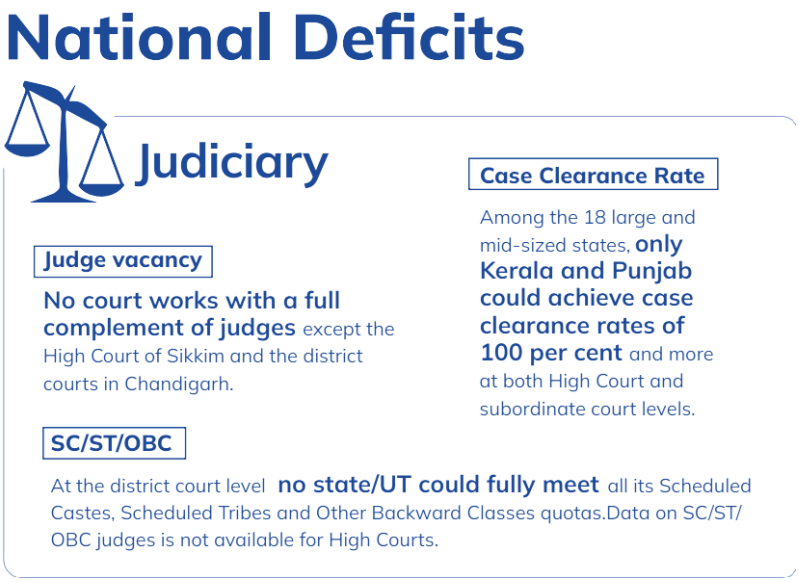
Recently the third edition of India Justice report was released by Tata Trust. According to the report Karnataka has achieved the top rank among the 18 large and mid-sized states in the delivery of justice with a population of over one crore.



Pre-Connect

About India Justice Report

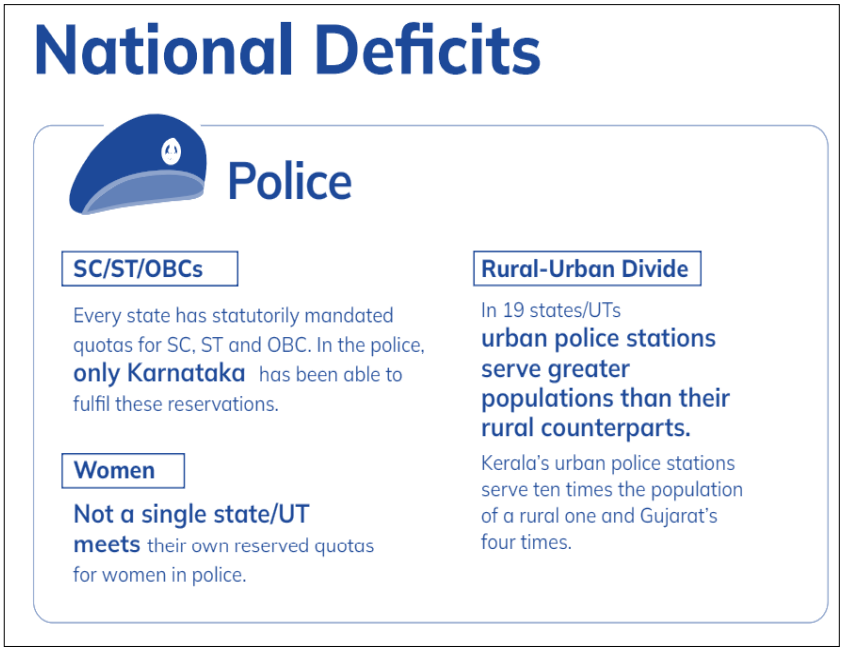
- The India Justice Report (IJR) was initiated by Tata Trusts in 2019.
- The foundation's partners include the Centre for Social Justice, Common Cause, Commonwealth Human Rights Initiative, DAKSH, TISS-Prayas, Vidhi Centre for Legal Policy and How India Lives, IJR's data partner.
- It compiles and categorises data of states and UTs, based on "**four pillars**" of justice delivery—the police, judiciary, prisons, and legal aid.
- Each pillar is analysed through the prism of budgets, human resources, workload, diversity, infrastructure, and trends (intention to improve over five years), against the state's own declared standards and benchmark.
- It separately assesses the capacity of the 25 State Human Rights Commissions as well.



Key-Findings of Report

On Budget Allocation

- India's justice system as a whole remains plagued by low budgets.
- There is a reduction of 44 per cent between 2019-2021 in legal aid clinics.
- Except for two union territories, Delhi and Chandigarh, no state spends more than 1 per cent of its total annual expenditure on the judiciary.
- The national per capita spend on legal aid is meagre of Rs 4.57 per annum.
- Most states have not fully utilised the funds given to them by the Centre and their own increase in spending on the police, prisons, and judiciary has not kept pace with the overall increase in state expenditure.



On Judicial Vacancy

- ✓ India has about 20,076 judges for a population of 1.4 billion, indicating a vacancy of 22 per cent among the sanctioned posts.
- ✓ As of December 2022, India had only 19 judges per one million people), which falls behind the Law Commission's 1987 target of reaching 50 judges per million population in a decade.
- ✓ Among high courts, there is a 30 per cent vacancy of judges. As of December 2022, the High Courts were functioning with only 778 judges against a sanctioned strength of 1,108 judges.

✓ Only 13% of High Court judges and 35% of Subordinate Court judges are women.

On Pendency and Case Load

- The average pendency in High Courts is highest in Uttar Pradesh (11.34 years) and West Bengal (9.9 years), while it is lowest in Tripura (1 year), Sikkim (1.9 years), and Meghalaya (2.1 years).
- The caseload per judge has steadily increased, with the caseload per judge increasing in 22 states and Union Territories between 2018 and 2022.

On Case Clearance Rate

- While CCR has increased in High Court by six percentage points (88.5% to 94.6%) between 2018-19 and 2022 but has declined by 3.6 points in lower courts (93% to 89.4%).
- In 2018-19, only four High Courts had a CCR of 100% or more. In 2022, this more than doubled to 12 High Courts.

On Prisons and Police

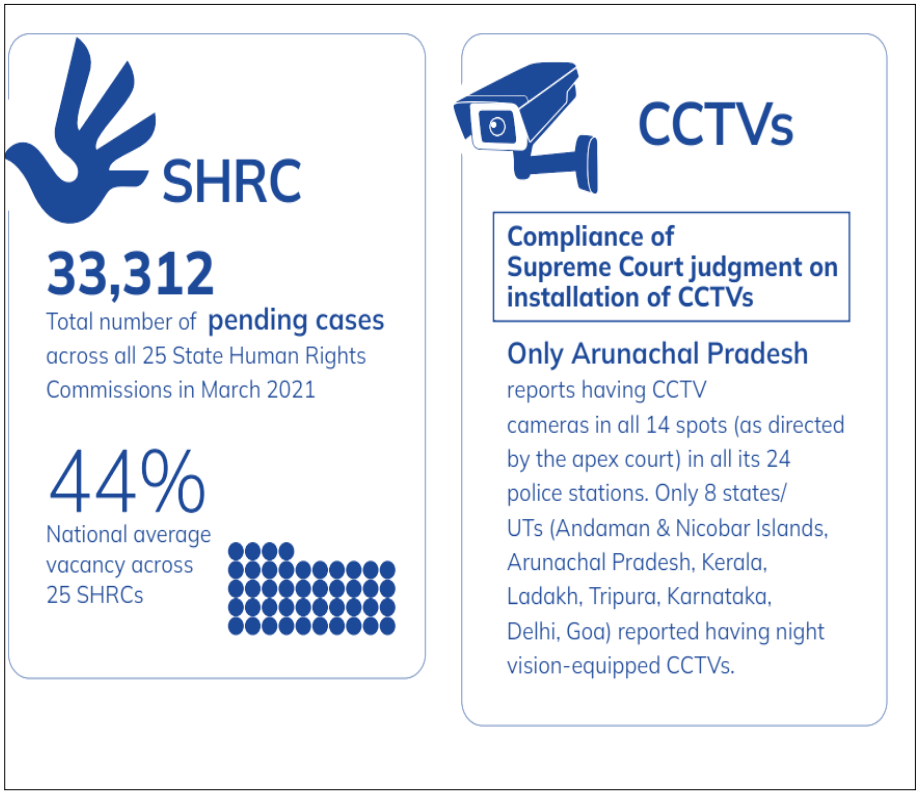
- Prisons in India are over-occupied at over 130%, with more than two-thirds or 77.1% of the prisoners still awaiting the completion of investigation or trial.
- Around 25% of the police stations in India do not have a single CCTV.
- There is the issue of inadequate women representation in the police, which currently stands at 11.75%, despite their numbers doubling in the last decade. About 29% of the officer positions are vacant.
- The police-to-population ratio is 152.8 per lakh, whereas the international standard is 222

On Diversity

⇒ Karnataka remains the only state to consistently meet its quota for SC, ST and OBC positions, both among Police officers and the constabulary, whereas in the judiciary, at the Subordinate/District Court level, no state met all three quotas.

⇒ Only Gujarat and Chhattisgarh met their respective SC quotas. Arunachal Pradesh, Telangana, and Uttarakhand met their respective ST quotas.

⇒ Kerala, Sikkim, Andhra Pradesh, Maharashtra, Tamil Nadu, Chhattisgarh, and Telangana met OBC quotas.



Overall ranking*

Color guide

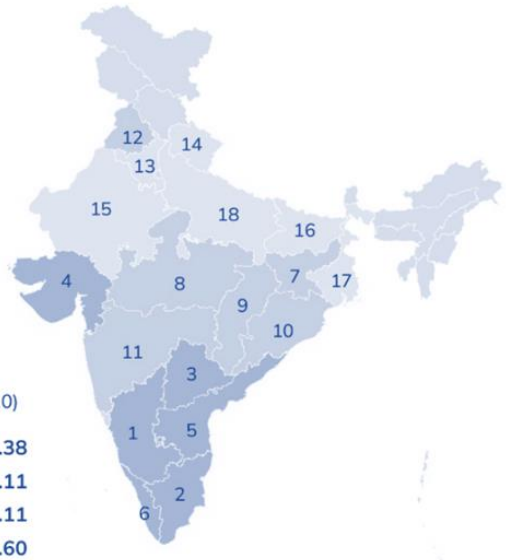
Best | Middle | Worst

Indicators (in IJR 3) **102**

Clusters

I. 18 large and mid-sized states (population above 10 million)

II. 7 small-sized states (population up to 10 million)



Map 1: Large and mid-sized states

Rank (out of 18) IJR 1 2019	IJR 2 2020	NEW IJR 3 2022	State	Score (out of 10)
6	14	1	Karnataka	6.38
3	2	2	Tamil Nadu	6.11
11	3	3	Telangana	6.11
8	6	4	Gujarat	5.60
13	12	5	Andhra Pradesh	5.41
2	5	6	Kerala	5.36
16	8	7	Jharkhand	5.26
9	16	8	Madhya Pradesh	5.25
10	7	9	Chhattisgarh	5.20
7	11	10	Odisha	5.16
1	1	11	Maharashtra	5.16
4	4	12	Punjab	5.10
5	9	13	Haryana	4.79
15	15	14	Uttarakhand	4.46
14	10	15	Rajasthan	4.36
17	13	16	Bihar	4.32
12	17	17	West Bengal	3.88
18	18	18	Uttar Pradesh	3.78

Map 2: Small states

Rank (out of 7) IJR 1 2019	IJR 2 2020	NEW IJR 3 2022	State	Score (out of 10)
2	2	1	Sikkim	5.01
6	5	2	Arunachal Pradesh	4.28
7	1	3	Tripura	4.02
5	7	4	Meghalaya	3.97
4	6	5	Mizoram	3.85
3	4	6	Himachal Pradesh	3.72
1	3	7	Goa	3.42

* Composite ranking across police, prisons, judiciary and legal aid

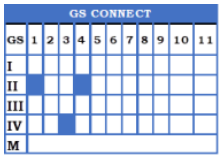
Note: Scores are shown up to 2 decimals. While they both show the same score, Tamil Nadu is ranked above Telangana on the third decimal (6.112 versus 6.105) and Odisha above Maharashtra (5.159 versus 5.157).

Recommendations

- ∇ Ensure 24*7 legal guidance and representation at police stations and courts at first instance.
- ∇ Fully implement the Supreme Court's **Paramvir Singh Saini judgement**, mandating every police station to be equipped with CCTV cameras to check abuse.
- ∇ Fill vacancies on an urgent footing.
- ∇ Prioritise increased resources for first responders.
- ∇ Increase diversity of caste, gender and the specially-abled across subsystems.
- ∇ Give training pride of place and prioritise human and financial resources in all training facilities.
- ∇ Ensure UTRCS (Undertrial Review Committees) guidelines of 14 categories of prisoners to be considered for release.
- ∇ UTRCs and all those officially mandated to visit jails, including judges, must be made accountable and their visits must be linked to their own performance review.
- ∇ SHRCS must be fully- resourced and reach out to the community proactively.
- ∇ Designate the justice delivery system as an essential service and enhance, enlarge and equip it as a first responder able to provide effective justice delivery at all times.

Right to Health

News Excerpt



The government of Rajasthan has recently passed the Right to Health Bill. The bill aims to give every resident of the state the right to avail of free services at all public health facilities.

Pre-Connect

Key Aspect of Right to Health

- Right to health means the most attainable levels of health that every human being is entitled to. The origin of the right can be traced back to the formulation of World Health Organisation which came into existence to formulate health terms as human rights.
- The right to health is inclusive. It includes a wide range of factors that can help us lead a healthy life such as:
  - Safe drinking water and adequate sanitation
  - Safe food
  - Adequate nutrition and housing
  - Healthy working and environmental conditions
  - Health-related education and information
  - Gender equality.
- The right to health contains entitlements as under:
  - The right to a system of health protection providing equality of opportunity for everyone to enjoy the highest attainable level of health
  - The right to prevention, treatment and control of diseases
  - Access to essential medicines
  - Maternal, child and reproductive health
  - Equal and timely access to basic health services
  - The provision of health-related education and information
  - Participation of the population in health-related decision-making at the national and community levels.
- Health services, goods and facilities must be provided to all without any discrimination.
- All services, goods and facilities must be available, accessible, acceptable and of good quality.

Common misconceptions about the right to health

- ❖ The right to health is NOT the same as the right to be healthy.
- ❖ The right to health is NOT only a programmatic goal to be attained in the long term.
- ❖ A country's difficult financial situation does NOT absolve it from having to take action to realize the

Right to Health Provisions in India

- ➢ The right to Health is considered as a part of the right to life with dignity which is a fundamental right under Article 21.
- ➢ Articles 38, 39, 42, 43, & 47 put the obligation on the state to ensure the effective realization of the right to health.
- ➢ SC in **Paschim Banga Khet Mazdoor Samity case** (1996) held that a welfare state should provide adequate medical facilities for its people.

- Similarly, in **Parmanand Katara Vs Union of India** ruled that every doctor has the professional obligation to extend his services with due expertise for protecting life.

Key Features of the Bill of Rajasthan Assembly

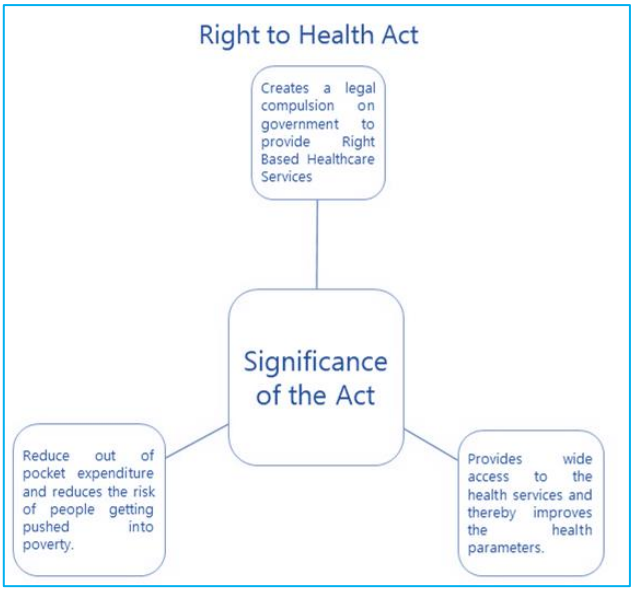
- ✓ At all public health institutions and select private facilities, free healthcare services include:
  - Consultation
  - Drugs
  - Diagnostics
  - Emergency Transport
  - Procedure and Emergency Care
- ✓ Right to Health Bill has the provision for mandatory free-of-cost emergency treatment for every resident of the State at both the government hospitals and the privately-run institutions.
- ✓ With this, Rajasthan has become the first and the only State in the country to legislate the right to health.

International human rights treaties recognizing the right to health

- ❖ The 1965 International Convention on the Elimination of All Forms of Racial Discrimination: art. 5 (e) (iv)
- ❖ The 1966 International Covenant on Economic, Social and Cultural Rights: art. 12
- ❖ The 1979 Convention on the Elimination of All Forms of Discrimination against Women: arts. 11 (1) (f), 12 and 14 (2) (b)
- ❖ The 1989 Convention on the Rights of the Child: art. 24
- ❖ The 1990 International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families: arts. 28, 43 (e) and 45 (c)
- ❖ The 2006 Convention on the Rights of Persons with Disabilities: art. 25.

Challenges Related to the Right to Health in India

- **Infrastructure Issues**: The majority of India's healthcare infrastructure is concentrated in the cities where roughly 27% population resides. Therefore, the crunch of infrastructure is serious in rural areas. Data also points out that India has 1.4 beds per 1,000 people, 1 doctor per 1,445 people, and 1.7 nurses per 1,000 people.
- **Health Financing**: India has one of the lowest public expenditures on healthcare. India's spending on healthcare is much lower than the average health spending share of the GDP of the Lower- and Middle-Income Countries (LMIC). As a result, there is a serious resource crunch. This can lead to inadequate healthcare services for individuals.
- **Gender issues**: India consistently ranks among the worst countries in the world for the health and survival of females. Women in India face several issues such as limited access to healthcare, higher rates of maternal mortality, and gender-based violence. Data suggests that Women from poor households account for lesser hospital visits than men.
- **High Disease Burden**: India has a high disease burden which will require a significant investment in healthcare infrastructure and resources.



Way Forward

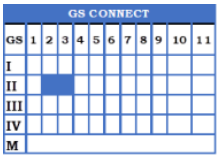
- There is a need to significantly increase investment in healthcare infrastructure and resources, including medical facilities, equipment, and healthcare professionals. For this public spending will not be enough and there is a need to increase private sector investment.
- There is a need to improve the accessibility to healthcare by removing the barriers that prevent individuals from accessing healthcare services ranging from financial constraints, and transportation to discrimination.
- There is a need to develop targeted policies and programs, such as health insurance schemes and mobile healthcare units.
- Creation of a designated and autonomous agency to perform functions such as
  - Disease surveillance
  - Information gathering on the health impact of policies
  - Maintenance of national health statistics
  - Enforcement of public health regulations
  - Dissemination of information to the public.

PEPPER IT WITH

Ayushman Bharat, PM-BJP, Right to Livelihood, Healthcare in India

Public Interest Immunity Claims Proceeding

News Excerpt



Supreme Court recently ruled on the use of sealed cover proceedings in courts by criticizing the government for silencing voices in the media and reducing constitutional rights and procedural guarantees of a fair hearing.

Pre-Connect

Sealed Cover Proceedings

- Seal-cover proceedings are used in cases which involve sensitive or confidential information such as national security matters or cases where the disclosure of the evidence may compromise the privacy of individuals.
- The documents and evidence have sealed covers when submitted to the court. The judge and a designated court officer have the authority to examine the contents of the sealed envelope.
- Seal-Cover proceedings are means of balancing the need for transparency in the judicial process.
- Since Court may only rely on the information contained in the sealed cover to make its decision and parties to the case may not have access to the contents of the sealed cover. Thus, under the law, their use has reduced constitutional rights and procedural guarantees of a fair hearing.

SC's Previous Observations of Sealed Cover Proceedings

- **In the INX Media case (2019)** when Delhi High Court denied bail to a former Union Minister on documents submitted by the Enforcement Directorate in a sealed cover, it was criticised by the SC and held action against the concept of a fair trial.
- **In P. Gopalakrishnan vs The State of Kerala, (2019)** it was held that disclosure of documents to the accused is constitutionally mandated.
- **In Cdr Amit Kumar Sharma v Union of India case (2022)** the Supreme Court stated that non-disclosure of relevant material to the affected party and its disclosure in a sealed cover to the adjudicating authority sets a dangerous precedent.

About Public Interest Immunity Claims Proceeding

- Proceedings were taken as an "alternative" to the sealed cover proceedings while dealing with state requests for confidentiality as claimed by the "less restrictive" Public Interest Immunity (PII).
- As per Supreme Court PII proceedings would be a "closed sitting," but at the same time, reasoned order allowing or dismissing the PII claim of the state should be pronounced in open court.

Role of Amicus Curiae

- Amicus curiae which mean "friend of the court" is appointed by a court to act as a bridge between the parties involved in public interest immunity claims.
- They will be given access to the materials sought to be withheld by the state and allowed to interact with the applicant and their lawyer before the proceedings to ascertain their case.
- They will not interact with the applicant or their counsel after the public interest immunity proceeding has begun and the counsel has viewed the document sought to be withheld.
- They shall be bound by oath to not disclose or discuss the material with any other person and "shall to the best of their ability represent the interests of the applicant".

PEPPER IT WITH

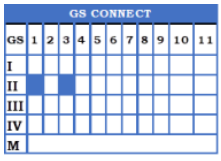
Public Intrest Litigation, Sealed Cover jurisprudence, Rights of Accused

Some drawbacks

- As per the Article 145 of the Constitution closed sitting proceedings as per PII might fall against this constitutional mandate and specifically mandates that all judgments of the Supreme Court be delivered in open court,
- After the Supreme Court announces the closed setting of public interest immunity proceedings in contradiction, it announced that the court is required to pass a reasoned order for allowing or dismissing the claim in open court.
- Sealed cover proceedings go a step ahead and infringe on the principles of natural justice as well as the principles of open justice.

Electoral issues: Recognition of Political Parties

News Excerpt



Recently, the Election Commission of India (ECI) recognised a major political party as a National party and at the same time, several parties lost their national party status. The EC also looked into the recognition of some state parties.

Pre-Connect

Registration of Political Party in India

- Registration of political parties is governed by the provisions of section 29A of the Representation of the People Act, 1951.
- A party seeking registration under the said section with the Commission has to apply to the Commission within 30 days following the date of its formation as per guidelines prescribed by the Commission in the exercise of the powers conferred by Article 324 of the Constitution of India and Section 29A of the Representation of the People Act, 1951.
- An applicant should publish the proposed name of the party in two national daily newspapers and two local daily newspapers, within two days of submitting objections, if any, concerning the proposed registration of the party before the Commission within 30 days from such publication.
- ECI registers political parties for elections and grants them recognition as national or state parties based on their poll performance.
- The other parties are simply declared as registered-unrecognised parties.

Recognised Political Party

- A recognised political party is either a National party or a State party.
- A recognised political party has certain privileges like allocation of the party symbols, provision of time for political broadcasts on state-owned television and radio stations and access to electoral rolls.

Election Symbol Disputes

- Election Commission can decide disputes among rival groups of a a recognised political party staking claim to its name and symbol.
- The EC is the only authority to decide issues on a dispute or a merger under the order.
- In case of the unrecognised parties, the EC usually advises the warring factions to resolve their differences internally or to approach the court.

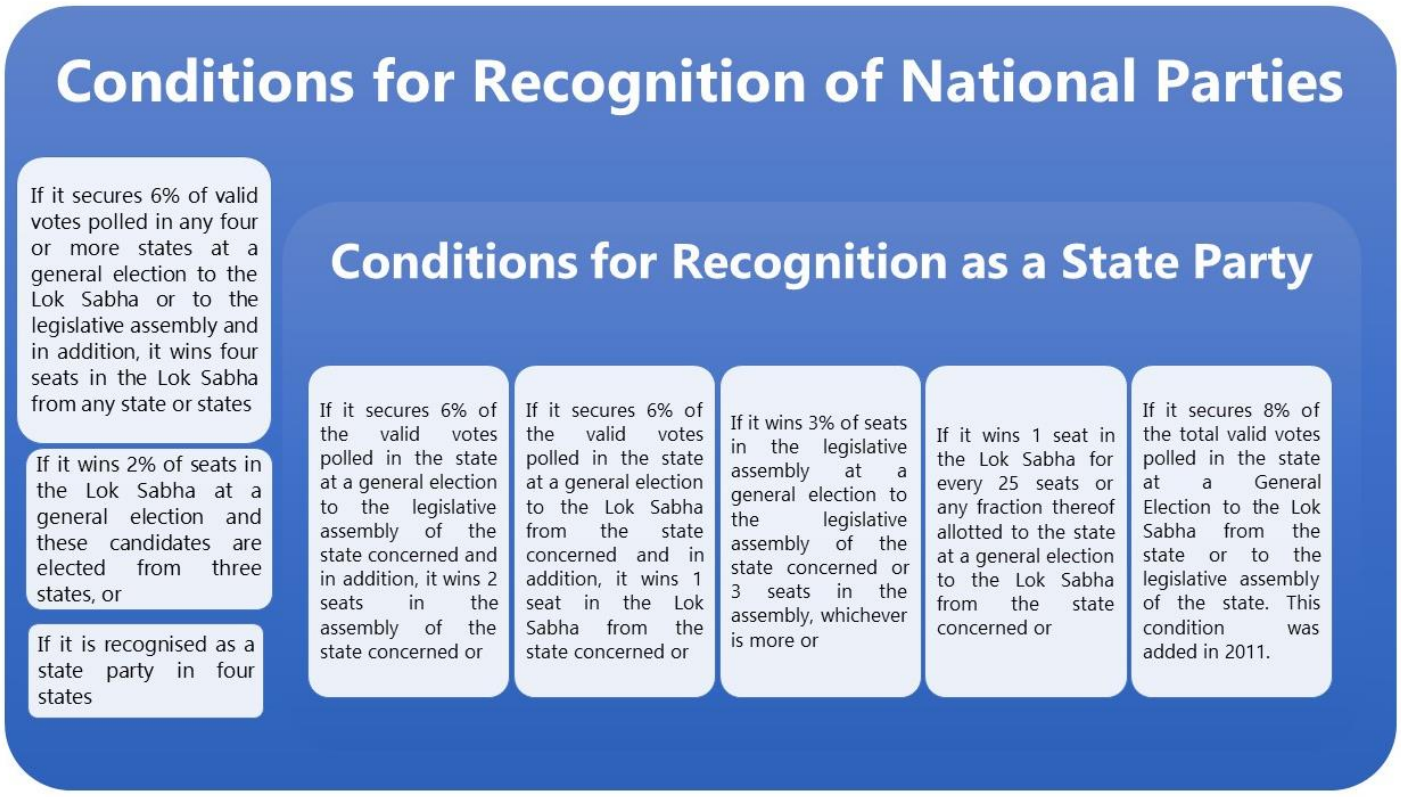
As of 2023, India has six national parties, over 56 recognised state parties, and 2796 unrecognised parties.

List of National Parties in India

1. Aam Admy Party (AAP)
2. Bahujan Samaj Party (BSP)
3. Bharatiya Janata Party (BJP)
4. Communist Party of India (Marxist)
5. Indian National Congress (INC)
6. National People's Party (NPP)

Registered Unrecognised Political Parties (RUPP)

- ✓ They are either newly registered parties or those parties
  - Not secured enough percentage of votes in the assembly or general elections to become a state party.



- Parties which never contested elections since being registered.

✓ These parties don't enjoy all the benefits extended to the recognised parties.

✓ They are provided with common symbols based upon an undertaking for putting up at least 5% of total candidates with regard to said legislative assembly election of a State.

Significance of being declared a National/State Party

There are several privileges associated with recognition as a recognised party:

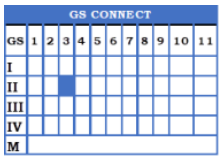
- Allocation of the party symbols
- A special provision of time for political broadcasts on state-owned television and radio stations and access to electoral rolls.
- Parties are allowed to have 40-star campaigners during the time of elections (the registered-unrecognised parties are allowed to have 20-star campaigners)
- Symbol allotted to a National party is exclusively reserved for its use throughout the country. Even in the states where it is not contesting elections.
- For a state party, the allotted symbol is exclusively reserved for its use in the state/s in which it is so recognised.

PEPPER IT WITH

Model Code of Conduct, Election Symbol, Tenth Schedule

Special Court

News Excerpt



The Supreme Court of India had opined that the "one-size-fits-all" approach may not resolve the problem of the long pendency of criminal cases in India. Therefore it has suggested setting up state-specific special courts for speedy trials.

Pre Connect

- To fast-track the long-pending trials of lawmakers Supreme Court ordered the setting up of special courts in 2017. As a result,12 special courts were set up across 11 States exclusively to try sitting MPs and MLAs.
- Amicus Curiae was appointed by Supreme Court in 2020 and it mentioned in its report that despite the best efforts by the court to constitute special courts for trying cases against legislators, close to 4,442 criminal cases involving 2,556 sitting members of Parliament (MP) and members of state legislature are pending.
- At present these cases have touched the 5,000 mark, with 400 of them concerning heinous offences.

About Special Court

➢ A Special Court manages a specific field of law as opposed to a specific regional ward with constrained purview.

➢ These are established under the Special Courts Act of 1979.

➢ Various special courts in India deal with specific types of cases.

➢ The objective of these courts is to provide speedy justice and to address the unique legal challenges associated with certain types of cases.

Other Special Court Initiative

Special Courts for POCSO cases

- These are established under a Central scheme (fully funded by the Centre) in each district across the country that had over 100 cases of child abuse and sexual assault pending trial under the Protection of Children from Sexual Offences (POCSO) Act.

Scheme for Fast Track Courts:

- In 2019, the government approved a scheme for setting up 1,023 fast-track special courts (FTSCs) across the country for expeditious disposal of pending rape cases under the Indian Penal Code (IPC) and crimes under the POCSO Act.

e-Courts Integrated Mission Mode Project:

- As part of the National e-Governance Plan, the project is under implementation since 2007 for Information and Communications Technology (ICT) development of the Indian Judiciary

Jurisdiction of Special Courts

✓ Special jurisdiction is a court's jurisdiction also referred to as limited jurisdiction.

✓ It deals with a certain types of cases such as bankruptcy, claims against the government, probate, family matters, immigration, and customs, or limitations on courts' authority to try cases involving maximum amounts of money or value.

✓ Judges in these courts serve for a specific term as these courts only hear cases in a very narrow jurisdiction, unlike constitutional courts which look after challenged unconstitutional laws as per rights and freedom.

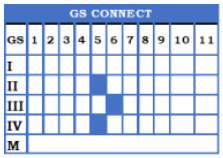
Way Forward

- Governance in India should be criminal-free as criminal elements create an unholy nexus with the bureaucracy which can impact the rule of law.
- There should be an identification of tainted political leaders so that public pressure can be mounted on the political parties and such leaders are denied tickets.

PEPPER IT WITH

Family Courts, Gram Nayala, Criminilisation of Indian Politics, RPA Act 1951

Regulating AI



News Excerpt

Recently, the Italian government has decided to ban ChatGPT due to concerns over the collection of personal data and the lack of guardrails to prevent minors from accessing the AI chatbot.

India's Response to AI Regulation

- India does not have an overarching guidance framework for the use of AI systems.
- The Information Technology Act, 2000 (IT Act) is the backbone of data protection legislation in India. The provisions of the IT Act, combined with the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011 (SPDI Rules) establish a technology-agnostic regime for the protection of sensitive personal information for all bodies corporate.

Regulators Response to ChatGPT

European Union

- Proposed a European AI Act which will bring a common regulatory framework for AI.
- The act will work in tandem with the General Data Protection Regulation (GDPR).
- The act classifies different AI tools according to perceived risk level and imposes different obligations and transparency requirements.
- ChatGPT might come under the General Purpose AI Systems category, which describes tools that can perform multiple functions.

United Kingdom

- It is following a light-touch approach by asking regulators in different sectors to apply existing regulations to AI.
- Government also published a white paper outlining five principles companies should follow:
- Safety, Security and Robustness.
- Transparency and Explainability
- Fairness
- Accountability and governance
- Contestability and Redress.

China

- Chinese government hasn't officially blocked ChatGPT, however, OpenAI does not allow users to sign up for the chatbot in the country.
- On the same ground OpenAI is also blocking users from other countries with heavy internet censorship such as Russia, North Korea, Egypt, Iran, Ukraine, and a few more.

- NITI Aayog has issued guiding documents on AI which is known as the Responsible AI for All report. The Report provided principles which are recommended for the responsible management of artificial intelligence in India and are based on the underlying principle of ensuring AI systems are designed in a manner that enables fundamental rights:
  - **Principle of Safety and Reliability:** AI should be deployed reliably as intended and sufficient safeguards must be placed to ensure the safety of relevant stakeholders. The AI system needs to be monitored through its lifecycle so it performs acceptably, reliably, and according to the desired goals.
  - **Principle of Equality:** AI systems must treat individuals under the same circumstances relevant to the decision equally
  - **Principle of Inclusivity and Non-discrimination:** AI systems should not deny opportunity to a qualified person based on their identity. It should also strive to ensure that unfair exclusion of services or benefits does not happen.
  - **Principle of Privacy and Security:** AI should maintain the privacy and security of the data of individuals or entities that are used for training the system. Access should be provided only to those authorized with sufficient safeguards.
  - **Principle of Transparency:** The design and functioning of the AI system should be recorded and made available for external scrutiny and audit to the extent possible to ensure the deployment is fair, honest, and impartial and guarantees accountability.
  - **Principle of Accountability:** All stakeholders involved in the design, development and deployment of the AI system must be responsible for their actions.
  - **Principle of protection and reinforcement of positive human values:** AI should promote positive human values and not disturb in any way social harmony in community relationships.

Concerns Related to AI and Chatbots

- **Personal Data Risks**

- The personal data collected and used by OpenAI to train ChatGPT without obtaining the necessary consent of the relevant individuals may violate personal data protection laws.
- Furthermore, when inputting queries in ChatGPT, there is a risk that the personal data of the user or a third party (if personal data relating to the third party is keyed in by the user) may be captured and processed by ChatGPT.

- **Inaccuracy and Misleading Information**
  - ChatGPT is subject to certain accuracy and bias risks. It can only generate text based on the data on which it was trained. This means that if the datasets ChatGPT is trained on contain errors, inaccuracies, or biases, these will be reflected in the ChatGPT's responses
  - It may produce a lucid and comprehendible answer, but one that is incorrect or incomplete. This raises concerns about ChatGPT's potential to create misleading content which may have serious consequences, such as damaging reputations or spreading misleading Information.
- **Intellectual Property and Infringement:** One of the main issues of using ChatGPT is its potential to infringe on intellectual property rights. If the datasets ChatGPT is trained on contain copyrighted works, the output generated by ChatGPT is likely to involve the reproduction of or may be similar to, such copyrighted works, thus giving rise to a risk that the use of the output, without permission, could constitute copyright infringement. The infringement risk may extend to the user and not just ChatGPT.
- **Confidentiality:** Another risk in using ChatGPT is the unauthorised disclosure of confidential information. When a user keys in queries or requests that ChatGPT perform a task, the user may be feeding ChatGPT with commercially sensitive or confidential information. Such information may be used in generating output for other similar or relevant queries or requests as such commercially sensitive or confidential information is now part of ChatGPT's database.
- **Plagiarism**: ChatGPT is a convenient tool for users to get quick answers to their queries, for example, students may use ChatGPT to complete an assignment or journalists may use ChatGPT to write an article. Plagiarism raises ethical concerns in addition to the other risks. Furthermore, it also obviously discourages and therefore impedes personal improvement and development.
- **Impacts Critical Thinking:** The more humanlike these bots become, the better they are at fooling people into thinking there is a sentient agent behind the computer screen. If this illusion fools people into believing an AI agent is performing human-like reasoning, they may trust its answers more readily.
- **Informational Threats:** They might provide a terrorist with instructions on how to build a bomb, churn out threatening messages for a harassment campaign or supply misinformation to a foreign agent attempting to sway an election.

Regulating AI

The greatest risk of adopting regulation approach to manage AI systems is that regulations have historically not kept pace with technology. AI is still an evolving field and the risks are not well understood, making it difficult to design concrete long term regulatory approaches. Regulating AI is a complex topic and there are diverse views regarding what degree and what forms of regulation will be effective for its varied applications. AI is a rapidly advancing technology, and a one size fits all approach may not be the most suitable approach. There is a need to balance soft governance measures with regulation depending on the use case and risks involved.

While overarching AI ethics principles will guide the overall design, development and deployment of AI in the country, a graded risk-based approach to varying use cases across different sectors need to be adopted.

At the same time, the AI ecosystem has multiple stakeholders- private sector, research, government, legal bodies, regulators, standard setting bodies, etc. It is important to bring in a common understanding on acceptable behaviour among different stakeholders and clarify applicability of existing policies and regulations through creation of Principles and guidance framework. Principles offer a technology agnostic framework for communicating expectations from responsible AI systems and identifying governance mechanisms.

Conclusion

As chatbots and other AI-driven technologies continue to gain traction, there is an underlying concern about the potential risks and detriments arising from AI. Regulators continue to either fine-tune existing laws or implement new laws to govern AI-driven technologies. This includes ensuring that the data used for training is collected and used in a way that respects the privacy of individuals and does not reinforce existing biases.

PEPPER IT WITH

Chatbots RESET Framework, FRT, Big Data Analytics, GDPR

Disqualification of a Representative and Defamation

News Excerpt

A Lok Sabha Member was recently sentenced to 2 years in jail in a 2019 defamation case. This raises the issue of defamation of representatives in India.

Defamation simply involves any kind of activity which aims to cause harm or damage to the good reputation of an individual. The enlarged version of the provisions of IPC also covers **cyber defamation**.

Pre-Connect

- Defamation is not absolute and has both explanation and exception attached to its definition if we go through Indian Laws.
- For example, defamation is to protect one's dignity, as has been guaranteed by **Article 21** of the Indian Constitution. But defamation is also related to misuse in the hands of many thereby causing a rise in debate on it with respect to the **limitation on free speech (Article 19)**.
- Defamation is both a **criminal** (which carries a prison sentence) and **a civil** (punishable through the award of damage) offence under the IPC and law of torts respectively.

Constitutional Provisions Related to Defection

The Constitution lays down that a person shall be disqualified from being a member of Parliament if She/he is so disqualified on the ground of defection under the provisions of the X Schedule in the following circumstances:

1. Voluntary gives up the membership of the political party on whose ticket She/he is elected to the House;

2. If votes or abstains from voting in the House contrary to any direction given by her/his political party;

3. If any independently elected member joins any political party; and

4. If any nominated member joins any political party after the expiry of six months.

The question of disqualification under the X Schedule is decided by the presiding officer of the house. However it is not beyond judicial review ***{Kihoto Hollohan case***

Under the Constitution, a person shall be disqualified from being elected as a member of Parliament:

- In the case of an **office of profit**
- If the representative is of **unsound mind** and stands so declared by a court.
- If the representative is an **undischarged insolvent**.
- If the representative is **not a citizen** of India or has voluntarily acquired the citizenship of a foreign state or is under any acknowledgement of allegiance to a foreign state; and
- If the representative is so disqualified under any **law made by Parliament**.

Some additional disqualifications have been made by the parliament under RPA 1951 as under:

- ✓ Must not have been found guilty of certain **election offences** or corrupt practices in the elections.
- ✓ Must not have been convicted for any offence resulting in imprisonment **for two or more years** (Not in case of preventive detention).
- ✓ Must not have failed to lodge an account of **election expenses within the time**.
- ✓ Must not have any interest in government **contracts, works or services**.
- ✓ Must not be a **director or managing agent** nor hold an office of profit in a corporation in which the government has **at least 25 per cent share**.
- ✓ Must not have been **dismissed from government service for corruption** or disloyalty to the State.
- ✓ Must not have been convicted for promoting enmity between different groups or for the **offence of bribery**.
- ✓ Must not have been punished for **preaching and practising social crimes** such as untouchability, dowry and sati.

On the question of whether a member is subject to any of the above disqualifications, the **president's decision is final**. However, the President should obtain the opinion of the election commission and act accordingly. It should also be noted here that in the case of defection under X schedule it is not the president but the presiding officer as the final authority (Obviously not beyond Judicial Review).

What happens if a Lawmaker/Representative is convicted of Defamation

Section 8(3) of RPA specifies that a person convicted of any offence and sentenced to imprisonment for not less than two years shall be disqualified from the date of such conviction and shall continue to be disqualified for a further period of six years since release.

Section **8 (4) of RPA** was struck down by SC in 2013 (**Lily Thomas case**). This subsection had provisions for convicted lawmakers to retain their seats if they filed an appeal within 3 months of their conviction.

Sections of IPC WRT Defamation

- **Section 499 of the IPC** defines defamation as any spoken, written, or visual statement about another person designed to damage that person's reputation. The conduct of any person addressing any public issue or expressing comments on a public performance is an example of exceptions to this rule, as well as any imputation of truth required for the public benefit. Defamation of a **deceased person** also comes under this.
- **Section 500 of IPC** outlines the punishment for defamation which includes fine, simple imprisonment for a time that may not exceed two years or both.
- **Section 501 of IPC** deals with the printing or engraving of matter known to be defamatory.
- **Section 502 of the IPC** specifies the sale of printed or engraved substances containing defamatory matter.

What is not Defamation?

- Imputation of truth which the public good requires to be made or published
- Accusation desired in good faith to the authorised person
- Conduct of any person approaching any public question
- Merits of a case decided in court or conduct of witnesses and others related to the case
- Merits of public performance
- Censure is passed in good faith by a person having lawful authority over another
- Public conduct of a public servant
- Caution intended for the good of a person to whom conveyed or the public good
- Publication of reports of proceedings of courts
- Imputation made in good faith by a person for the protection of his or others' interests

Some Important Judgments Related to Defamation

- **Rohini Singh v. State of Gujarat (2018)**: Offence of defamation may not be committed if someone only types defamatory material without publishing it or disseminating it to others. So, the individual making the defamation claim must prove that the defamatory material was intended for an audience.
- **Mrs. Pat Sharpe v. Dwijendra Nath Bose (1963):** the author of the article (and not the source of the information) becomes liable if the recipient of defamatory material from an anonymous source creates and publishes an article based on that information.
- **Subramanian Swamy v. Union of India (2016):** The Supreme Court of India dismissed challenges to the constitutionality of the criminal offense of defamation, holding that it was a reasonable restriction on the right to freedom of expression.
- **S.T.S. Raghavendra Chary v. CheguriVenkatLaxma Reddy (2018):** The distinction between libel and slander was drawn by the Andhra Pradesh High Court in this case.
  1. Libel: Defamation caused by means of words written.
  2. Slander: Defamation caused by means of words spoken thus temporary in nature.

PEPPER IT WITH

Cyber Defamation, Shreya Singhal v. Union of India case and Section 66A of IT Act, Mahendra Ram Vs. Harnandan Prasad (1958), Section 8 of RPA, Right to be forgotten

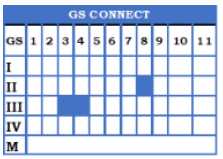
Conclusion

Reputation is part of a dignified life and is hence covered under Article 21. However, defamation has a chilling effect on freedom of speech and expression but its constitutionality is held valid by Supreme Court. There are some fundamental constitutional questions about the offence of defamation which needs to be answered but it should always be kept in mind that Freedom of Speech and defamation laws should coexist in harmony. The concept of defamation in the present context needs to be deciphered by the legislatures and the way forward needs to be with reference to a flexible provision instead of a rigid legal framework.

SOCIAL ISSUES

Open-source seeds movement

News Excerpt



Open-source software has become an important and relevant option for the commercialisation of seeds along with farmer benefits with declining public sector breeding and the rising dominance of the private sector in the seed sector.

Pre-Connect

Open-Source Software (OSS)

- It is a software that is available for use, modification, and distribution with its original rights as it is distributed with its source code.
- Richard Stallman, a programmer at MIT informally started an ideological movement of making source code freely available in 1983.
- He developed the General Public License (GPL), the first of the 'Free and Open-Source Software' licences which used copyright law to protect users' rights and prevent misappropriation.
- Source code is the part of software not visible but controls how a program or application behaves.
- OSS typically includes a license that allows programmers to modify and control the software as per their needs.
- Some examples of Open-Source software are GNU/Linux, Mozilla Firefox, VLC media player, SugarCRM, GIMP, VNC, Apache web server, Libre Office, and jQuery.

Open-Source Initiative

- ❖ This source was created to promote and protect open-source software and communities.
- ❖ It acts as a central informational and governing repository of open-source software.
- ❖ It provides rules and guidelines for how to use and interact with OSS
- ❖ It also provides code licensing information, support, definitions, and general community collaboration to help make the use and treatment of open source understandable and ethical.

Intellectual Property Rights in Agriculture (IPRs)

Plant Breeders Rights

- ➢ IPRs in agriculture are used to protect goods or services produced in the agricultural sector and mainly deals with patents, plant breeder's right, trademarks, geographical indications and trade secrets. These are legally enforceable rights which are used to protect new varieties of plants that are distinguishable, uniform, and stable.
- ➢ It gives the owner, exclusive rights to commercially use it, sell it, direct the production, sale, and distribution of it, and receive royalties from the sale of plants.
- ➢ In many countries, PBR lasts for up to 25 years for trees and vines and 20 years for other species. In some countries, these allow rights-holders to restrict the unauthorised use of seeds to develop new varieties.
- ➢ To be eligible for protection, the new variety must be shown to be distinct, uniform, and stable.
- ➢ Trade-Related IPR Agreement cast a global IPR regime over plant varieties with the establishment of the World Trade Organisation in 1994.
- ➢ TRIPS required countries to provide at least one form of IP protection while consolidation in the seeds sector raised concerns about the freedom to innovate.
- ➢ The Green Revolution was spearheaded by public-sector breeding institutions with no restrictions on cultivation but the genetic revolution in agriculture was led by the private sector, with seeds mostly made available as hybrids and/or protected by strong IPRs.

The Protection of Plant Varieties and Farmers' Rights Act

- ❖ The Govt. of India enacted "The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001" adopting sui generis system.
- ❖ It became the world's only IPR legislation on plant varieties that recognised and protected the rights of both commercial plant breeders and farmers for maintaining traditional landraces.
- ❖ It provides to implement TRIPs in a way that supports the specific socio-economic interests of all the stakeholders including private, public sectors and research institutions, as well as resource-constrained farmers.

Rights under the Act:

- Breeders Rights
- Researchers Rights
- Farmers Rights

Intellectual Property Rights in Agriculture in India

- **Plant-breeders' rights and patents** are the two forms of IPR Protection in Agriculture.
- These restrict farmers' rights and the freedom to develop new varieties using germplasm from IP-protected varieties.

- These rights have consolidated the seed sector and increased the number of plant varieties covered by IPRs.
- **India Patent Act of 1970** provided patents for agricultural tools and machinery or the processes of development of agricultural chemicals.
- Till the initial 2000s only substances prepared by chemical processes were patentable.
- The government of India passed the **Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act in 2001.**
- In 1999, a Canadian plant breeder named T.E. Michaels suggested an approach to seeds based on the principles of open-source software. India is yet to test and adopt it widely.
- Currently, the Hyderabad-based Centre for Sustainable Agriculture (CSA), part of the Apna Beej Network, is trying to use this approach through three farmer-producer organisations (FPOs) and developed a model incorporated into an agreement between CSA and the recipient of the seed/germplasm.
- Farmers can register varieties as 'farmer varieties' if they meet certain conditions, and have the right to reuse, replant, and exchange seeds. They can't breed and trade in varieties for commercial purposes.

International Union for Protection of New Plant Varieties (UPOV Convention)

- ❖ It administers an international system of intellectual property (IP) rights that protect plant breeders' rights and encourage innovation in agriculture through the development of new varieties of plants.
- ❖ It is an intergovernmental organization based in Geneva, Switzerland.
- ❖ Till date, it has 75 members covering 94 countries.

Open-Source Model of Seeds

- Open-Source Seeds is committed to re-establishing seed as a common good by providing new varieties with an open-source licence. This is an easy way to legally protect seeds from patents and other forms of privatization.

➢ The model was introduced as the "Bio Linux model" in 2002 for seeds and plant varieties.

➢ Jack Kloppenburg launched the **Open-Source Seeds Initiative (OSSI)** in Wisconsin in 2012.

Need for Open-Source Approach

✓ It can be used in farmer-led seed conservation and distribution systems as there is many traditional-variety conservation and sharing initiatives in India.

✓ It can help the government and stakeholders to adopt and focus on traditional varieties that are unique to specific regions or sites and/or have specific features.

✓ It can also help in promoting farmer-led participatory plant-breeding exercises.

✓ It can help in overcoming challenges in traditional varieties such as lack of uniformity and aren't of excellent quality by facilitating testing, improvisation, and adoption with will benefit India's food security and climate resilience.

✓ It can help farmers to gain more rights over germplasm and seeds and facilitate innovation.

PEPPER IT WITH

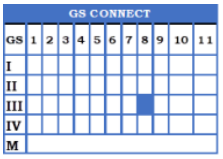
Navdanya Seed Banks, Seed Village Scheme, Pradhan Mantri KISAN Samman Nidhi

Conclusion

Software and seeds can have a strong parallel observing previous scenarios where high prices of genetically modified seeds and IP claims triggered many problems, including the State's intervention on Bt cotton seeds in India. Also, with the increasing hold of the private sector dominating the seed sector, there is a high need for alternatives. The open-source approach has come up as a ray of new hope.

Technology and Innovation Report 2023

News Excerpt



Recently, Technology and Innovation Report 2023 was published by United Nations Conference on Trade and Development (UNCTAD) and highlighted the importance of green innovation.

Pre-Connect

About UNCTAD

- United Nations Conference on Trade and Development (UNCTAD) is not a permanent organ of the United Nations (UN) General Assembly, established in 1964 to promote trade, investment, and development in developing countries.
- It is headquartered in Geneva, Switzerland, and UNCTAD has approximately 190 members.

- UNCTAD calls on governments in developing countries to **invest in more complex and greener sectors, boost technical skills and build capacities** to harness frontier technologies.

About Report

- The report is built around the concept of green innovation which focuses on creating or introducing new or improved goods and services that leave lighter carbon footprints and open up green windows of opportunity.
- India was ranked 67th position as the greatest overperformer followed by the Philippines and Vietnam.
- The report analyses the market size of 17 **green and frontier technologies**, such as artificial intelligence, the Internet of Things and electric vehicles, and their potential to create jobs.
- The report assesses countries' preparedness for frontier technologies.
- It presents a "readiness index" ranking 166 countries based on five "building blocks": **ICT deployment, skills, research and development (R&D) activity, industry activity and access to finance.**

Green Technology or Green tech

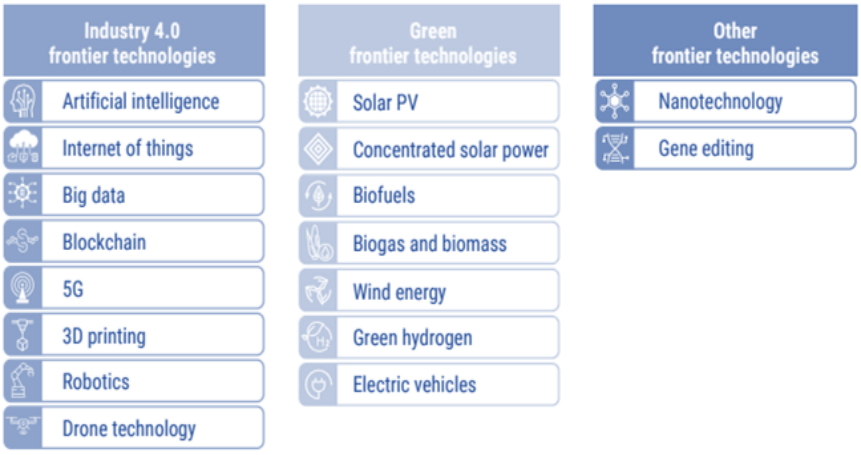
- It refers to a type of technology that is considered environmentally friendly based on its production process or its supply chain.
- It also refers to clean energy production, the use of alternative fuels, and technologies that are less harmful to the environment than fossil fuels.
- It encompasses a wide area of scientific research, including energy, atmospheric science, agriculture, material science, and hydrology.
- Solar power is one of the cheaper and most successful green technologies.

Key Finding

The Report recommends:

✓ Pacing with frontier technology

- ✓ In 2020 the total market value of this technology was $1.5 trillion and by 2030 it is expected to reach $9.5 trillion which will be largely influenced by the Internet of Things (IoT).
- ✓ In developed countries, the total exports of green technologies jumped to more than USD 156 billion in 2021 from about USD 60 billion in 2018 while USD 75 billion from USD 57 billion in developing countries.
- ✓ The United States, and China with a combined 30 per cent share of global publications and almost 70 per cent of patents and some countries in Western Europe have supplied this technology such as blockchain, drones, and solar power.



- ✓ Current job expectations may be more pessimistic because of the increasing capacity of AI to mimic human intelligence. The net impact on jobs will depend on the final balance between creation and extinction.
- ✓ The most mature technology is AI but IoT is relatively immature.

✓ Laying Foundation for Green Tech

- Developing countries require capabilities such as necessary policies, regulations, and infrastructure along with scientific or technical skills.
- Major emerging economies are ranked Brazil, which is ranked at 40, China at 35, India at 46, the Russian Federation at 31, and South Africa at 56 in the second quarter of reports.
- India remains the greatest performer by ranking 67 positions better than expected.
  - ✓ With weak ICT infrastructure and research & development the LDCs, LLDCs, and SIDS rank lower than 100 for all the indicators

✓ Prioritizing Open Green Windows

➢ The report identifies a set of priorities for latecomer countries where with the collaboration between the private sector and other stakeholders they can build

India's Initiatives in Green Technologies:

- Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)
- Green Energy Corridor (GEC)
- National Smart Grid Mission (NSGM) and Smart Meter National Programme
- Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME)

digital competency along with the necessary infrastructure and institutions, strengthening innovation capacity and overcoming financial barriers.

➢ Governments need to assess at various stages where and how production and innovation should be strengthened by setting direction by aligning industrial and environmental policies.

- Government should Invest in green sectors by supporting priority sectors through vertical policy instruments such as clusters, smart specialization initiatives, pilot and demonstration projects and areas, and the associated finance complemented with foreign direct investment.
- For building strong consumer demand governments can offer the incentives and infrastructure that help shift consumer demand to encourage recycling and the circular economy.
- Government should invest in research and development by offering subsidies and setting up technology demonstration projects.
- Government should raise awareness and build the skill of green technology by involving private sectors and other stakeholders.
- Government should invest in digital infrastructure (high speed and high quality) and develop skills to use the technology, especially in urban and rural regions.

✓ Promoting International Collaboration for more sustainable production

- Collaboration on innovation not only transfers capital goods and equipment but helps in skill building and understanding.
- Trade rules should permit developing countries to protect infant green industries through tariffs, subsidies and public procurement.
- The international IPR system should be reformed or relaxed to enable governments in developing countries to manage their systems to support climate action.
- The Intergovernmental Panel on Climate Change (IPCC), the Paris Agreement of 2015 and the agreements for the Sustainable Development Goals are some of the projects for collaboration.
- The European Organization for Nuclear Research (CERN), the International Thermonuclear Experimental Reactor (ITER) and the Square Kilometre Array (SKAO) project are some successful examples of collective research.
- There should be proper technology assessments such as AI and gene editing in developing countries.

PEPPER IT WITH

Paris Agreement, TRIPS Agreement, Montreal Protocol, The Least Developed Countries Report, Digital Economy Report, World Investment Report

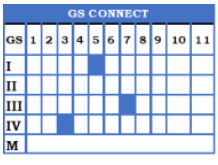
Conclusion

The report warns that economic inequalities risk growing as developed countries reap most of the benefits of green technologies such as artificial intelligence, the Internet of Things and electric vehicles. The report proposes a multilateral challenge fund "Innovations for our common future" as most developing countries lack the financial or management capacities to develop incentives for innovations and new ideas.

Thus, funding from international organizations, donors and international philanthropy could help with such challenges. The next step towards green innovation could be to incorporate North-South and South-South STI cooperation for North-South and South-South STI cooperation for green innovation.

Hormonal Contraceptives

News Excerpt



According to a study, all hormonal contraceptives carry a slightly increased risk of breast cancer, including the increasingly popular progestogen-only pills.

Pre-Connect

Birth Control Methods

- Contraception is a way to prevent pregnancy. There are many different types of contraception and some are more effective than others.
- Different contraception methods work in different ways, contraception generally prevents sperm and egg from meeting.

- Contraception helps in dual protection from the simultaneous risk of HIV and other STDs. Hormonal contraceptives and IUDs are highly effective at preventing pregnancy, they do not protect against STDs, including HIV.
- Contraceptives like condoms reduce the risk of HIV infection and other STDs, including chlamydial infection, gonococcal infection, and trichomoniasis.

Hormonal Contraceptives and their impact

➢ Hormonal Contraceptives influence women's hormone levels, and most of them prevent mature eggs from being released by the ovaries (ovulation).

➢ Most birth control pills contain a combination of the hormones estrogen and progestin, which is why they are also called "combined pills" or "combination pills."

➢ The birth control pill, the vaginal ring, the contraceptive skin patch and hormone-releasing contraceptive coils are some of the hormonal contraceptives.

➢ Hormonal contraceptives reliably prevent pregnancy, but they can have side effects such as headaches, spotting and many other serious issues.

➢ The birth control pill is the most commonly used form of this contraception while others are newer and less known hormone-based methods like skin patches, vaginal rings, hormone-based coils etc.

➢ They should be taken only on doctors' recommendations.

Hormonal Contraceptives and breast cancer

As per the study published in the journal PLOS Medicine:

✓ The risk of a woman developing breast cancer is the same for hormonal contraceptives using both estrogen and progestogen as for those using just progestogen.

✓ Regardless of the delivery method, the risk of developing breast cancer remains the same.

✓ Women taking hormonal contraceptives have a 20-30% higher risk of developing breast cancer.

✓ The risk of having breast cancer in women was higher between the age group of 35 -39 years than in others.

Impacts of Hormonal Contraceptives

Advantages

- **Reliability:** Hormonal contraceptives are reliable when used properly; studies show that only about 1 out of 1,000 women get pregnant per cycle if they take the pill or use a contraceptive skin patch or vaginal ring properly.
- **Relieve period pain:** They can also relieve period pain and often lead to lighter periods.

Disadvantages

- It includes side effects such as headaches, nausea, sore breasts and vaginal yeast infections (thrush).
- It can also cause spotting between periods or lead to mood swings and may reduce women's sexual desire.
- They don't protect against sexually transmitted diseases such as AIDS or hepatitis C.

Types of Contraception Methods

❖ **Reversible Methods**

○ **Intrauterine Contraception**

Levonorgestrel intrauterine system (LNG IUD),
Copper T intrauterine device (IUD)

○ **Hormonal Contraceptives**

Implant, injection or shot, combined oral contraceptives, progestin only pill, patch, hormonal vaginal contraceptive ring.

○ **Barrier Methods**

Diaphragm or cervical cap, sponge, male condom, female condom, spermicides

○ **Fertility Awareness-Based Methods**

○ **Lactational Amenorrhea Methods**

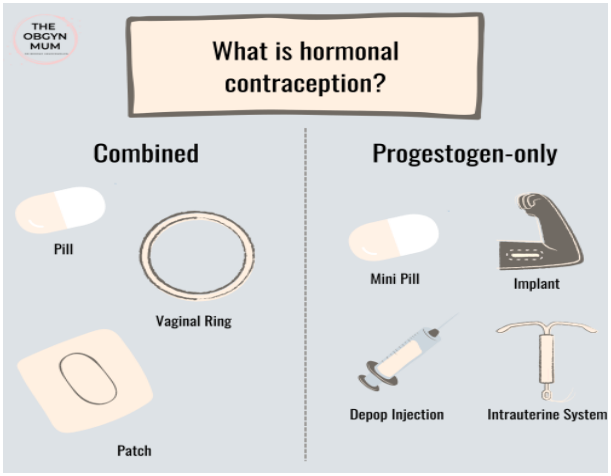
○ **Emergency Contraception**

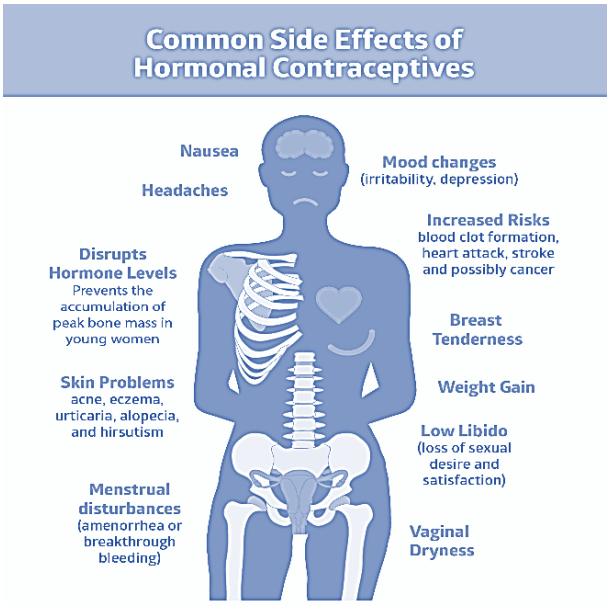
Copper IUD, Emergency contraceptive pills

❖ **Permanent Methods**

○ Female Sterilization—Tubal ligation or "tying tubes"

○ Male Sterilization–Vasectomy





- Women above 40, who smoke, overweight have higher chances of vascular disease.
- There is also a risk of blood clots forming which is called thrombosis.

Government Initiatives for Family Planning

- Mission Parivar Vikas
- National Family Planning Indemnity Scheme (NFPIS)
- New Family Planning Media Campaign
- Compensation scheme for sterilization acceptors under the scheme Ministry of Health and Family Welfare
- National Family Health Survey for population analysis.

Way Forward

- Creating awareness about different and safe methods of contraception other than hormonal contraceptive methods which had fewer side effects.
- As per the Ministry of Statistics and Programme Implementation's report **'Women and Men 2022'** female sterilization is considerably higher than male sterilization. Hence, this shows the increased burden of using contraceptives on women, any implementation requires proper study.
- As per NFHS data overall **Contraceptive Prevalence Rate (CPR)** has **increased substantially** in most States/UTs but still ensuring the right contraception methods is the need of the hour.
- Partnering with the private sector for better promotion and awareness of contraception methods, so that correct information is passed to a wide range of the population.
- Ensuring contraceptive financing of family planning by the government.

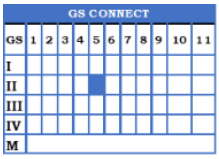
PEPPER IT WITH

InVitro Fertilization, Pradhan Mantri Surakshit Matritva Abhiyan, Pradhan Mantri Matru Vandhana Yojna

National Credit Framework (NCrF)

News Excerpt

The implementation of the National Credit Framework (NCrF) has been announced by University Grants Commission for all regulatory organisations and universities in India.



Pre-Connect

The purpose behind National Credit Framework

National Credit Framework was emphasized by the National Education Policy 2020 (NEP) for the integration of general academic education and vocational & skill education with the objective of:

- ✓ ensuring equivalence within and between two education streams.
- ✓ seamless horizontal and vertical mobility between the two streams for lifelong learning.
- ✓ providing different modes of learning including homeschooling, offline schooling, online schooling, or blended learning.
- ✓ providing multiple entry and exit options to a student who wants to leave school or enrol in vocational learning.
- ○ Validating different types of learners by giving them diplomas and certificates.

Notional hours refer to the time that the average student would need to attend all classes, study for tests and do assignments and homework.

About National Credit Framework (NCrF)

- NCrF has been jointly developed by UGC, AICTE, NCVET, NIOS, CBSE, NCERT, Ministry of Education, DGT, and Ministry of Skill Development to achieve this vision and intent of NEP
- The framework defines the academic year by the number of hours a student puts in and accordingly provides the credits at the end of the academic year.
- It is a meta-framework with three verticals:

National School Education Qualification Framework (NSEQF)

National Higher Education Qualification Framework (NHEQF)

National Skills Qualification Framework (NSQF).

- > The framework has put 1200 hours as the total **'Notional Learning hours in a year.**
- > A minimum credit of 40 can be earned for 1200 hours of learning every year with 20 credits per semester of six months.
- > Students will earn a total of 160 credits during their entire schooling, by the last year of graduation course the student will have 120 credits and if he completes a PhD, the earned credits would be 320.
- > Credits will be given for participating in Olympiads, science quizzes, internships, and taking up jobs while they are studying in college.
- > Along with credits, there are credit levels, the framework proposes several **levels from 1 to 8**.

- Students' registration will be based on Aadhar and then an Academic Bank of Credit (ABC) account will be opened (specific for higher education) for the deposit of degrees and credits to enable the transfer of credits across higher educational institutes.
- A knowledge locker will be introduced along the lines of DigiLocker for the deposit of degrees and credentials.

Significance of NCrF

- ➢ It will ensure flexibility in the duration of courses for students through **provisions of multiple entries and exit work options as well as pave the path for creditisation of all learning hours**, including academic, vocational and experiential learning.
- ➢ It will remove the distinction between different streams such as arts, science, social sciences, and commerce and will allow **experimental learning.**
- ➢ It will remove the hard distinction between the education stream and making study choices respectful, allowing for more than one award in the same period
- ➢ It will create a diverse and rich **student knowledge base by unifying higher education and** promoting multidisciplinary education.
- ➢ It will also help in making credit mechanism simpler and uniform, increasing focus on research and innovation, promoting digital learning, blended learning, and open distance learning and leveraging the institutional infrastructure
- ➢ It will increase the scope for the **creditisation of national and international achievers**.
- ✓ It will assist the government to increase the enrolment of students, helping to fulfil the national vision of complementing **the demographic dividend and transforming India into the Skill Capital of the World** by making vocational education and skilling aspirational.
- ➢ It will help in educating and training a workforce for Aatmnirbhar Bharat
- ➢ It will allow students to attain **NSQF-approved foundational skills** developed by industry and be more employable.
- ➢ The provision of micro-credentials will allow the integration of quick educational upgradation.
- ➢ It will also help in re-skilling and **up-skilling existing engineers** by creating a cross-sectoral skilled pool of employable youth.

Credit Level (Level 1 to 8)

- ❖ The level can be attained after completion of school education will be from level 1 to level 4, i.e., grade 5th will be level 1, grade 8th will be level 2, grade 10th will be level 3, and grade 12th will be level 4.
- ❖ After higher education from levels will be from level 4.5 to level 8.
- ❖ Levels are 1 to level 8 for vocational education and training.

Challenges

- **Standardisation and systematising different verticals**: The framework have different verticals such as NSEQF, NHEQF, and NSQF. Ensuring standardisation and systematising different approaches across these verticals will be a challenge given the institutions' diversity, expanse and approach.
- **Ensuring data privacy and corruption:** The framework uses digital registration using Aadhar and an academic bank of credit (ABC) which might face privacy risks.
- Thus, the security and confidentiality of the data will be a challenging task.
- Some Institutions familiar with credit-based approaches (such as NIOS or higher education institutions adopting Choice Based Credit System (CBCS)will have an advantage over their counterparts while others will have to struggle.
- **Inclusion of disadvantaged learners:** NCrF misses the aspect of inclusion of all learners, especially those from socio-economically weaker backgrounds who have historically been known to drop out of education (such as Out-of-School Children (OOSC), orphan children, children in conflict with the law etc.) while NEP 2020 stresses providing an optimum learning environment and support to all learners.
- Similarly, the framework fails to account for special education and its incorporation within the **credit mechanism to diving** or people with disabilities.

- **Excessive Competition:** The framework inadvertently promotes put extensive pressure on some groups of students, requiring careful consideration before implementation.
  - Guidelines on the importance of credits given through curricular and co-curricular activities are still not clear.

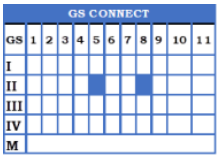
PEPPER IT WITH

Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan, National Merit-cum-Means Scholarship Scheme

Conclusion

NCrF is a well-intentioned framework to provide seamless horizontal and vertical mobility between different education streams in India but at the same time, there are lots of challenges encircling which will require a collaborative effort from various stakeholders to ensure that the framework is up-to-date, relevant, and effective in addressing the changing needs of the education system in India.

World Happiness Report



News Excerpt

Recently, the World Happiness Report 2023 was released by the UN Sustainable Development Solutions Network.

Pre-Connect

About the World Happiness Report

✓ The report is released annually as part of the International Day of Happiness celebration since 2012.

- Usually report ranks global happiness in over 150 countries, this year report ranked 136 countries.

✓ The study also compares numerous (quality of life) criteria.

▪ The two main principles of the report are:

- Identifying key elements that determine well-being and life evaluation across countries.
- Happiness or life evaluation measured through opinion surveys.

➢ The variable is given a populated weighted average score on a scale from 0 to 10 and is measured annually which is then measured over time in comparison with other nation.

✓ Bhutan uses gross national happiness as its primary development indicator.

- An international sample survey was used to compile the rankings of national happiness.

Sustainable Development Solutions Network (SDSN)

❖ The UN SDSN was launched under the auspices of the UN Secretary-General IN 2012.

❖ SDSN promotes integrated approaches through education, research, policy analysis, and global cooperation to implement the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change.

Key Findings

Variables for Ranking of Happiness

❖ Real social support
❖ GDP per capita
❖ Freedom of choice in one's life
❖ Healthy life expectancy
❖ Perceptions of corruption
❖ Generosity.

➢ COVID-19 and other key problems had considerable impact on the review of 2023 World Happiness Report.

➢ Three countries from the Scandinavian region topped initial three spots in the report.

➢ Finland has again topped the happiness index sixth time in a row followed by Denmark, Iceland, Israel, and the Netherlands.

➢ United States secured, Britain and France secured 15th,19th and 21st position in the index.

➢ According to the report, India ranks at 125th position out of 136 countries, making it one of the least happy countries in the world. It even lags behind its neighbouring nations like Nepal, China, Bangladesh and Sri Lanka. At the very bottom of list is Afghanistan.

➢ High levels of corruption and short life expectancy were highlighted in maximum nations.

➢ Despite of Russia Ukraine war, Russia ranked 70th and Ukraine ranked 92nd better than many countries. As per report between 2020 and 2021, compassion increased in both nations while compassion increased significantly in Ukraine but decreased in Russia in 2022.

India's Position

✓ India ranked 125th in Sustainable Development Solutions Network's World Happiness Report 2023, position has increased from 2021 (139) and 2022(136).

✓ Report analyses that people's assessments of their quality of life declined by more than one full point on a scale of 0 to 10 over the previous ten years in India.

✓ Though the ranking has increased it is still lower than its neighbours Bangladesh, Nepal, and China.

✓ India has been placed lower than nations that are experiencing crises.

Factors responsible for India's Unsatisfactory position

❖ Rapid urbanization
❖ Congestion in cities
❖ Food security and water safety
❖ Rising costs of health care
❖ Women's safety
❖ Environmental pollution
❖ Poor mental wellbeing

Significance Of the Happiness Report

▪ It signifies despite high income; countries have poor perception about governance and law order and the countries with higher GDP and higher per capita income are not necessarily the happiest countries.

▪ It signifies that countries usually have low score of subjective well-being and poor mental health.

▪ Happiness is a crucial indicator to monitor for both nations and corporations.

▪ Report's objective is to find the main factors influencing well-being.

▪ The report is important in a way that it assist nations in formulating strategies targeted at creating happier societies.

- It signifies the importance of public policy to aim at making happiness as a criterion.
- It can help in improving the relationships between law and government.

PEPPER IT WITH

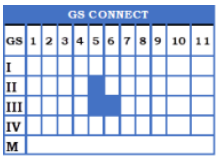
Sustainable Development Goals, Happiness Alliance, UNGA Resolution 66/281, Happiness Agenda for Next 10 years.

Conclusion

Happiness Index Report is necessary as the pursuit of happiness is taking us nowhere. The report shows how the new science of happiness explains personal and national variations in happiness. In case of India, despite of improved ranked it has very low position, and several of our small neighbours are placed higher. Though it is questionable to some but it shows putting happiness as a criteria for government policy and prioritising overall happiness of people as government's agenda.

Smart Cities

News Excerpt



In the report presented to the Lok Sabha, the Standing Committee on Housing and Urban Affairs has highlighted the "slow progress of the Smart Cities mission".

Pre-Connect

About Smart Cities Mission

- It is an initiative of the Union Housing and Urban Affairs Ministry launched in 2015.
- Ministry selected 100 cities for the Mission over five rounds after cities submit their proposals for projects to improve municipal services and to make their jurisdictions more liveable.
- The Ministry changed the deadline for all cities to June 2023, which was earlier the deadline for Shillong alone.
- The objective of the smart city initiative is to promote sustainable and inclusive cities for better quality of life and focus on smart solutions such as data-driven traffic management, intelligent lighting systems, etc.
- The mission is a centrally sponsored scheme but it also requires other bodies especially state government and urban local bodies to contribute financially.
- States are expected to seek funds for projects outlined in the Smart City Proposal from multiple sources including the ULB resources, utilising innovative finance mechanisms, Pooled Finance Development Fund Scheme and Tax Increment Financing (TIF).
- The core infrastructure elements in a Smart City:
  - Adequate water supply
  - Assured electricity supply
  - Sanitation including solid waste management
  - Efficient urban mobility and public transport
  - Affordable housing, especially for the poor
  - Robust IT connectivity and digitalization

Criteria for Smart City

- ❖ The city should be resource neutral or resource positive. It should give back more than it takes from the nature within its ability to replace or regenerate.
- ❖ It should prioritise public spaces over private spaces.
- ❖ People's representation through urban local bodies is key to determine the smartness quotient of the city from urban planning to deciding fees, levies and taxes for services.

- Good governance, especially e-governance and citizen participation
- Sustainable environment
- Safety and security of citizens, particularly women, children and the elderly
- Health and education

- The mission covers 100 cities, gives equal weightage (50:50) to urban population of the State/UT and the number of statutory towns. This criterion decides the formation of smart cities.
- Smart cities will be administered by An Apex Committee, headed by the Secretary of the Ministry of Urban Development at National level, a High Powered Steering Committee (HPSC) to be headed by the Chief Secretary of the State at state level, a Smart City Advisory Forum in all Smart Cities, comprising the District Collector, Chief Executive Officer of Special Purpose Vehicle (an SPV at the city level.

Current Status of the Mission

As per the report based on the demand for grants of the Ministry of Housing and Urban Affairs:

- 100 cities have issued work orders for 7,799 projects worth Rs 1.80 lakh crore.
- 20 cities are about to meet the deadline in June and rest will take time.
- Cities selected in January and June 2018 have achieved 44% of their targets, while those selected in 2016 in the second round are not much farther ahead with 46% completion.
- 32 cities already completed more than the number of projects planned for implementation
- 68 cities are yet to meet the targets wherein the performances of some are quite poor
- Out of the total Rs. 48000 crores for the mission, Rs. 36,561 crores have been released and out of this 90% of the fund has been utilized by the cities.
- Karnataka is at the top with a total of 821 project tenders issued, while Manipur is at last with only seven tenders.
- Delhi and Nagaland have completed over 70% of their projects, while another seven states while Rajasthan, Gujarat, Karnataka, Madhya Pradesh, Goa, Tripura, and Andhra Pradesh (50-60).
- The mission has covered over 140 public-private partnerships, 340 'smart roads', 78 'vibrant public places', 118 'smart water' projects and over 63 solar projects.

Municipal Performance Index (MPI)

It is a first of its kind initiative launched in 2019 by the Ministry which seeks to examine the sectoral performance of Municipalities across a set of 5 verticals namely Service, Finance, Planning, Technology and Governance. These 5 verticals have been further divided into 20 sectors which will be evaluated across 100 indicators. These indices will help build a mature data ecosystem with a common baseline data that can be leveraged by States and cities as an instrument for urban planning and management. It will facilitate a competitive environment among cities and enhance avenues of investment.

Ease of Living Index (EOL)

EOL was introduced in 2019 with the aim to assess the ease of living of citizens across three pillars: Quality of Life, Economic Growth and Sustainability which are further divided into 14 categories across 50 indicators. The Ease of Living indicators are strongly linked to Sustainable Development Goals (SDGs) and this exercise will help our Country to track and achieve SDGs.

Challenges

- ✓ **Large Scale Infrastructure development** is in itself a challenge looking at the legal set-up, inconsistency in policies and regulatory norms actual execution of projects. Most cities are still struggling at a primary planning stage, and financial closure to projects is still a long way off.
- ✓ Area based development approach is difficult to execute especially for sewage system and web of roads as will cover just about three per cent of the urban areas associated with these smart cities.
- ✓ There are chances that it will create islands of development rather than an inclusive all-round development of the city.
- ✓ Inadequate function of urban local bodies restricts the working culture.

- ✓ 20 priority areas have been identified weak for the interventions for India's Smart Cities Mission
- ✓ **Technological Constraints:** Limited technical capacity to make city smart can hinder the cost-effective and timely implementation of the smart steps.
- ✓ **Maintaining Finance**: Most ULBs are not financially self-sustainable.
- ✓ Getting right Finance and the maintenance of the technological developments is a big challenge.
- ✓ **Urbanizing the public transport**: Due to lack of investment, high population density, zoning, and poor urban planning have made urbanization of public transport challenging.

Government initiatives to support Smart City Mission

- ❖ Atal Mission for Rejuvenation and Urban Transformation
- ❖ National Urban Digital Mission
- ❖ National Urban Learning Platform
- ❖ Ease of Living Index
- ❖ India Smart Cities Awards Contest
- ❖ The Urban Learning Internship Programme

Way Forward

- India should develop transport, waste management data for improving urban governance taking example from better nations.
- Systematic collection of data is a rational solution only smart cities cannot be a solution to urban crisis happening in India.
- Environmental concerns like excessive cutting of trees for widening roads and highways should be taken seriously.
- Government funding is not enough for building of these cities more private sector's involvement is required.
- Government should facilitate smoother land acquisition with appropriate rehabilitation and resettlement.
- Citizen should participate more from policy inputs, implementation and execution in the mission.
- Strong leadership from three tiers of government is another way for effective implementation of Smart cities development.
- Local governance should be strengthened with urbanization gaining prominence in the global policy discourse.

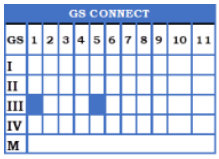
PEPPER IT WITH

Climate Smart Cities Alliance, India Urban Data Exchange, National Urban Observatory, National Urban Innovation Stack.

ECONOMY

Structural Transformation in the Indian Economy

News Excerpt



Data from the National Sample Survey Organizations' (NSSO) Periodic Labour Force Survey (PLFS) for 2021-22 (July-June) and National Statistical Office's (NSO) National Income Data paints a grim picture of structural transformation in the Indian Economy.

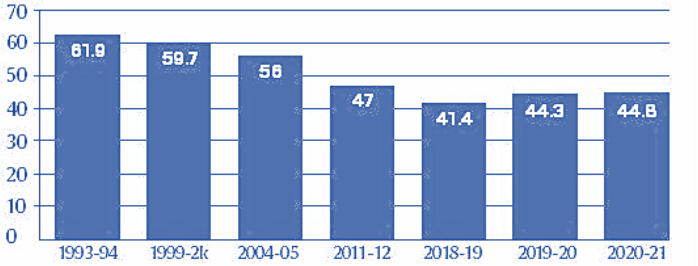
Pre-Connect

Understanding Structural Transformation

- Structural change or transformation refers to changes in the relative importance of the main sectors of an economy (agriculture, industry, services, and so on) in the course of economic growth.
- It is the reallocation of economic activity across the broad sectors of agriculture, manufacturing, and services that accompanies the process of modern economic growth. As countries develop, they undergo a structural transformation.
- It is a compositional shift that entails the transfer of surplus labour from agriculture to sectors where productivity (output per worker) and average incomes are higher.
- Structural changes in the economy can be viewed in veneration of different outcomes viz. changes in the structure of output and occupational diversification.
- The driving force behind the structural transformation is the change in productivity in the modern sector, which is dominated by manufacturing and services.
- It is also characterized by the movement of the workforce from labour-intensive activities to skill-intensive ones.

Understanding GVA

- Gross Value Added (GVA) is defined as the value of output minus the value of intermediate consumption and is a measure of the contribution to GDP made by an individual producer, industry or sector.
- At its simplest it gives the rupee value of goods and services produced in the economy after deducting the cost of inputs and raw materials used.
- GVA can be described as the main entry on the income side of the nation's accounting balance sheet, and from an economics perspective represents the supply side.



SECTORAL EMPLOYMENT SHARES (IN PER CENT)

	2011-12	2018-19	2019-20	2020-21
Agriculture	47.0	41.4	44.3	44.8
Manufacturing	12.5	12.1	11.3	11.0
Mining	0.6	0.4	0.3	0.3
Construction	10.7	12.2	11.7	12.4
Services	28.6	33.2	31.8	30.9
Utilities	0.6	0.6	0.6	0.6
Total	100.00	100.00	100.00	100.00
Organised sector	24.1	23.3	22.9	23.2

Need for Structural Transformation

There are several reasons which make structural transformation crucial these include:

- It results in higher productivity growth along with a rise in per capita income.
- It helps in achieving greater diversity of the economic structure, which creates a country's resilience to vulnerability to poverty and external shocks.
- It helps in generating new jobs, income and demand in a rapidly urbanizing world.
- It results in well-functioning labour and capital markets.
- It aids in achieving and sustaining a higher standard of living.
- It creates an economy in which there is an efficient allocation of resources and carries a lower transaction cost to connect and integrate economic activities.
- It also helps in ushering social changes as shifts in production structure led to changes in incentive structures, educational requirements and the relative positions of different groups in the society

Issues with Structural Transformation in India

- Since 2011-12, the share of agriculture in employment not falling fast enough and rising after 2018-19. India's farm sector should be employing 33-34% of the total workforce. However, it still hovers around 45.5%- a significant deviation. This has primarily to do with the Covid-induced economic disruptions.

- The share of manufacturing is falling behind the construction. There is not much labour transfer taking place from farms to factories. This shows that the labour movement outside agriculture is more towards low-skill construction jobs than semi-skill to high-skill manufacturing jobs.
- GVA from agriculture is higher than that generated from manufacturing despite having low gross value output than the manufacturing sector.

✓ The bulk of jobs in the services sector is in informal economic activities. This is reflected in the low share of employment in organized enterprises. Thus, labour transfer is happening within the low-productivity informal economy.

✓ While India's manufacturing and services sectors both operate in similar economic and regulatory environments the productivity of India's services sector relative to its manufacturing sector is an outlier. Its services sector is four times more productive than its manufacturing sector, whereas in most other countries the services sector is at most twice as productive.

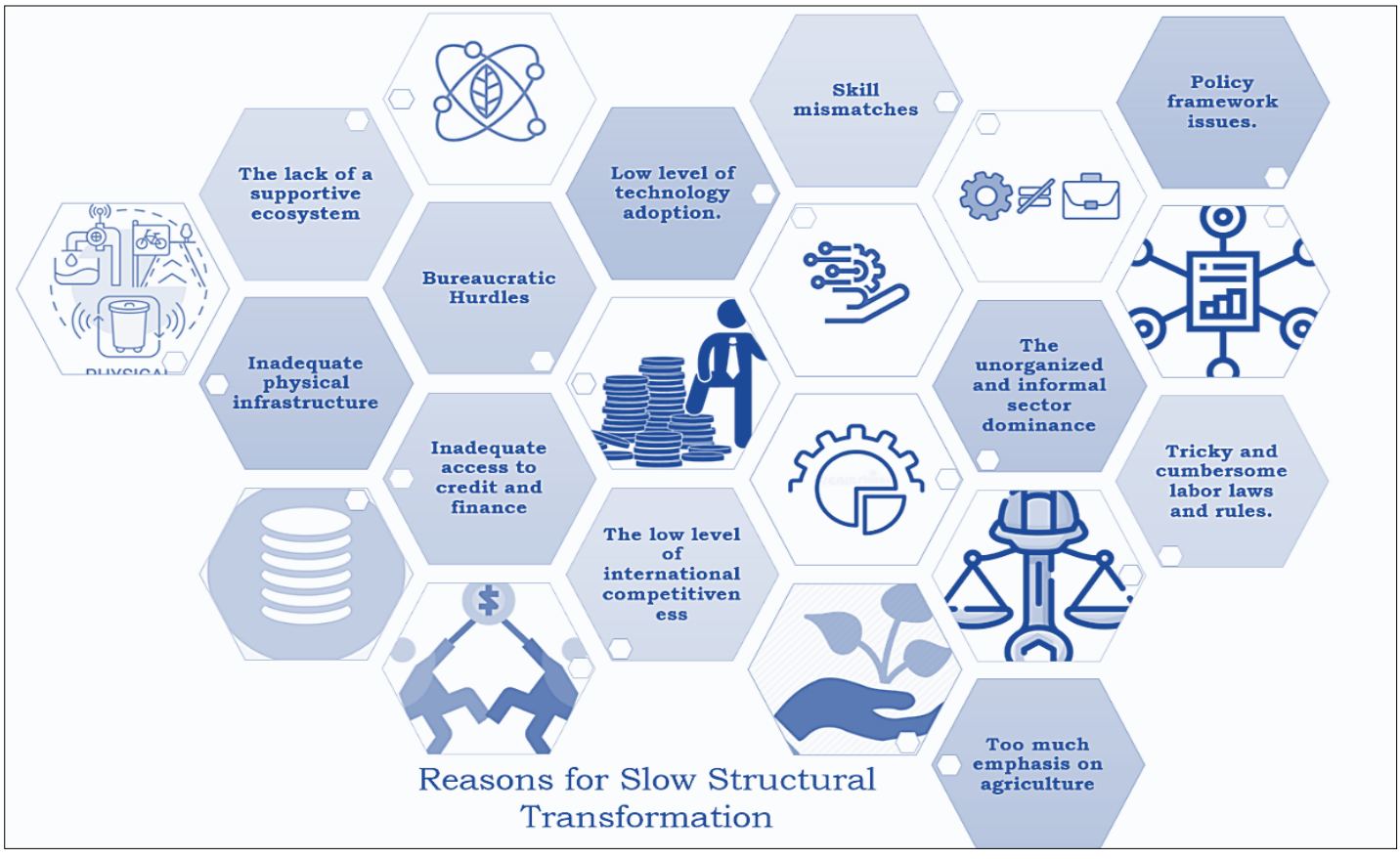
Impact of Stunted Structural Transformation

- Reduction in poverty along with sustained growth remains a problem in India.
- A rise in the rural-urban divide
- A decline in both output and productivity
- Rise in informal employment

Structural Issues with Indian Economy

Structural issues include long-term obstacles to a country's economic growth prospects. Indian economy faces several structural issues such as:

- ❖ Increasing capital intensity in a labour-abundant country like India is aggravating the problem of unemployment.
- ❖ India has one of the world's lowest labour force participation ratios (the proportion of a country's population either working or looking for jobs).
- ❖ High unemployment rates (especially among youths) impose a cap on India's potential growth rate.
- ❖ The incremental capital output ratio – which means India will need increasingly more capital to maintain the same level of GDP growth.
- ❖ Increasing income inequality
- ❖ Risks related to archaic regulatory as well as non-regulatory regulations that lower the potential return on investment.
- ❖ A combination of higher effective taxation and poor civic amenities is an important factor driving the rich and wealthy out of India to low tax destinations.



Addressing the Issue

- ✓ The focus must be on accelerating Infrastructural development.
- ✓ Support skill development and entrepreneurial spirit which will help in creating new job opportunities and spur innovation.
- ✓ Access to affordable credit must be easy to help small and medium enterprises grow and expand their operations.
- ✓ Investment in R&D must be increased to ensure that manufacturing becomes more innovative and globally competitive.
- A boost must be given to exports which will help manufacturers tap into global markets.
- Large-scale development and investment in agro-processing can help create linkages between agriculture and manufacturing, and thereby create more value and employment opportunities.
- Ease of doing business must be the motto of the government which should help in reducing the regulatory burden and increase efficiency.
- There is also a need to focus on regional development which would ensure equitable distribution of growth, address the issue of migration and aid in creating manufacturing clusters.

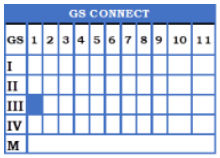
The Missing Middle

India's manufacturing sector has been characterised by the missing middle: a concentration of small/micro firms at one end of the spectrum, and some large firms in each sector at the other. There are several reasons responsible for the same:

- ❖ Fragmented of polices as several ministries are involved in creation of manufacturing clusters and industrial planning.
- ❖ Biased nature of the MSME Ministry's incentives, financial and non-financial policies
- ❖ Limited access to access to institutional sources of credit.
- ❖ Skill unavailability
- ❖ Poor infrastructure

Pricing Mechanism for Gas

News Excerpt

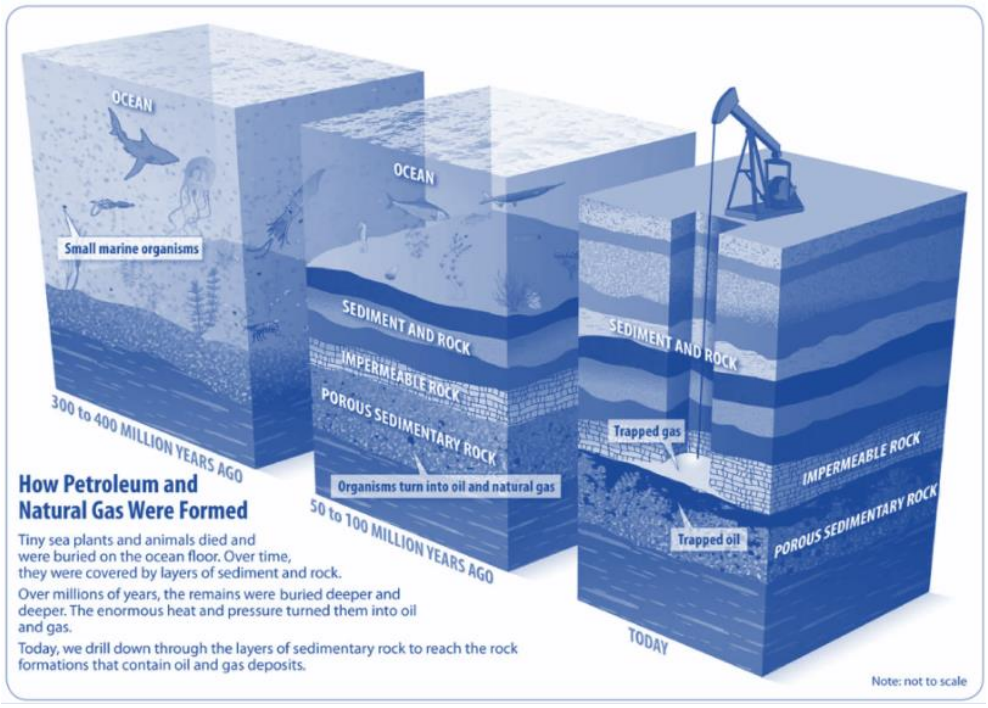


Recently, The Union Cabinet has approved significant changes in the pricing regime for domestic natural gas under the ambit of the administered price mechanism. This will result in a reduction price of PNG (Piped Natural Gas) and Compressed Natural Gas (CNG) for households.

Pre-Connect

Gas Supply and Demand in India

- Gas consumption in India is projected to reach 143.08 BCM by 2040. According to the International Energy Agency (IEA), Industrial consumers are expected to account for 40% of India's net demand growth.
- India's natural gas imports increased at a CAGR of 6.89% between FY16 and FY22.
- According to the IEA, consumption of natural gas in India is expected to grow by 25 BCM, registering an average annual growth of 9% until 2024.
- Major reserves of Natural Gas in India are the Gulf of Kutch, Gulf of Khambhat, Bassein field, Bombay High, Barmer in Rajasthan, KG basin, Cuddalore district of Tamil Nadu, Odisha, Assam, Tripura, etc. Among these Economically viable basins are:



- 541 BCM- Assam and Gujarat (on-shore)
- 190 BCM each- Bay of Cambay and Bombay High (off-shore)
- 400 BCM- Tripura Basin
- 72 BCM- Rava Structure
- Other than these 1700 BCM is found in Andaman and Nicobar Island however its viability is yet to be established.

Basic Forms of Natural Gas	
	Liquefied Natural Gas (LNG) - Natural Gas which has been liquefied at – (Minus) 160 degree Centigrade. Natural Gas is liquefied to facilitate transportation in large volumes in cryogenic tankers across seas / land.
	Regasified Liquefied Natural Gas (RLNG) – LNG Re-gasified at import terminals before transporting it to consumers through Pipelines.
	Compressed Natural gas (CNG) - Natural Gas compressed to a pressure of 200-250 kg/cm2 used as fuel for transportation. CNG decreases vehicular pollution on the virtue of being cleaner fuel than liquid fuels.
	Piped Natural gas (PNG) - Natural Gas distributed through a pipeline network that has safety valves to maintain the pressure, assuring safe, uninterrupted supply to the domestic sector for cooking and heating / cooling applications.

Pricing Mechanism of Natural Gas

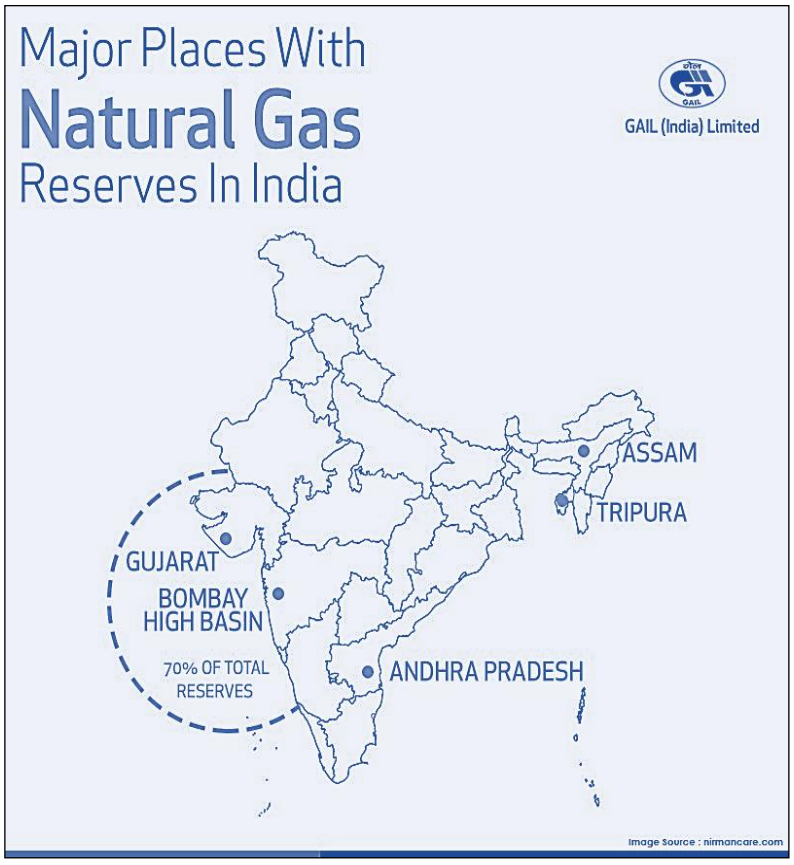
Existing Mechanism

➢ The majority of natural gas produced in India doesn't command a market-determined price.

➢ To set the price the government uses a formula in which the weighted average price of four global benchmarks —
- Henry Hub (USA)
- Alberta Gas (Canada)
- NBP (UK)
- Russian Gas

➢ The price of these benchmarks in the prior year is used and is applied for six months. For instance, the price applicable from April 1 to September 30, 2022, is based on benchmark prices from January to December 2021.

➢ This formula had created several issues such as:
- Despite real-time price rises, domestic users pay less price as result producers get disincentivized and thereby decrease their output
- This creates an unending cycle in which government imports gas at higher prices and end users are forced to buy imported gas at higher prices.



New Pricing Mechanism

✓ It is based on the recommendations of the Kirit Parikh Panel.

✓ The panel made the following recommendations:
- For Legacy fields- It will be indexed to the crude oil price. It will be 10 per cent of the monthly average of Indian Crude Basket and shall be notified monthly.
- For Nomination fields (acreages that the government awarded to ONGC and OIL before 1999 i.e., before the auction process was introduced)- These will be subjected to Administered Price Mechanism (government sets the price of natural gas produced by oil and gas companies) and will be subjected to a floor and a ceiling.
- Both New Wells (drilled in areas where oil and gas reserves are known or suspected to exist but have not yet been developed) and Well Interventions (Involve various techniques that are used to increase the productivity of existing wells) in the nomination fields of ONGC and OIL would be allowed a premium of 20 per cent over the APM price.

✓ There shall be no revision in the ceiling price for two years, after which the cap will increase by 25 cents per year.

India's Move Towards a Gas Based Economy

Natural gas is an essential energy source in many parts of the world because it emits almost 50% less carbon dioxide than other forms like coal or diesel when burned for power generation or vehicles, respectively. Thus, making it more environmentally friendly than conventional sources such as diesel or coal-fired thermal plants used across sectors. The Government of India has also taken several steps to boost India's gas-based economy these include:

- ❖ The revenue sharing model adopted by the government has helped monetize marginal fields of National Oil Companies (NoCs) under Discovered Small Fields (DSF) Policy, with policy for grant of extensions to medium fields.
- ❖ The policies for uniform licensing in hydrocarbon exploration and marketing freedom for gas produced from deep water are significant steps towards a sustainable future.
- ❖ Significant progress has been made in operationalizing stranded R-LNG power plants and developing gas-consuming markets for a cheap supply of raw materials such as fertilizers to the farmers.
- ❖ In a rare scenario, the government has also decided to give a capital grant as VGF to GAIL for pipeline infrastructure development. This will help connect the eastern parts of India with the National Gas Grid.

Several more reforms are needed to

- ❖ Implement Taxation reform in the sector as cascading taxation disincentivises consumption and must be brought under GST.
- ❖ There is a need to increase the utilisation of current assets. As low utilization increases cost to customers, erodes profitability and creates non-performing assets. The centre, state, and private sector must collaborate to increase utilization of gas-based plants.
- ❖ New build infrastructure ought to use the best technology for preventing gas leakage.

- ✓ APM-based changes do not apply to gas production from difficult acreages such as deep water, ultra-deep water, high-temperature, and high-pressure fields.

Significance of the Move

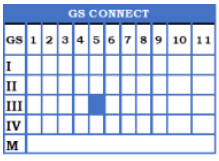
- Linking with the crude oil prices makes natural gas more relevant to India's consumption basket, and has deeper liquidity in global trading markets on a real-time basis.
- It will remove the time lag factor and now data of the Indian crude basket price from the previous month would form the basis for APM gas price determination.
- It will balance the demands of both consumers as well as producers and therefore from now on producers won't suffer a loss for a prolonged period as it brings balance by adding a ceiling and floor price mechanism.
- It will lead to a significant decrease in prices of Piped Natural Gas (PNG) for households and Compressed Natural Gas (CNG) for transport.
- The move shall also lower the fertilizer subsidy burden and help the domestic power sector.

PEPPER IT WITH

One Nation One Gas Grid, Compressed Bio Gas New Exploration and Licensing Policy (NELP) Petroleum and Natural Gas Regulatory Board

Sugar Industries in India

News Excerpt



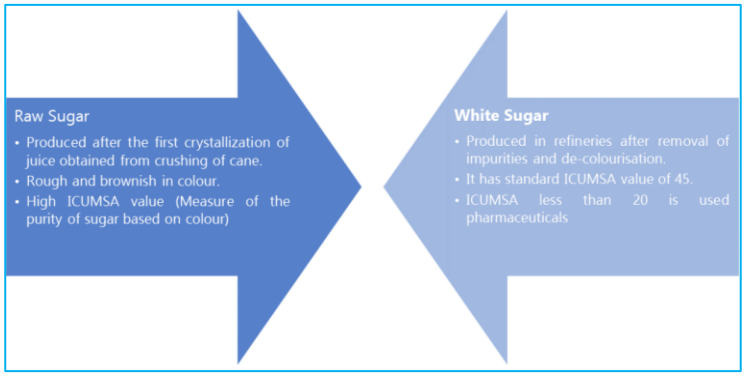
Recent estimates suggest that sugar exports from India now stood second only to Brazil. Between 2017-18 and 2021-22, exports have soared from USD 810.9 million to USD 4.6 billion. It is estimated that sugar exports may cross USD5.5 billion in the current fiscal year.

Pre-Connect

Sugarcane

- It is a tropical area crop mainly cultivated in sub-humid and humid climates. It is largely an irrigated crop in India. It requires
  - Temperature: Between 21-27°C with a hot and humid climate.
  - Rainfall: Around 75-100 cm.
  - Soil Type: Deep rich loamy soil.
- Major cultivation is largely concentrated in Uttar Pradesh. In western India, it is spread over Maharashtra and Gujarat. Also, in the irrigated tracts of Karnataka, Tamil Nadu, Telangana and Andhra Pradesh.
- Sugarcane yield is low in northern India whereas in southern India yield is high. This was due to the fact that the tropical climate of South India provides for a higher sucrose content.

Sugar Industry and Export from India



- In India around 5 lakh people are directly employed in sugar mills and there are near about 50 million sugarcane farmers in India.
- India is the 2nd largest producer of sugar after Brazil with about 15% of the share in global sugar production.
- Indian sugar exports have ballooned from mere 6.2 lakh tonnes in 2017-18 to 110 lakh tonnes in 2021-22. Out of this export, 56.29 lt is raw sugar while white sugar accounted for 53.71 lt.
- The biggest importers of Indian sugars are:
  - Raw Sugar- Indonesia- Bangladesh-Saudi Arabia-Iraq-Malaysia
  - White Sugar- Afghanistan-Somalia-Djibouti-Sri Lanka-China- Sudan.
- Indian Raw Sugar has seen not only a significant rise in its exports but also it is fetching a 4% premium over the global benchmark price. this is attributed to several factors such as:
  - Ease of transport and distribution as it can be transported in large vessels with no bagging or containerization.
  - It is dextran (a bacterial compound formed when the cane is exposed to the sun for too long after harvesting) free.
  - It carries very high polarization i.e., it has very high sucrose content and thus it is easy to refine.
  - It acts as an alternative to refineries during the off-season in Brazil.

CHART 1

INDIA'S SUGAR EXPORTS IN VALUE

*April to January

CHART 2

INDIA'S SUGAR EXPORTS IN LAKH TONNES

Sugar Year	Raw Sugar	White Sugar***	Total
2016-17	0	0.46	0.46
2017-18	0.47	5.73	6.2
2018-19	13.13	24.87	38
2019-20	17.84	41.56	59.4
2020-21	28.16	43.74	71.9
2021-22	56.29	53.71	110
2022-23**	19.13	30.91	50.04

Note: Sugar Year is from Oct-Sept

**As on March 15; ***Includes refined sugar

Challenges Faced by Sugar Industry

- ✓ Crop Competition: Sugarcane compete with other food and cash crop such as rice, cotton etc. This impacts the availability of sugarcane to mills and creates volatility in the market.
- ✓ Low-Output- India's output per hectare is exceedingly low in comparison with leading sugarcane-producing countries. Similarly, the average rate of sugarcane sugar recovery is less than ten per cent which is again quite low.
- ✓ Cane reservation area and bonding issue- Both farmers and Sugar mill owners are bonded with each other through the Cane reservation policy under which a mill owner had to purchase from cane farmers within the cane reservation area, and conversely, farmers are bound to sell to the mill. This disrupts farmers' bargaining power and restricts the options for the mill owners.
- ✓ Minimum distance criteria- The government has mandated a minimum radial distance of 15 km between any two sugar mills but this often distorts the market by giving mills power over farmers, restricting competition, inhibiting entry, and further investment by entrepreneurs.

Rangarajan Committee

Established in 2012 to provide suggestions on sugar sector regulation. It has recommended several suggestions:

- ❖ Abolish quantitative limitations on sugar export and import and replace them with suitable tariffs. So, there are no more outright prohibitions on sugar exports.
- ❖ Minimum radial distance concept should be re-examined.
- ❖ The selling of by-products should be unrestricted, and pricing should be established by the market.
- ❖ States should also alter their policies to allow mills to use bagasse-generated energy.
- ❖ Remove the restrictions on the distribution of non-levy sugar.

- ✓ Problems with production- The majority of sugar mills are unable to benefit from economies of scale. Further, India has a high production cost of sugar compared to international levels.
- ✓ Seasonal Nature: It is a seasonal industry which lasts about 4-5 months every year. It results in financial losses for workers, as well as a lack of full utilisation of sugar mills.
- ✓ Faulty policies: To control the demand-supply quagmire of sugar the government introduced various interventions like export duties, stock limits on sugar mills, and changes in meteorological rules, among others. However, these have created more problems for the industry than solutions.

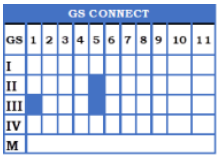
Way Forward

There are several reforms sector needs to further improve its export capability and efficiency, these include:

- The government should develop better policies which can lead to structural improvements and boost exports.
- Sugar mills need both financial injection and modernization which can increase production efficiency.
- More R&D in sugarcane can help resolve low-yield issues and also develop climate-resilient and less water-consuming crops.
- Ethanol blending must be promoted to absorb excess production of Sugar and reduce oil import. Further alcohol production can also be allowed the mills to improve their financial status.

Blue Economy

News Excerpt



India has a vast and diverse maritime territory whose potential is yet to be realized. India is keen to develop its blue economy, however, it faces challenges on many fronts. India can learn several lessons from China when it comes to the development of the Blue Economy.

Pre-Connect

Understanding Blue Economy

- Blue Economy entails sustainable use of marine resources for exploration, economic growth, improved livelihoods, and transport while preserving the health of marine and coastal ecosystems.
- The concept was introduced by Gunter Pauli in his 2010 book- "The Blue Economy: 10 Years, 100 Innovations, 100 million jobs".
- It emphasizes on integration of the development of the ocean economy with social inclusion, and environmental sustainability, combined with innovative business models.
- Oceans play a critical role in the global economy as 80% of world trade happens using the seas, 40% of the world's population lives near coastal areas, and more than 3 billion people access the oceans for their livelihood.

Blue Economy Related Initiatives of India

India-Norway Task Force on Blue Economy for Sustainable Development: It was inaugurated jointly by both the countries in 2020 to develop and follow up joint initiatives between the two countries.

Sagarmala Project: It is the strategic initiative for port-led development through the extensive use of IT enabled services for modernization of ports. It aims at developing Inland waterways and coastal shipping which will revolutionize maritime logistics.

O-SMART: It is an umbrella scheme which aims at regulated use of oceans, marine resources for sustainable development.

Integrated Coastal Zone Management: It focuses on conservation of coastal and marine resources, and improving livelihood opportunities for coastal communities etc.

National Fisheries Policy: It is the policy for promoting 'Blue Growth Initiative' which focus on sustainable utilization of fisheries wealth from the marine and other aquatic resources

- In India, the blue economy encompasses various sectors such as shipping, tourism, fisheries, and offshore oil and gas exploration. It comprises 4.1% of the Indian GDP.
- An Exclusive Economic Zone of over 2 million square kilometres provides India with huge opportunities when it comes to the blue economy.

Significance of Blue Economy for India

- It can help in realizing the full potential of India's shipping industry and increase India's capacity as a hub for ship repair and maintenance this will have various economic and geopolitical benefits.
- India has 9 coastal states, 12 major, and 200 minor ports, with a focus on the blue economy, India can revolutionize its logistics sector.
- The blue economy provides India with opportunities to develop offshore wind and solar energy to fulfil India's growing energy demand.
- It can support the growth of Aquaculture and Marine Biotechnology in India which can aid the country's food security and improve the health of the ocean ecosystem.
- It will also help India fulfil its SDG goal 14 i.e., Life Below Water.

Challenges to India's Blue Economy

- ✓ A lack of critical infrastructure can make it difficult for India to develop and expand economic activities related to the blue economy to every region in the country.
- ✓ Overfishing is a persistent problem in India, it can lead to the depletion of fish stocks and harm the marine ecosystem. It will also have a negative impact on the fishing industry.
- ✓ Pollution has also emerged as a key irritant, issues like oil spills, plastic waste, and industrial effluent are having a negative impact on the marine ecosystem and the development of the blue economy.
- ✓ Climate change has also created negative impacts such as rising sea levels posing a serious risk to the coastal communities and also having negative impacts on the blue economy.
- ✓ Fishing conflict with neighbouring countries especially with Sri Lanka led to confusion and conflict between fishermen of both countries.

Lessons from China

China owns the world's largest deep-water fishing fleet, which also serves as a maritime militia assisting the Chinese navy and coast guard. China had begun distant deepwater fishing, in 1985 with an eye on "protein and profit", struck contracts to fish in the exclusive economic zones (EEZ) of other many countries in Asia and Africa.

India also needs to learn from China and should take following reforms to make an advance towards a developed blue economy:

- ❖ Mechanisation and Modernisation of fishing vessels by providing communication links and electronic fish-detection devices.
- ❖ Developing deep-water fishing fleets (DWF), with bigger, sea-going trawlers equipped with refrigeration facilities
- ❖ A DWF fleet will have to be built around the "mother ship" concept, wherein a large vessel would accompany the fleet to provide fuel, medical and on-board preservation/processing facilities.
- ❖ Development of modern fishing harbours with adequate berthing and post-harvest facilities, including cold storage, preservation, and packaging of fish.

PEPPER IT WITH

Blue Water Navy, Sea Lines of Communication, UNCLOS, Exclusive Economic Zones, Draft Blue Economy Policy of India

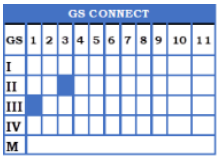
Way-Forward

- The focus should be on the implementation of sustainable resource management practices and enforcing regulations to prevent the overuse of marine resources to ensure long-term viability.
- Developing infrastructural facilities in coastal areas can aid in supporting the growth and expansion of economic activities in these regions.
- To improve efficiency and reduce the negative impact on the environment due to development activities, support must be provided to Research & Development with a special focus on technology.
- Need to focus on marine ICTs, transport (shipping) and communication services, and the creation of a knowledge hub for marine research and development.
- Oceans should be looked upon as a global stage for continued economic, social, and cultural dialogue. Therefore, for the efficient development of the blue economy India should foster partnerships with like-minded countries and other international organisations.

Monetary Policy and Inequality

News Excerpt

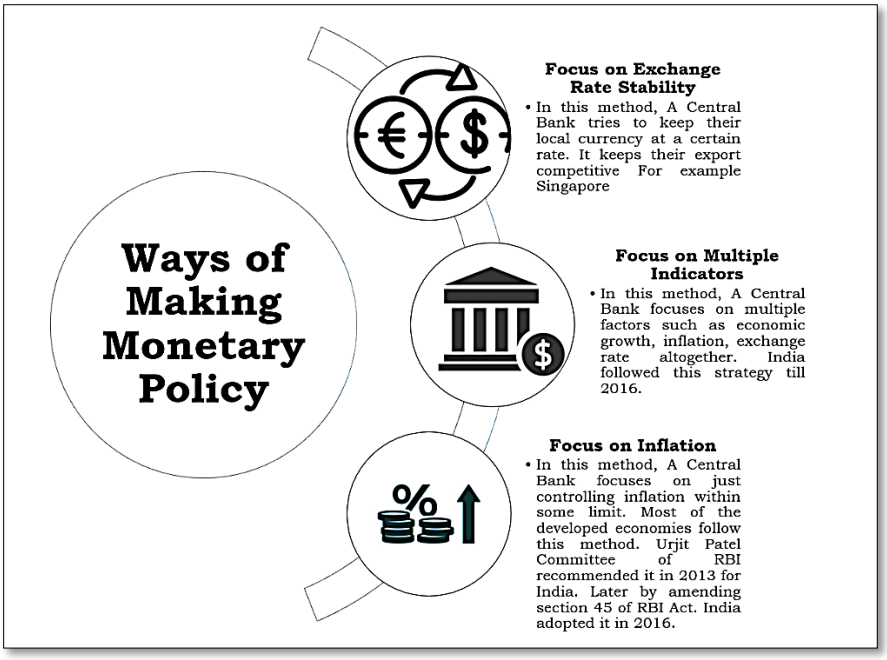
Recently, RBI in a surprising move went against the street expectations of a 25-basis points rate hike and kept the repo rate unchanged at 6.5 per cent amid concerns over the global banking crisis.



Pre-Connect

What is Monetary Policy (MP)?

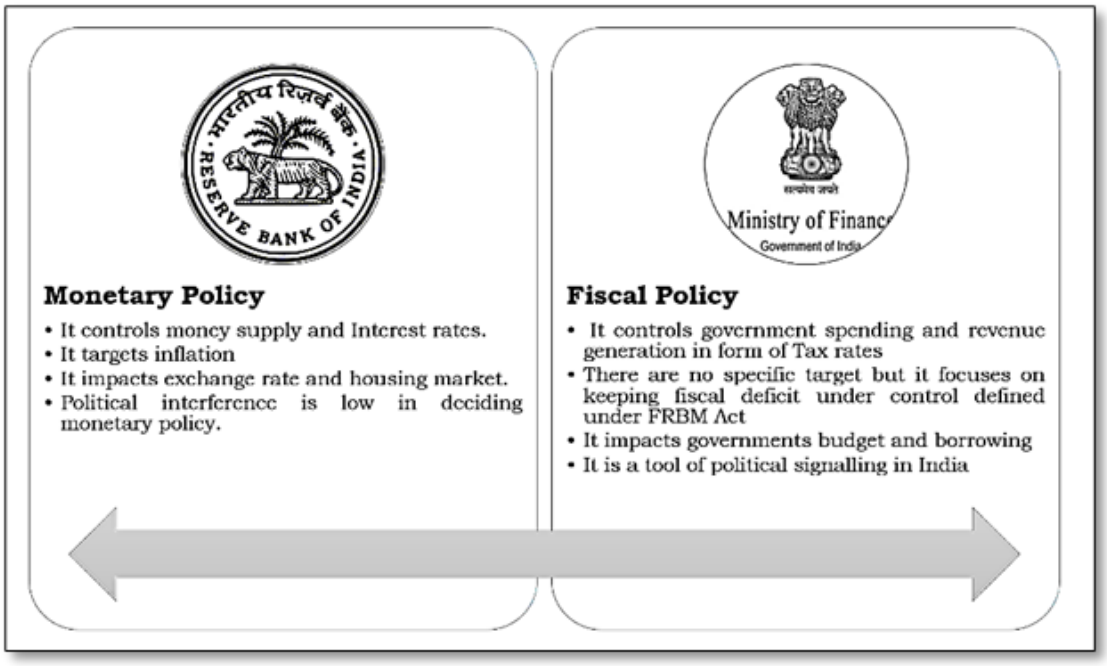
- ✓ MP is a macroeconomic policy designed by the Central Bank of a country. It aims to manage the money supply and interest rates. It shapes several variables including consumption, savings, investment, and capital formation among others.
- ✓ It ensures price stability, economic growth, job creation, and social justice in any country.
- ✓ According to **Philip Curve**, Higher inflation lowers unemployment, and therefore inflation at a controlled level is considered a sin qua non for any economy.



Tools of Monetary Policy

➢ **Quantitative Tools**: Also known as General/Indirect tools, their impact is felt on the entire economy and not on a particular sector. These include:

- ☐ **Statutory Reserve Requirements-** These are set on a fortnightly basis and helps in preventing bank run. All banks had to keep them, norms or slabs can be different for Regional Rural banks and Cooperative Banks.
  - ▪ **Cash Reserve Ratio**: The idea was first given by JM Keynes. It is the deposit that banks had to keep with the RBI. Banks do not earn an interest rate on such deposits, except in exceptional circumstances. It is mandated under RBI Act 1934.
  - ▪ **Statutory Liquidity Ratio (SLR):** These are the deposits banks must keep in liquid assets with RBI e.g., Gold, Government securities (G-Sec), Treasury bills, etc. It is mandated under the Banking Regulation Act 1949 and it cannot be more than 40% of the Net Demand and Time liabilities of a bank.



- o **Liquidity Adjustment Facility**
  - ▪ **Repo Rate:** The rate at which a bank borrows from RBI on a short-term basis by pledging its G-Sec as collateral. However, Banks can't use securities that have already been pledged under SLR. It is the policy rate to control inflation in India.
  - ▪ **Reserve Repo Rate:** The rate at which the bank earns interest for parking its surplus fund with the RBI for a shorter period. In this situation, RBI submits its G-Sec as collaterals.

- **Marginal Standing Facility (MSF):** It is the interest rate at which RBI lends short terms loans to banks using their G-Sec of SLR quota as collaterals.
- **Standing Deposit Facility:** It is similar to the reverse repo rate, only in this condition RBI doesn't pledge any G-Sec as collaterals.
- **Open Market Operations:** To control the money supply, RBI buys and sells G-Sec. Therefore
  - When RBI Buys G-Sec: **INCREASE** in money supply
  - When RBI Sells G-Sec: **DECREASE** in money supply

➢ **Qualitative tools:** Unlike quantitative tools which controlled the volume of loans, Qualitative tools control the distribution of loans to a particular sector of an economy. These include

- **Moral Suasion or Publicity**: It means using persuasion rather than a penalty to bring a change.
- **Direct Action**: If any bank flouts RBI's directive, then RBI can punish the same bank. For instance, in 2019, it introduced a clawback provision, in which if any top executives did any scam or fraud and they have to return any previously paid salary or bonus even if they retired or left their job after the scam.
- **Loan to Value**: It is a cap placed on loans pledged against a physical asset such as Gold or House. RBI fixes the rate, accordingly, the maximum amount sanctioned is decided for instance if LTV is 75% then only 75% of the asset value could be led by a bank.
- **Priority Sector Lending (PSL):** Started in 1968, PSL norms mandates bank to lend at least 40% of their loans to the priority sector defined by the RBI. These include sectors like agriculture, micro, and small enterprises, and the weaker section.

Understanding the Stance of RBI

RBI announces its monetary policy stance in every MPC announcement, this includes:

- Calibrated Tightening: In this, they will either increase the repo rate or keep it unchanged but they will not cut it.
- Neutral: In this, they can increase or decrease or keep the repo rate the same.
- Accommodative: In this, they will either decrease the repo rate or keep it unchanged but they will never increase it.

Monetary Policy and inequality

Economists often argue that monetary policy tools exacerbate inequality. This is based on the fact that monetary easing works in part by raising asset prices, like stock prices. As the rich own more assets than the poor and middle class it led to disparities in wealth. Inequality and lack of social mobility are issues of first-order significance for economic policy in general. However, they cannot become first-order significance when it comes to the making of monetary policy as:

- Widening inequality is a very long-term trend. The degree of inequality seen in present times is the result of globalization, technological progress, demographic trends, and institutional change in the labour market and elsewhere. By comparison to the influence of these

Repo Pause- Understanding Present RBI trend

Repo Pause is the decesion of the RBI to pause the expected hike in the Repo Rate. The present decision by RBI is viewed from two different perspectives. This despite the fact that the inflation rate is still have been significantly above the comfort zone of RBI. However there are several reasons which have directed the present pause such as:

- OPEC+ production cut for 2023
- Banks' liquidity crisis in the Western economies such as the US and Europe.
- Breathing space provided by The moderation in inflation rate forecast for FY24 to 5.2 per cent
- Slump in consumption
- Tepid private investment

Limitation of Monetary Policy

In India, the use of Monetary Policy to target inflation and boost economic growth is impacted by several reasons:

- **Banking Issues:** A huge level of Non-performing assets (NPA) impacts the transmission of monetary policy. Financial frauds in both Public, as well as Private sector banks, restrict capital formation and impact the trust of depositors. Banks takes 6-12 month to transfer policy-cut benefits to the end customers.
- **Culture of the Indian Economy:** In western economies, there is a culture of consumerism hence their saving rate is low. But in India, it is diametrically opposite, there is a culture of saving for rainy days. Therefore, Banks don't depend on Repo as a major source of its fund. Further, In India, formal lending is also low, in rural areas informal moneylenders circulate black money and charge high-interest rates to their borrowers.
- Lack of **ease in doing business** and crucial infrastructure, coupled with heavy dependence on monsoon and high energy imports creates a structural imbalance in the Indian economy.
- A **high fiscal deficit** and a new trend of populist measures in Indian polity create further trouble for economic policy.
- **Demand-Side Control:** Monetary Policy is effective in managing only the demand-side issues. However, it is unable to address any supply-side constraints.

long-term factors, the effects of monetary policy on inequality are almost certainly modest and transient.

- Monetary policy, if properly managed, promotes greater economic stability and prosperity for the economy as a whole, by mitigating the effects of recessions on the labour market and keeping inflation low and stable.
- Even if aggregate economic gains from effective monetary policies are unequally distributed that would not be a reason to forego such policies. Rather, the right response is to rely on other types of policies to address distributional concerns directly, such as fiscal policy (taxes and government spending programs) and policies aimed at improving workers' skills.

There are several distributional effects of monetary policy such as:

⇒ Easier monetary policies promote job creation as well as increases in asset prices. More jobs at better wages benefit the middle class, and it is the best weapon against poverty.

⇒ The rich have more assets than the middle class but the middle class is not without assets whose values rise during a period of easy money. They also benefit from a general increase in asset prices and an improving economy.

⇒ Debtors tend to benefit (and creditors lose) from higher inflation, which reduces the real value of debts. Debtors are generally poorer than creditors, so on this count easier monetary policy again reduces inequality. (Higher inflation hurts those who rely relatively more on cash in their transactions, a group that is poorer than average; at current inflation rates, however, this effect is very small.). Debtors are also made better off by low-interest rates, all else equal. For example, homeowners benefit when they can refinance their mortgage at a lower rate.

⇒ Stock prices always vary and go up and down from time to time, monetary policies nowhere in the world have led to permanent increases in stock prices but instead have returned them to trend.

PEPPER IT WITH

Monetary Policy Committee, External benchmark rate, Policy Corridor, Quantitative Easig, Taper Tamper

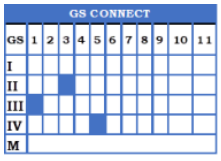
Conclusion

Monetary policy is a blunt tool which certainly affects the distribution of income and wealth, although whether the net effect is to increase or reduce inequality is not clear. But the (uncertain) distributional impact of monetary policy should not prevent the Central Banks from pursuing their mandate to achieve maximum employment and price stability, thereby providing broad benefits to the economy. Other types of policies are better suited to addressing legitimate concerns about inequality.

Dabba Trading

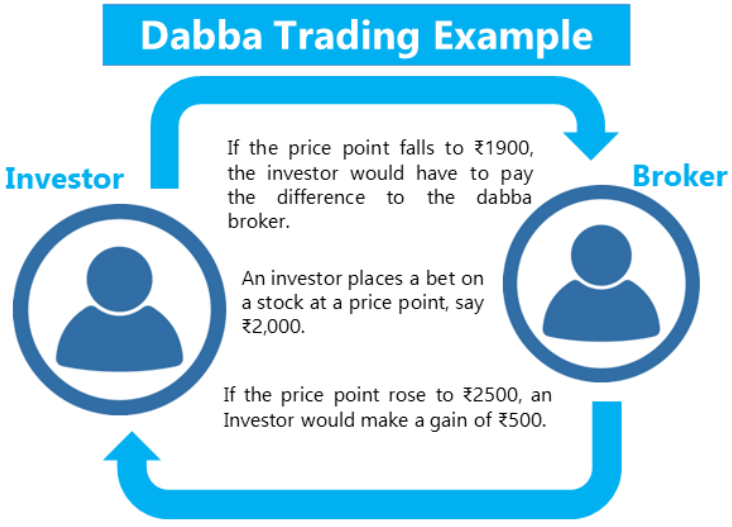
News Excerpt

Recently, National Stock Exchange (NSE) has sent notices to entities involved in Dabba trading.



Understanding Dabba Trading

- It is a form of informal trading that takes place outside the purview of the stock exchanges.
- Under this transaction, traders place a bet on stock price movements, however, without incurring a real transaction and taking physical ownership of a particular stock.
- Such transactions results in gambling centred around stock price movements which are illegal and unregulated.
- It is recognized as an offence under Section 23(1) of the Securities Contracts (Regulation) Act (SCRA), 1956 and upon conviction, can invite imprisonment for a term extending up to 10 years or a fine up to ₹25 crores, or both.



Issues Associated with Dabba Trading

➢ All dabba transactions are dealt with in cash and outside the purview of recognized software. Thus, they escape taxation which results in a loss to the government exchequer.

➢ It creates risks for the investor as it is outside the regulatory purview. Investors are devoid of any formal provisions for investor protection, dispute resolution mechanisms and grievance redressal mechanisms that are available within an exchange. There is a high chance that the broker defaults in paying the investor or the entity become insolvent or bankrupt.

➢ It could lead to the growth of black money besides perpetuating a parallel economy, which could lead to risks entailing money laundering and criminal activities

Way Forward-Preventing Dabba Trading

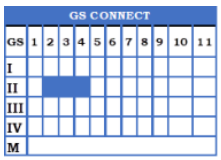
✓ Despite being an offence under the Securities Contracts (Regulation) Act, 1956. Dabba trading is still very prevalent in the stock markets. Therefore, strict enforcement of the law is required to punish those who are involved and deter others from engaging in Dabba trading.

✓ Awareness must be generated among retail investors about the risks associated with such trades. Regulators could play a key role in implementing the same.

✓ Strict monitoring of social media and other mobile apps could allow the Regulators to take action against those who promote or engage in such practices.

Fertiliser Subsidy

News Excerpt



The government will roll out a modified direct benefit transfer (DBT) scheme of fertilisers in seven districts across as many states on a pilot basis. Under the new plan, sales of subsidised fertilisers to farmers will be capped, taking into consideration their land holdings.

Pre-Connect

- Fertilisers are either natural or artificial substance that improves the growth and productiveness of plants.
- They contain the chemical elements Nitrogen (N), Phosphorus (P) and Potassium (K).
- In India, there are 3 basic fertilisers these are- Urea, DAP and Muriate of Potash (MOP).

Fertiliser Subsidy in India

➢ The Government of India provides a subsidy to fertiliser producers so that they can provide it at cheap rates to farmers.

➢ Various types of subsidies are provided such as:

- Subsidy on Urea: Urea is the most produced, imported, and consumed fertiliser. Urea Subsidy is based on the cost of production at each plant and the units are required to sell the fertiliser at the government-set Maximum Retail Price (MRP).
- Subsidy on Non-urea Fertilisers: These are generally decontrolled fertilisers but due to global geopolitical turbulence these are brought under the control regime.
- All Non-Urea based fertilisers are regulated under the Nutrient Based Subsidy (NBS) Scheme.

Issues Related to Fertiliser Subsidy in India

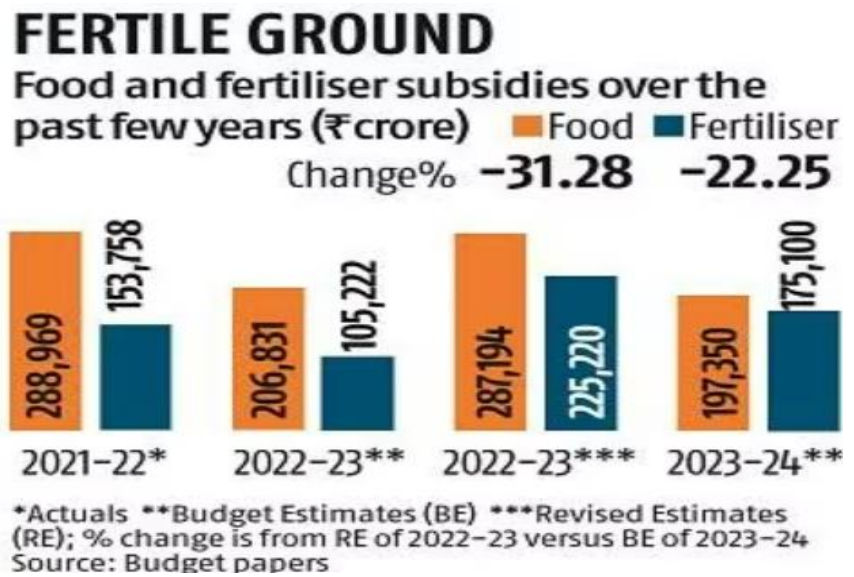
- ✓ Subsidy on urea and DAP makes them cheaper vis-à-vis other fertilisers. This makes them prone to overuse.
- ✓ The ideal ratio of the use of N, P and K in India is far away from the ideal use ratio of 4:2:1. This can be attributed to the fact that Urea and DAP contain more than 30% of any single nutrient. This results in an imbalance which has implications for soil health, crop yield and ultimately food security.
- ✓ Subsidized urea is getting diverted to bulk buyers/traders or even non-agricultural users such as plywood and animal feed makers. It is being smuggled to neighbouring countries like Bangladesh and Nepal.

Green Shoe Option

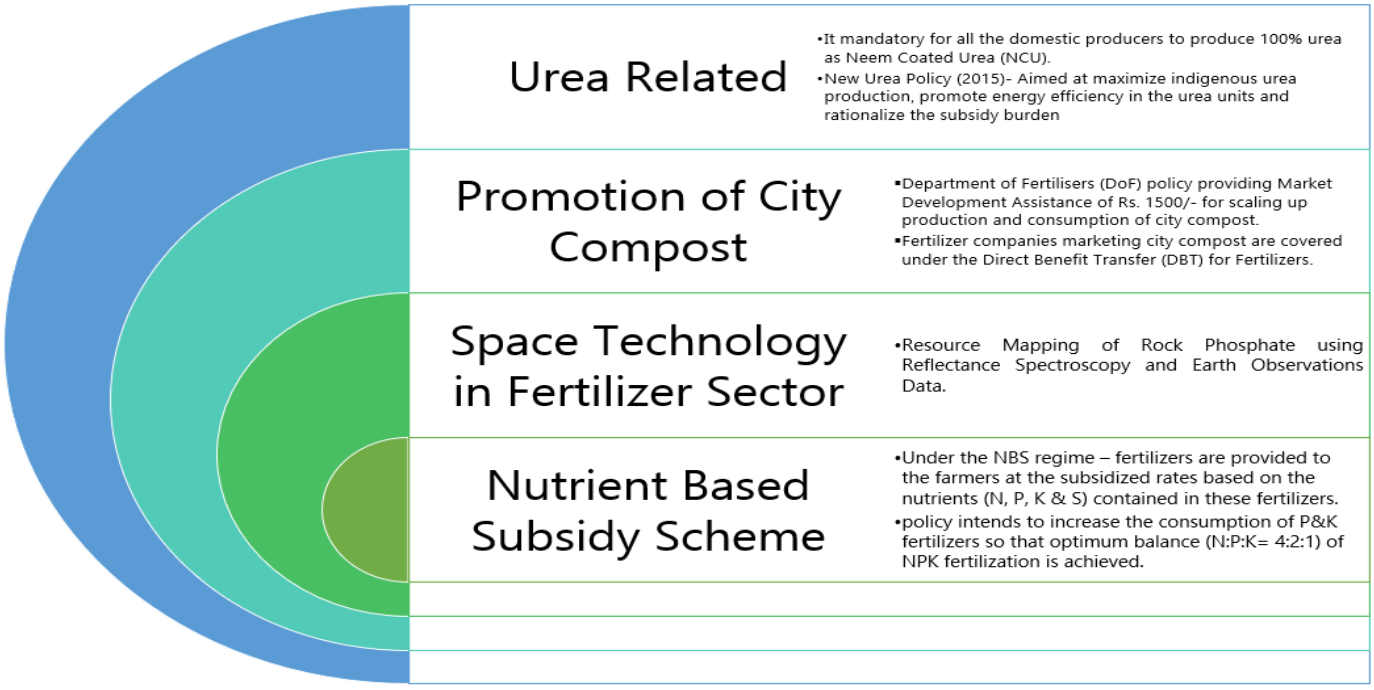
Under a green shoe option, the issuing company has the option to allocate additional equity shares up to a specified amount.

A Green Shoe option allows the underwriter of a public offer to sell additional shares to the public if the demand is high.

The option is a clause in the underwriting agreement, which allows the company to sell additional shares, usually 15 per cent of the issue size (in case of IPO), to the public if the demand exceeds expectations and the stock trades above its offer price.



Initiatives Related to Fertilizer



Way-Froward

- There is a need to develop a uniform policy for all fertilisers as all three nutrients are critical for crop yield.
- A flat per-acre cash subsidy can do much well than NBS but that subsidy must include value-added and customised products and deliver nitrogen more efficiently than urea.

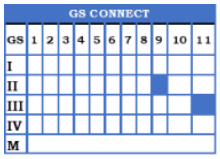
Nano Fertilizers

- Nano-particles offer unique abilities it has high absorption capacity (ability to get attached to a substance), an improved surface-to-volume ratio and allow for controlled release to a targeted site. These properties make them a potential contender as a plant growth enhancer.
- It can act as a smart delivery mechanism where there would be a slow and gradual release of nutrients for a more extended period.
- It will allow for photosynthetic activity, seedling growth, rate of seed germination, nitrogen metabolism, and carbohydrate and protein synthesis.
- It provides support to nutritional management because of which nutrient leaching gets controlled and ingredients are released in response to biological demand and environmental stress.
- They are developed from chemical fertilizers by
  - Deposition e.g. Urea on Calcium Cyanamide gives Nano nitrogen
  - Grinding and mixing with Bio-fertilizers
  - Encapsulation i.e. coating a thin layer of Nano-particles on fertilizers.
  - Nanoemulsion
- Nano-fertilizers offer various advantages
  - Increased absorption capacity
  - Reduce crop cycle period
  - Increase crop yield
  - Development of plant root system
  - Reduces environmental pollution
  - Improve seed production
- There are certain limitations of Nano-fertilizers
  - Lack of Standardization in Production
  - High cost of adoption (though can be reduced with the backing of subsidy)
  - Economics of scale is difficult to achieve.
  - Lack of risk management system.

INTERNATIONAL RELATIONS

NATO Expansion

News Excerpt



Recently, Finland became the 31st country to join the North Atlantic Treaty Organization (NATO). The move to join the security alliance was precipitated by the Russian invasion of Ukraine in 2022.

Pre-Connect

About NATO

- NATO was founded in 1949 and is a group of 31 countries from Europe and North America that exists to protect the people and territory of its members.
- Before Finland, North Macedonia was the last member to join the alliance in 2020.
- NATO is based on three basic points:
    - **It is a Political and Military Alliance**: NATO's fundamental goal is to safeguard the Allies' freedom and security by political and military means. It promotes democratic values and it is committed to the peaceful resolution of disputes.
    - **It believes in Collective Defence**: NATO is committed to the principle that an attack against one or several of its members is considered an attack against all. This is the principle of collective defence, which is enshrined in Article 5 of the Washington Treaty. So far, Article 5 has been invoked once - in response to the 9/11 terrorist attacks in the United States in 2001.
    - **The Transatlantic Link**: It is an alliance of countries from Europe and North America and provides a unique link between these two continents, enabling them to consult and cooperate in the field of defence and security and conduct multinational crisis-management operations together.

Washington Treaty

- The Washington Treaty forms the basis of the NATO. The Treaty derives its authority from Article 51 of the United Nations Charter, which reaffirms the inherent right of independent states to individual or collective defence.
- The primary aim of the Treaty was to create a pact of mutual assistance to counter the risk that the Soviet Union would seek to extend its control of Eastern Europe to other parts of the continent.
- The Treaty also required members not to enter into any international commitments that conflicted with the Treaty and committed them to the purposes and principles of the Charter of the United Nations (UN).

Paasikivi's Line

Named after Juho Kusti Paasikivi, Paasikivi's line was based on the idea of peaceful coexistence with the Soviet Union with neutrality being its cornerstone. It helped Finland navigate complex international relations after the turbulent time of the Second World War.

Reasons Behind Finland

- Finland's decision can be viewed as a rational choice, as cooperation between Finland and NATO began as early as 1994 with the Partnership for Peace (PfP) programme.
- Finland had the status of an 'Enhanced Opportunity Partner' and contributed in a significant manner to the NATO-led operations in the Balkans, Afghanistan and Iraq.
- The main rationale behind Finland's decision has been to receive additional security guarantees from NATO. It provides Finland with conventional deterrence ('an attempt to persuade an adversary not to initiate a war because the expected costs and risks outweigh the anticipated benefits').

Long Shadow of NATO-Russia Contestation on India

- Fundamental structural changes are shaping the security landscape in Europe and they are also casting their shadow on Indian foreign policy and national security.
- Russia's Ukraine invasion has filled a new life in NATO which was recently seen as a relic of the past.
- Russian aggression has managed to unite the West and forced it to relook at its post-World War II security posture.
- Russia on the other hand has started a closer alliance with China. Both are targeting emerging coalitions. They also expressed their opposition to the cobbling together of a closed and exclusive bloc structure in the Asia-Pacific region.
- Russia's involvement in Ukraine has created strain in defence ties between Russia and India which is the mainstay of the bilateral relationship. Russia is unable to fulfil its commitment to provide India's military with essential defence supplies due to the Ukraine war.

✓ This creates trouble for India as it faces a formidable military adversary in China across the border. India will look for alternative sources of military supplies even as it doubles down on strengthening its defence manufacturing base.

India and NATO

India in recent years has broken many presumed political taboos in its foreign policy, but talking to NATO is not one of them. India's refusal was premised on its non-alignment. But in recent times, India has military exchanges with many members of NATO including the US, Britain, and France. However, India is not having an India-NATO dialogue.

The real question is when India can have military exercise with its adversary like China and Pakistan under SCO then NATO should not be anathema. The reality is India's real problem is not with NATO, but with its difficulty in thinking strategically about Europe.

This inhibition has multiple reasons:

- ❖ During colonial times India viewed Europe through British eyes and after independence through Russian lens.
- ❖ Later, India came to rely on the Soviet Union for its security in the Cold War, amidst its widening political divide with the West.
- ❖ Further, the bureaucratisation of the engagement between Delhi and Brussels and the lack of high-level political interest prevented India from taking full advantage of a re-emerging Europe.

In recent times, India appears to be poised for a vigorous new push into Europe. Therefore, a pragmatic engagement with NATO must be an important part of India's new European orientation especially amidst the continent's search for a new role in the Indo-Pacific.

A sustained dialogue between India and NATO could facilitate productive exchanges in a range of areas such as terrorism, changing geopolitics, emerging military technologies, and new military doctrines. An institutionalised engagement with NATO should make it easier for India to deal with the military establishments of its 30 member states. On a bilateral front, each of the members has much to offer in strengthening India's national capabilities.

On the question of Russia, it should be a clear for both India and Russia that as mature states they have to insulate their bilateral relationship from the larger structural trends buffeting the world today.

Conclusion

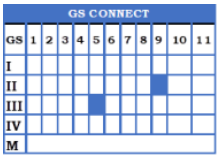
NATO and Russia should search for ways out of the constant cycle of implementing measures and imposing countermeasures. Given the rising tensions, both Russia and NATO should exercise cautious behaviour vis-à-vis the other. As far as India is concerned, the expansion of NATO and the bolstering of its structure is causing ripples in national capitals across the world. India's relations with Russia are also feeling the heat. India will be hoping for the best but it should be preparing for the worst.

PEPPER IT WITH

The Brussels Treaty, NATO strategic concept 2022, Common Security and Defence Policy (CSDP) and the Nordic Defence Cooperation (NORDEFCO)

Asia-Pacific trade treaty: CPTPP

News Excerpt



Recently, the UK government signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). The agreement is being touted as post-Brexit freedoms. The agreement will now need to be ratified by the British Parliament and the Parliaments of each of the CPTPP countries.

Pre-Connect

Understanding CPTPP

- CPTPP is a Free Trade Agreement (FTA) between Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, New Zealand, Singapore and Vietnam.
- CPTPP (erstwhile known as Trans-Pacific Partnership (TPP)) was signed in 2018 after the US withdrew from negotiations. The agreement came into force in December 2018.

Advantages offered by CPTPP

- ➢ It removes 99% of tariffs on goods and services
- ➢ It covers a broad range of goods and services including financial services, telecommunications, and food safety standards.
- ➢ It also focuses on the environment by focusing on cutting down wildlife trafficking, unsustainable logging and fishing. It imposes penalties on countries that don't comply with such rules.
- ➢ It also sought to harmonise everything from labour and environmental standards to intellectual property regulations among member-states.

Benefits for the UK under CPTPP

- ✓ Zero tariffs for its key products such as cheese, cars, chocolate, machinery, gin, and whisky.
- ✓ The deal is expected to add GBP 1.8 billion (USD 2.2 billion) annually to the U.K. economy in the long run, a modest boost of 0.08% to GDP.
- ✓ Gateway to the Indo-Pacific region which is bound to account for a majority of global economic growth in the future.
- ✓ UK firms will operate at par with firms in host countries without establishing a local office or being a resident.

India's Stand on CPTPP

India did not join CPTPP for multiple reasons such as:

- Greater labour and environmental standards
- Imposition of detailed transparency requirements
- Issues with the host state's right to regulate the firms.
- Narrow qualifications on standards for investment protection
- Data localisation

Lesson For India from the deal

PEPPER IT WITH
GDPR, RECP, ASEAN, SAFTA

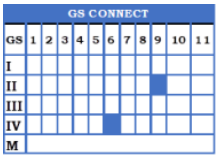
There are several reasons why India should consider joining the CPTPP:

- CPTPP had developed a strong reputation for being a liberal and flexible trade bloc and was created with small and medium-sized businesses in mind, in a bid to expand their export markets. This can prove good for Indian companies.
- The CPTPP has no capital city, no parliament, no central bank, no single currency and no wish to impose a political union. It doesn't want vast sums of money from its members to fund an administrative apparatus of unelected bureaucrats.
- The trade bloc is one of the world's most significant free trade areas when measured by the combined economies of the member states. The UK joining the partnership would take the trade bloc's GDP to £12 trillion.
- The removal of tariffs and quotas will make it cheaper and easier to export goods including digital services, giving better access to markets on all sides of the world.
- CPTPP is known to be less restrictive, allowing member states to adopt discretionary measures. For example, unlike the European Union's rigid and unrelenting commitment to GDPR, CPTPP takes a more liberal approach, by keeping more data-sharing decisions within the remit of individual member states.
- The absence of China is also a key advantage for India as the West becomes increasingly worried about its dependence on authoritarian regimes and keen to disassociate from China's economic power, a deeper engagement with the rapidly growing Indo-Pacific region not only makes economic sense but should now be a key part of foreign policy.

The conflict between Israel and Syria

News Excerpt

There has been frequent conflict between Israel and Syria.



Pre-Connect

Understanding Israel-Syria Conflict

- The two nations have been at odds since Israel's founding in 1948. Syria has never maintained official diplomatic ties.
- Syria has never recognized Israel as a legitimate state, and Israeli passports are not recognized as legally valid for entry into Syrian territory. Israel, on the other hand, regards Syria as a hostile state.
- In 1967, during the Six-Day War, Israel occupied the Golan Heights- a region overlooking both Israel and Syria, offering a commanding military vantage.
- In 1973, during the Yom Kippur War, Syria made an unsuccessful bid to recapture the Golan Heights.
- In 1974 a ceasefire agreement was signed between the two countries but most of the area of Golan Heights remain under the control of Israel.

Genesis of the Present Conflict

- ➢ The change of guard in Israel has brought an ultra-nationalist government to power. This has created apprehensions in the Israeli neighbourhood.

- The recent raid on the Al-Aqsa mosque in Jerusalem by Israeli forces drew a reaction in form of a wave of rocket attacks from Lebanon, the Gaza Strip, and Syria.
- Israel has apprehensions that since the Syrian civil war broke out in 2011, Syria has become a fertile ground for Iran to use non-state actors like Hezbollah to station its fighters and weapons close to Israel's borders.
- The biggest casualty of this conflict is in form of a humanitarian crisis resulting in the displacement of millions of people and the loss of countless lives.

Israel Golan Heights Law

Israel drafted Golan Heights law which extended its laws, jurisdiction and administration to the area in 1981. This was declared null and void by the UNSC (United Nations Security Council) and without international legal effect. However, it has not changed the situation on the ground. Later in 2000, Israel and Syria attempted to negotiate a settlement but failed but the frontier has not seen major hostilities for more than 40 years.

Implications for India and India's stand

- India maintains a balanced position in the Israel-Syria conflict and requested parties to exercise restraint and resolve their difference peacefully using talks.
- India is in favour of the sovereignty and territorial integrity of Syria and urged other nations to end their interference in its internal affairs.
- The biggest implication for India in any Middle-East conflict is its energy security. India imports oil from middle-east including Syria. Therefore, any disruption will have a significant impact on the Indian economy.
- There is also a security threat as any conflict in the Middle-East breeds radicalisation among extremist and terror organisations in India's neighbourhood. This creates an opportunity for such groups to further their agenda.
- With a large Muslim population, there is always a threat of the creation of sectarian threats within the country.

Way Forward

The Syrian conflict is a quagmire of a proxy war between major powers such as the US, Russia, and Iran. With time the on-ground situation has become complex and with no clear path to peace. The present situation requires a comprehensive approach to address the root cause of the nature of the conflict. Several things could be done such as:

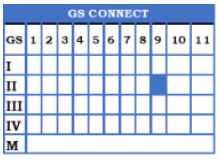
- Increase the diplomatic efforts in finding a peaceful and just solution to the conflict. This would also require the engagement of all the players including Hezbollah.
- Regional cooperation and dialogue must be promoted as through such dialogue tensions could be reduced among the parties and trust and confidence can be built.
- Instruments like Abraham Accords signed between Israel and several Arab states could serve as a template for future cooperation and dialogue.

PEPPER IT WITH

Yom Kippur War, Camp David Accords, Abraham Accords

United Nations Statistical Commission

\News Excerpt



For a four-year term, India has been elected to the highest statistical body of the United Nations beginning from January 1, 2024.

Pre Connect

About UN Statistical Commission

- Established in 1947 being the highest body of the global statistical system, it focuses on bringing together the Chief Statisticians from member states from around the world.
- It is a Functional Commission of the UN Economic and Social Council and its work includes overseeing the United Nations Statistics Division (UNSD).
- It is the highest decision-making body when it comes to international statistical activities including their implementation at the national and international levels especially the setting of statistical standards and the development of concepts and methods.
- Recently in March 2023, the 54th session of the United Nations Statistical Commission was held.

Mandate

- The Economic and Social Council established the Statistical Commission. Since, 2000 the Commission meets annually for four days each session.

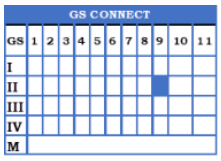
- Based on geographical distribution, there are 24 member countries of the United Nations elected by the United Nations Economic and Social Council.
- The term of office of members is four years and the pattern includes :
  - Five members from the African States;
  - Four members from Asia-Pacific States;
  - Four members from the Eastern European States;
  - Four members from Latin American and Caribbean States;
  - Seven members from Western European and other States.
- **The commission shall assist the Council:**
  - In promoting the development of national statistics and the improvement of their comparability;
  - In the coordination of the statistical work of specialized agencies;
  - In the development of the central statistical services of the Secretariat;
  - In advising the organs of the United Nations on general questions relating to the collection, analysis and dissemination of statistical information;
  - In promoting the improvement of statistics and statistical methods generally.
- **The issues of concern considered by the Statistical Commission are**
  - International statistical development
  - Methodological issues
  - Coordination and integration of international statistical programmes.
  - Support of technical cooperation activities in statistics and organizational matters.
- The Chairman, 3 Vice-chairmen and the Rapporteur are the officers of the Commission, referred to as the Bureau.

United Nations Economic and Social Council

- It was established by UN Charter in 1945 as one of the six important organ of UN.
- It is an important part of United Nations system to advance the three dimensions of sustainable development which is economic, social and environmental.
- Its functions include :
  - Fostering debate and innovative thinking, forging consensus on ways forward, and coordinating efforts to achieve internationally agreed goals.
  - Following-up to major UN conferences and summits.

UN Democracy Fund (UNDEF)

News Excerpt



India funds at least 68 projects worldwide linked to George Soros's Open Society Foundation and is the fourth-highest donor to the UN Democracy Fund (UNDEF). India has already put George Soros's NGO on a watchlist in 2016.

About UNDEF

- UN Secretary-General Kofi A. Annan established UNDEF in 2005 as a United Nations General Trust Fund to support democratization efforts around the world.
- During the 2005 World Summit, it was welcomed by the General Assembly in the Outcome Document.
- A unique role of complementing the UN's other work with governments to strengthen democratic governance around the world is done by UNDEF.

UNDEF's Mandate and Projects

- Projects that empower civil society, promote human rights, and encourage the participation of all groups in democratic processes are funded by UNDEF where local civil society organizations (CSOs) are the maximum fund receiver.
- The policy guidance and funding guidelines are offered by the Advisory Board of the UNDEF and recommendations or proposals are approved by Secretary-General.
- Grants ranging from USD 100,000 to USD 300,000 are proposed.
- Over 880 two-year projects in more than 130 countries in 15 rounds have been supported by UNDP.

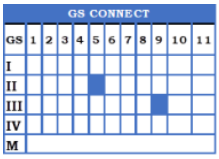
India and UNDEF

- ✓ Over USD 32 million have been invested by India since 2005 i.e., its inception.
- ✓ US, Sweden, and Germany are the three main donors.
- ✓ UNDEF's mission of promoting democratic governance worldwide through funding of projects carried out by local and international CSOs and NGOs has got consistent support from India.

ENVIRONMENT

Aravalli Green Wall Project

News Excerpt



Ministry of Environment, Forest and Climate Change launched the 'Aravalli Green Wall Project' to increase the green cover and biodiversity of the region through various measures.

Pre-Connect

- The Aravalli hills, located in Gujarat, Rajasthan, Haryana, and Delhi, have been designated as ecologically sensitive area.
- Specifically, in 1992, the National Capital Region Planning Board notified the Aravali ranges in Gurgaon and Alwar (Rajasthan) as ecologically sensitive zone.

About the project

- The Aravalli Green Wall Project aims to combat land degradation and desertification by creating green corridors across Haryana, Rajasthan, Gujarat, and Delhi.
- The project includes planting native trees and shrubs, restoring water bodies, and promoting agroforestry to improve the livelihoods of local communities.
- **Objectives** of the projects are-
    - Improving the ecological health of the Aravalli range
    - Creating green barriers to prevent land degradation and the eastward expansion of Thar Desert.
    - Planting native tree species in the Aravalli region for carbon sequestration, enhancing biodiversity and ecosystem services, and improving water quality and quantity.
    - Involving local communities in afforestation, agroforestry, and water conservation activities to promote sustainable development and livelihood opportunities.
    - Contributing to India's commitments under UNCCD, CBD, and UNFCCC.
    - Enhancing India's image as a global leader in environmental protection and green development.
- **Aravalli Green Wall Project in Haryana**
    - In the initial phase, 75 water bodies will be rejuvenated under the project, starting with five waterbodies each in every district of the Aravalli landscape.
    - The project will also include large-scale plantation drives and the conservation of water resources in the Aravalli region. The project will cover degraded land in Gurgaon, Faridabad, Bhiwani, Mahendergarh and in Rewari districts of Haryana.

Importance of Aravalli

- ✓ **Climatic Factor**: The Aravali hills have played an important role in shaping the climate of the upper Indo-Gangetic plain for centuries, influencing factors such as rainfall, temperature, aquifer recharge, soil conservation, biodiversity, and ecology.
- ✓ **Combat Desertification**: The Aravalis check the spread of the Indian Desert towards eastern Rajasthan and Indo-Gangetic Plains, Haryana and western UP.
- ✓ **Recharge Groundwater**: This range plays an important role in recharging groundwater, especially in urban pockets of Delhi NCR region and Haryana. With high porosity levels, it recharges northern aquifers.
- ✓ **Ecological Balance**: Aravalli's forest patches act as a green lung for the Delhi NCR region and Haryana. This range is home to tropical dry-deciduous forests and several wildlife species.

Existing Challenges

- **Ambiguous Laws**: The Haryana government's indecision on declaring the entire Aravalli range as a 'notified forest' has led to environmental violations, while rampant illegal mining in Rajasthan has not been adequately addressed by the state government.
- **Illegal Mining and Deforestation**: Illegal mining of stones in Rajasthan and Haryana has continued despite the 2002 ban imposed by the Supreme Court. This has resulted in the destruction of hills and the opening of gap (Passes) areas, allowing the desert to progress toward North India. The occurrence of sandstorms has also been attributed to this destruction. Many villages are losing their grazing lands due to unsustainable mining practices.
- **Lack of Research**: No comprehensive government study has been conducted to assess the on-ground challenges related to mining in the Aravalli region.

Analytica

- Unsustainable economic development can have long-term negative consequences on citizens, the economy, and the environment. While economic growth is important for improving lives, governments must be aware that extensive and unsustainable mining practices can disrupt the ecological balance of a region.
- Widespread mining can lead to severe impacts on forest habitats and agricultural surfaces, while mismanaged urban growth can create conditions that facilitate the emergence of pandemics.

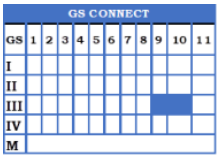
PEPPER IT WITH
UNCCD, Edge Effect, CBD, Aravalli Biodiversity park

Way Forward

- Involving citizens in preserving the Aravalli range and combating illegal mining is crucial. Active citizen participation can help monitor and report illegal activities, while the government and local administration must take strict action to enforce laws.
- The Aravalli Green Wall Project should be implemented in a planned and systematic manner, taking into account the unique characteristics of the Aravalli region.

EL Nino

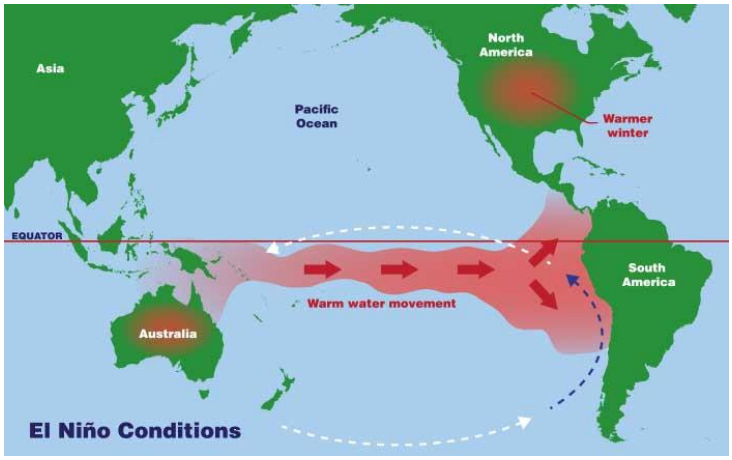
News Excerpt



There is a nearly 70% probability of an El Nino developing this monsoon, according to the India Meteorological Department (IMD).

Pre-Connect

- El Niño events are major disruptions of the climate that originate in the equatorial region of the Pacific Ocean.
- The occurrence of El Niño is characterized by the cooling of waters in the Australian region, which in turn affects the distribution of pressure belts in the Indian Ocean.
- During El Niño, the coastal waters off Peru tend to be unusually warm, while the waters near Australia become cooler.
- This leads to the development of high-pressure conditions over Australia, which in turn causes the cooling of the western Pacific Ocean.
- The unusual phenomena affect the formation of monsoon trough over the Indian Plains. The pressure gradient is not formed due to low pressure on the Madagascar region. El Nino badly affects the monsoon of India.



Consequences of El Nino

Dimension	Impacts
Economy	○ El Niño can lead to reduced agricultural output, which can have a negative impact on the economy. ○ The decrease in agricultural production can lead to higher food prices, reduced income for farmers, and increased imports of food items.
Climate	○ During El Niño, there is a decrease in rainfall over India, particularly during the monsoon season. ○ This can lead to drought conditions, which can have a range of consequences including water shortages, lower crop yields, and increased risk of wildfires.
Agriculture	○ Deficit rainfall during El Niño can negatively impact crop yields, leading to lower agricultural production. ○ The crops that are most affected include rice, wheat, and pulses, which are major staples in India, which could led to issue of hunger in society.
Society	○ El Niño can lead to social and economic hardship for vulnerable communities in India, particularly those who rely on agriculture for their livelihoods. ○ This may include decreased access to food, water, and other resources.

Coral reefs	○ During El Niño, warmer waters can cause coral bleaching, leading to the loss of color and eventually death of the coral. ○ This may have a significant impact on biodiversity in the affected areas, as coral reefs are important habitats for many marine species.
Fisheries	○ El Niño can cause changes in ocean currents and temperature, which can lead to changes in the distribution and abundance of fish populations. ○ El Niño can have significant impacts on fishers in India by changing the distribution of fish and reducing productivity.
Forest Fire	○ El Niño can contribute to an increased risk of forest fires in India, particularly in regions that are already prone to drought conditions. ○ During El Niño, there is often a decrease in rainfall, which can lead to dry conditions and an increase in the amount of available fuel for fires.

Mitigation strategies

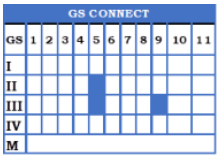
PEPPER IT WITH

ENSO, Indian Ocean dipole, Walker Circular, Upwelling, downwelling

- **Early warning systems**: Effective early warning systems can help to reduce the impacts of El Niño on communities and ecosystems. This can include monitoring ocean temperatures, weather patterns, and other indicators of El Niño, and providing timely and accurate information to those who may be affected.
- **Climate-smart agriculture**: To ensure food security adoption of climate-smart agricultural practices must be taken. These practices can help to reduce the vulnerability of agricultural systems to El Niño-related droughts and other weather extremes.
- **Protecting and conserving ecosystems**, such as coral reefs and forests, can help to maintain their resilience and reduce the impact of El Niño-related disruptions.

National Conference on Biomass: Biomass co-firing

News Excerpt



Recently, Government has organized the "National Conference on Biomass 3P - Pellet to Power to Prosperity".

Pre-Connect

- Ministry of Power, under its revised policy, mandates the use of 5% biomass pellets made primarily of agro-residue along with coal in thermal power plants.
- As per the policy, the obligation to use biomass pellets in thermal power plants shall increase to 7%, in the next 2 years.
- Co-firing of agro residue pellets with coal has started in almost 40 thermal power plants.
- The 'National Mission on use of Biomass in coal-based thermal Power plants', also called SAMARTH — Sustainable Agrarian Mission on use of Agro-residue in Thermal Power Plants — has shared a list of pellet manufacturers with the power plants.

About

- Biomass co-firing is the practice of substituting a part of the fuel with biomass at coal thermal plants which can help cut emissions.
- Biomass pellets made from agricultural waste have an equivalent calorific value to that of Indian coal. (As per the Central Electricity Authority (CEA).
- It can help cut emissions from the combustion of fossil fuels, address India's burgeoning problem of farm stubble burning to some extent, and reduce waste burden while also creating jobs in rural areas.
- Around 95,000-96,000 tonnes of biomass pellets are required per day for co-firing, according to the 'National Mission on use of biomass for coal thermal power plants set up by the Union power ministry'.
- Ex-situ utilization of paddy straw is an important strategy to control stubble burning and instances of air pollution in the National Capital Region and surrounding fringes.

Challenges of biomass Co-firing

- ✓ **Unavailability**: One challenge in carrying out the Union power ministry's directive to co-fire biomass with coal in thermal power plants is the lack of availability of biomass pellets.

- ✓ **Demand Supply Gap**: The demand-supply gap could further be intensified due to the growing disparity, the suppliers of these pellets are inclined to sell their products to other industries like textile, food processing, and metal-based industries, or in the open market where they can get higher prices, instead of supplying to coal thermal power plants at the offered price.
    - Skewed demand supply and Lack of infrastructure further pose issues for the effective utilization of Biomass in the form of crop residue.
- ✓ **Price Factor**: Thermal power plants offer fewer prices as compared to other industries and the open market, therefore enough supply stock is not held by power plants.
- ✓ **Seasonal factor**: Unstable and seasonal supply of biomass pellets is causing a gap between their demand and supply to power plants.
- ✓ **Storage limitations**: Storing biomass pellets for extended periods at power plant sites is difficult as they quickly engross moisture, rendering them inapt for co-firing.

Positive Outcomes

- Biomass co-firing can play a vital role in curbing crop stubble burning, air pollution, reducing the carbon footprint of thermal power plants in India, by augmenting farmers' income.
- Co-firing biomass pellets with coal can lower GHG emissions from coal-based power plants, particularly in areas where agro-residue burning is widespread, leading to reduced coal reliance and significant decreases in pollution levels.
- Farmers in the country are earning extra income by selling agro-residue/biomass, previously regarded as waste, for conversion into torrefied/non-torrefied biomass pellets used to produce zero-carbon electricity.
- Biomass co-firing can have a multitude of impacts like-
    - Co-firing in coal plants can significantly increase the use of biomass in electricity production.
    - It is the lowest-capital-cost option for scaling up biomass utilization to generate electricity.
    - Co-firing biomass and coal can take advantage of the high efficiencies achievable in large coal-fired power plants.
    - Biomass's higher volatile content can improve combustion when co-fired with coal.

Steps taken by Government

- ❖ A specialized window for procuring biomass pellets has been created on the GeM portal.
- ❖ The RBI's identification of biomass as a priority lending sector has simplified and accelerated access to bank loans for pellet manufacturers.
- ❖ The State Bank of India has introduced a specific scheme to provide long-term loans to biomass pellet manufacturers.
- ❖ Financial subsidy schemes issued by the Central Pollution Control Board (CPCB) and the Ministry of New & Renewable Energy (MNRE) aim to encourage new entrepreneurs to enter the biomass pellet sector.

PEPPER IT WITH

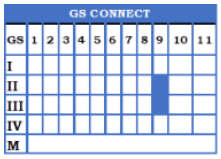
Rice Straw, Crop Residual, Waste to Wealth, National Policy for Management of Crop Residues, In-situ management

Way Forward

- SAMARTH can address the pellet shortage by mapping existing manufacturers and incentivizing entrepreneurs to set up more pellet plants.
- Biomass pellet prices should be protected from market demand fluctuations, and farmers should have a role in the pellet manufacturing and co-firing business model.

International Big Cat Alliance

News Excerpt



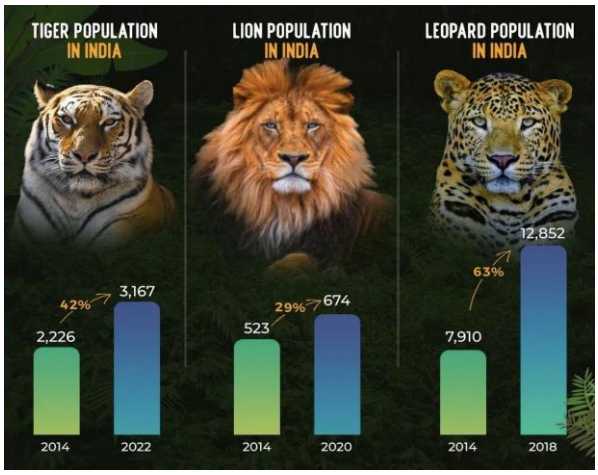
Recently, the Indian Government launched the International Big Cat Alliance (IBCA) during an event commemorating 50 years of Project Tiger in Karnataka.

Pre-Connect

- The first ever global tiger summit to save the tigers from extinction was held at The Tiger summit 2010 at St. Petersburg, Russia.
- In 2005, National Tiger Conservation Authority was constituted on recommendation of the Tiger Task Force, to reorganize management of Project Tiger and the many Tiger Reserves in India.

Project Tiger

- Project Tiger was launched by the Central government in 1973, at the **Jim Corbett National Park** during Indira Gandhi Government.
- The program was initially started in nine tiger reserves of different States such as **Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Uttar Pradesh and West Bengal**. Now it has been undertaken by more than fifty national parks.



About International Big Cat Alliance (IBCA)

- In 2019, India first proposed an international group against **poaching and illegal wildlife trade** while releasing the country's tiger census report to mark **Global Tiger Day**.
- The IBCA aims to conserve the planet's seven big cats: Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma.
- Through this alliance India hopes that IBCA will provide a platform for the member nations to share **knowledge and expertise.**
- The global bloc will include as many as 97 range countries.
- The key role of IBCA will be in facilitating the **mobilization of financial** and **technical resources** for the overall ecosystem dealing with big cat species while implementing the **conservation** and **protection** agenda that has emerged from the experiences of other countries.

Current status of these seven big cats

Type of species	Population(world)- IUCN status	Distribution	Threats
Lion	(23,000-39,000)- Endangered	Parts of sub-Saharan Africa, West Africa and Asiatic lions at the Gir National Park.	Land use and climate change.
Tiger	(3,700-5,000)- Endangered	Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam.	Use of land by humans for agriculture and development.
Cheetah	(Less than 7000)- Vulnerable	Endemic to the savannahs of Africa. Africa, India, Pakistan, Russia, Iran and the Middle East.	Human-wildlife conflict, climate change, loss of prey and illegal trafficking.
Jaguar	(Around 1,73,000)- Near threatened	Amazon rainforest and the Pantanal in South America. Brazil accounts for half of the wild jaguars in the world	Illegal hunting, trade, fragmented habitats, deforestation and agricultural activities.
Snow Leopard	(4,000-6,500)- Vulnerable	Across the mountainous regions of 12 countries across Asia — Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.	Climate change, human disturbances and increased use of grazing space. decline in natural prey species and retaliatory killings due to human-wildlife conflict.
Puma	(Less than 50,000)- Near threatened	Canada through the U.S. and Central and South America.	Loss of habitat and prey, besides human-wildlife conflict.
Leopard	(Around 2,50,000)- Vulnerable	Africa, parts of the Middle East and Asia, including India and China.	Habitat loss, poaching for body parts and harm due to human intervention. road accidents in protected areas

Issues pertaining Big cat conservation

✓ **Creating a Framework and Governance Structure:**

- A well-defined framework and governance structure will be established to manage the alliance, enabling smooth coordination among the participating countries and ensure that the IBCA's goals are met and that resources are allocated efficiently.

- ✓ **Comprehensive Conservation Strategy:**
  - A comprehensive conservation strategy will be formulated, taking into account the unique challenges faced by each big cat species and their habitats by including habitat restoration, population monitoring, community engagement, and anti-poaching measures.
- ✓ **Promoting Knowledge Exchange and Capacity Building:**
  - The IBCA will include sharing best practices, technologies, and scientific research related to big cat conservation, as well as organizing training and capacity-building workshops for forest officials, policymakers, and other stakeholders among participating countries.
- ✓ **Mobilizing Resources and Funding:**
  - Securing adequate funding is crucial for the success of the IBCA. Participating countries and international organizations will collaborate to mobilize resources and explore innovative financing mechanisms, such as public-private partnerships, to support conservation efforts.
- ✓ **Raising Public Awareness and Engagement:**
  - The IBCA will work towards creating targeted campaigns to raise awareness about the importance of big cats and their ecosystems, highlighting the need for conservation efforts and encouraging public participation in various initiatives for the long-term success of big cat conservation.
- ✓ **Monitoring and Evaluation:**
  - Regular monitoring and evaluation of the IBCA's progress will be conducted to assess the effectiveness of conservation efforts and identify areas for improvement.
  - This will enable the alliance to adapt its strategies and remain agile in addressing emerging challenges.

Big Cat and their role in Ecosystem:

- The loss of an apex predator like big cats can set off something called a "**trophic cascade**," in which the disrupted food chain sends the ecosystem spiraling out of control.
- Without predators, for example, prey populations may explode, overgrazing and degrading the health of the landscape. This can lead to intensifying wildfires, disease and a host of other ecological challenges. **Big cats keep ecosystems in balance.**
- Protecting tiger habitats fights **climate change** means protecting forests that give us the air we breathe and soak up carbon dioxide from the atmosphere, helping to mitigate climate change.

PEPPER IT WITH

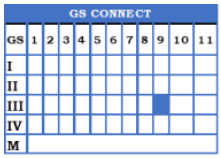
Indian Wildlife (Protection) Act, 1972: Schedule I, National Tiger Conservation Authority (NTCA), Critical Tiger Habitats (CTH)

Conclusion

With big cats as mascots for sustainable development and livelihood security, India and the big cat range countries can usher in major efforts on environmental resilience and climate change mitigation, while paving a future where natural ecosystems continue to thrive, and gain centrality in economic and development policies.

UN Water Conference

News Excerpt



Recently, the United Nations 2023 Water Conference held in New York was the first such meeting on water after 46 years. The conference coincided with the mid-term comprehensive review of the International Decade for Action.

Pre-Connect

- The **Mar del Plata conference** in Argentina created an Action Plan on "**Community Water Supply**" in 1977, declaring that all peoples have the right to access to drinking water in quantities and quality equal to their basic needs.

About UN Water Conference

- ➢ Since the first UN Water Conference was held in Argentina in 1977, the Earth's population has doubled to 8 billion and demand for water is skyrocketing.
- ➢ It also marks the halfway point through **the International Decade for Action "Water for Sustainable Development**", adopted by the UN General Assembly on W**orld Water Day – 22 March 2018**.
- ➢ The Conference aims to raise awareness of the global water crisis and decide on action to achieve internationally agreed water-related goals.
- ➢ It will be held in **New York,** Co-hosted by the governments of the **Netherlands** and **Tajikistan**.

The Conference has **five themes** that support the **SDG 6 Global Acceleration Framework:**

- ✓ **Water for Health:** Access to **'WASH'** (Global Water, Sanitation, & Hygiene) including the Human Rights to Safe Drinking Water and Sanitation.
- ✓ **Water for Sustainable Development**: Valuing water, the water-energy-food nexus and sustainable economic and urban development.
- ✓ **Water for Climate, Resilience and Environment**: Source to sea, biodiversity, climate, resilience and disaster risk reduction.
- ✓ **Water for Cooperation**: Trans-boundary and international water cooperation, cross sectoral cooperation and water across the 2030 Agenda.
- ✓ **Water Action Decade**: Accelerating the implementation of the objectives of the Decade for Action, including through the UN Secretary-General's Action Plan.

The conference's outcomes

- **Action Oriented Plan**-
  - To face the complexity of today's water problems, it included a $50-billion commitment from the Indian government to improve rural drinking water services under its **Jal Jeevan Mission.**
- **Technology** –
  - There were specific innovations in **wastewater treatment** or **solar treatment of water** in remote areas, and a number of proposals for incubation platforms, including the IBM Sustainability Accelerator, focused on water management.
- **Data and models** –
  - To anticipate potential impact there is a need for Simulations, it advocated **Cost-effective approaches** to data-generation included sensors and satellite data.
- **Knowledge sharing** –
  - By using accelerated cross-learning tools like **W12+ Blueprint** we can solve most of these problems in each region and country.

❖ **W12+ Blueprint**- It is a UNESCO platform that hosts city profiles and case studies of programs, technologies, policies that addresses common water security challenges.

- **Capacity building**-
  - Efforts like the **Making Rights Real initiative** offered to help marginalized communities and women understand how to exercise their rights.
  - Similarly, the '**Water for Women Fund**' offered support mechanisms for more effective and sustainable water, sanitation, and hygiene outcomes for women.
- **Civil society** –
  - There were several platforms for collective action by civil society groups lobbying for changes in regulations, e.g. creating **transnational networks** to advocate for national and international bodies to criminalize the use of certain pesticides harmful to aquatic life.
- **Environmental, social, and corporate governance** –
  - The conference concluded that a big barrier to farmers and industries using water more efficiently is that they have no incentive.
  - Specifically, farmers aren't becoming more efficient or going pesticide-free unless consumers are willing to pay a premium for more sustainably produced goods.

Challenges

- The challenge is that improving access to water and sanitation no longer translates directly to sustained access to water and sanitation.
- Many drinking water projects have failed because they drew too much groundwater or the water sources were contaminated, leaving communities slipping back again with no access to water.

- **Groundwater over-abstraction** is mostly driven by agricultural pumping. The only way to solve this problem in heavily irrigated places like Punjab is to pump less. This would need a policy change which requires many agencies and ministries to cooperate.

Conclusion

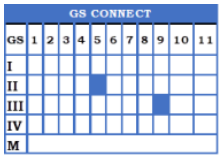
Effective water governance hinges on these broad areas, and weaving them into the Water Action Agenda is a step to these commitments through tough political choices, empowering agencies, and strengthening democratic processes.

PEPPER IT WITH

United Nations, SDG, Jal Kranti Abhiyan, National Water Mission, National Rural Drinking Water Programme, NITI Aayog Composite Water Management Index, Jal Jeevan Mission, Jal Shakti Abhiyan, Atal Bhujal Yojana, W12+ Blueprint.

Great Nicobar Island Project

News Excerpt

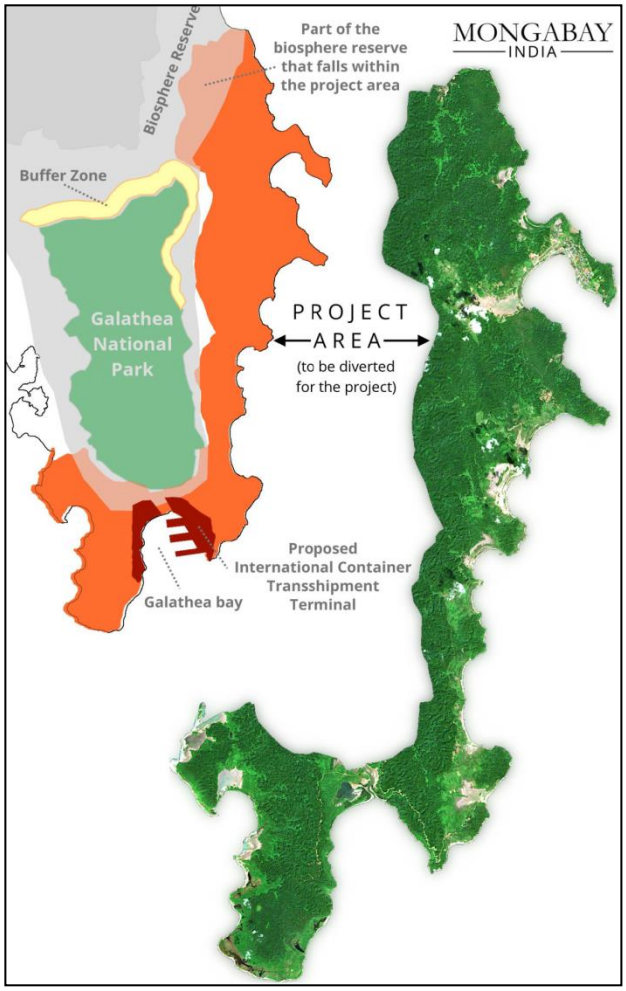


Recently, the eastern bench of National Green Tribunal (NGT) has ordered constitution of a high-powered committee under the Environment Secretary for a "relook" at environmental clearances given to the Rs 72,000-crore Greater Nicobar project.

Pre-Connect

About Great Nicobar Island Project

- The GNI Project is, in fact, **four 'interlinked'** projects that together constitute the **new Greenfield city** at Great Nicobar. The four projects are:
  - The International Container Transshipment Terminal (ICTT),
  - Greenfield International Airport,
  - A Township and
  - A 450 MVA gas- and solar-based power plant over 16,610 hectares.
- The project is being spearheaded by **Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO)**, under a vision plan conceived by the **NITI Aayog.**
- The idea behind the development of GNI is based on leveraging the locational advantage of being on the international sea route and develops GNI as a **sustainable, green, global destination for business, trade, and leisure.**
- The island has a total area of a little more than 900 sq km, with nearly **850 sq km** designated as a tribal reserve under the **Andaman and Nicobar Protection of Aboriginal Tribes Regulation, 1956**.
- The ecologically rich island was declared a **biosphere reserve** in **1989** and included in **UNESCO's Man and Biosphere Program** in **2013.**



Major Observations by NGT

- The tribunal observed that a sector of the project falls under the **CRZ-IA** area, in which construction of ports is prohibited.
- The project also involves the cutting of nearly a million trees in a **largely pristine** and **untouched rainforest ecosystem**. The location of the proposed port also has a huge number of coral colonies.
- Andaman and Nicobar Island Integrated Development Corporation Ltd (ANIIDCO) is bound to comply with the **Island Coastal Regulation Zone 2019** and tribal rights.
- It has also planned compensatory far-field afforestation and mangrove plantations in **Haryana and Madhya Pradesh**.
- The **MoEFCC's Expert Appraisal Committee (EAC)-Infrastructure I** environmental clearance process is riddled with contradictions and lack of transparency.

Concerns

✓ **Human Dimension-**

- The rights and livelihoods of the two tribal communities for whom Great Nicobar has been home for thousands of years: **the Nicobarese** (about a 1,000 people) and **the Shompen** (about 200).
- **Shompen** is classified as a **particularly vulnerable tribal group (PVTG)** and is a hunter-gatherer nomadic community critically dependent on the forests of the island for survival.

✓ **Environmental and Ecological Dimension-**

- Great Nicobar covers a variety of unique and threatened eco systems **– tropical, wet evergreen forests, mountain ranges** reaching 642 metres above sea level and coastal plains.
- It is home to myriad species of **angiosperms, gymnosperms, ferns** and **bryophytes,** as well as to hundreds of species of fauna, many of which are rare and threatened species such as **the giant leatherback turtle.**
- It also has endemic or endangered species such as the **crab eating macaque**, the **Nicobar tree shrew, the dugong**, **the Nicobar megapode**, **the saltwater crocodile**, the **Nicobar cricket frog** and several others.
- The **Galathea bay** in the island is a nesting ground for birds and the project area is part of **Coastal Regulation Zones-IA and IB.**
- All these are seriously threatened and will quite possibly be rendered extinct by the enormous 'development project' proposed to be taken up.

✓ **Tectonic Volatility And Disaster Vulnerability-**

- The main concern is the project's location is on a **major fault line**, Great Nicobar Island's proximity to the Ring of Fire and its history of earthquakes raise concerns about the feasibility of developing an urban port city.
- The coastline of Great Nicobar saw **permanent subsidence** of nearly four metres as evidenced by the fact that the lighthouse at **Indira Point** now stands surrounded by water.

PEPPER IT WITH

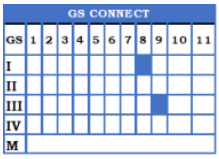
National Green Tribunal (NGT), Great Nicobar Island, Coastal Regulation Zones, Turtles, Dolphins

Conclusion

The impact of mankind on biodiversity has clearly been detrimental to many animals and plants, but the story is more complex and subtle than has been appreciated. Having assumed the leadership of the G-20 group of nations this year, India should surely demonstrate that economic development does not, and should not, have to be at the expense of the environment, and that protecting the environment is the wisest of economic decisions.

Issue of Coastal Erosion

News Excerpt



Recently, the Ministry of Earth Sciences informed the Lok Sabha that of the 6,907.18 km long Indian coastline of the mainland, 33.6% of area is under varying degrees of Coastal erosion.

Pre-Connect

About Coastal Erosion

- Coastal erosion is the wearing away of the land by the sea often involves destructive waves wearing away the coast (though constructive waves also contribute to coastal erosion).
- There are four main processes of coastal erosion. These are:
  - **Corrasion** the mechanical erosion of soil and rock by the abrasive action of particles set in motion by sea waves.
  - **Abrasion** is the physical process of rubbing, scouring, or scraping whereby particles of rock (usually microscopic) are eroded away by friction.
  - **Hydraulic Action** is the sheer force of water crashing against the coastline causing material to be dislodged and carried away by the sea.
  - **Attrition** is when waves cause rocks and pebbles to bump into each other and break up.

International Involvement

➢ INCOIS being a permanent member of the Indian delegation to IOC of UNESCO and a founding member of the **Indian Ocean Global Ocean Observing System (IOGOOS)** is actively engaged in capacity building and international exchange of students and researchers. It provides ocean information and forecasts to member countries.

The key physical parameters

- ✓ **Coastal Geomorphology**:
  - Coastline type and sensitivity to coastal processes.
- ✓ **Wind:**
  - The main force in wave generation; under the right environmental conditions, wind may transfer sediment from the beach environment landward on all open coastlines.
- ✓ **Waves:**
  - They are the most important forces for sediment erosion and transport to the coastal zone.
  - It is important to understand the movement of wave forms as well as water particles and their interaction with seabed material; also how the waves determine whether the coasts are erosive or accretional.
- ✓ **Tides:**
  - They are influential in beach morphodynamics. They modulate wave action, controlling energy arriving on the coast and drive groundwater fluctuation and tidal currents.
  - The interaction of groundwater with tides in the coastal forest environment is crucial in understanding why coastal forest clearance causes intensive coastal erosion in particular environments.
- ✓ **Vegetation:**
  - Important for improving slope stability, consolidating sediments and providing some shoreline protection.

Indian National Centre for Ocean Information Services (INCOIS)

- ❖ It is an autonomous organization of the Ministry of Earth Sciences (MoES) that has carried out Coastal Vulnerability Index (CVI) mapping to assess the probable implications of sea-level rise along the Indian coast.

Significant human activities

- **Activities along the coast:**
  - Building houses via land reclamation or within sand dune areas and **port/harbour** development has a long-term impact on shoreline change;
  - **Protective seawalls** lead to erosion at the end of the structures, generate beach scouring at the toe of seawall and shorten the beach face.
  - Removal of **dune vegetation** and **mangroves** will expose low energy shorelines to increased energy and reduced sediment stability, causing erosion within five to ten years.
- **Activities within river catchments/watersheds:**
  - **Dam construction** and **river diversion** cause reduction of sediment supply to the coast that contributes to coastal erosion.
- **Onshore and offshore activities:**
  - Sand and coral mining and dredging may affect coastal processes in various ways such as contributing to sediment deficit in the coastal system and modifying water depth that leads to altered wave refraction and long shore drift.

Way forward

In order to avoid shoreline erosion, the following activities were taken up

- **Development of web-based coastal change system** to disseminate information related to coastal development, impact assessment of extreme events and climate change (SLR) on the shoreline and its management aspects.
- **Development of an operational coastal flood warning system** for flood-prone coastal cities of the country and impact based forecasting expert system for tropical cyclones and multi-coastal hazards in disaster-prone areas of the country.
- **Mapping of vulnerable areas** along the coast using crowd sourcing and working in close coordination with the State Governments on developing scientific and technology-based tools to aid their disaster risk reduction operations.
- The **15th Finance Commission** has recommended the creation of **National Disaster Risk Management Fund (NDRMF**) and **State Disaster Risk Management Fund (SDRMF).**
- The Commission has also made specific recommendations for "**Mitigation Measures to Prevent Erosion"** and **"Resettlement of Displaced People Affected by Erosion**" under NDRF.

PEPPER IT WITH

Indian National Centre for Ocean Information Services, Coastal Vulnerability Index, Coastal Regulation Zone (CRZ)

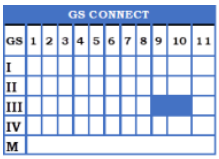
Conclusion

Economic, environmental, social and cultural values are all subjects of protection from coastal erosion; national governments can determine priorities by taking these factors into account, depending on the specific situation by growing Coastal forests as a green belt/buffer zone using participatory planning in collaboration with local communities.

Antarctic Ice Melting

News Excerpt

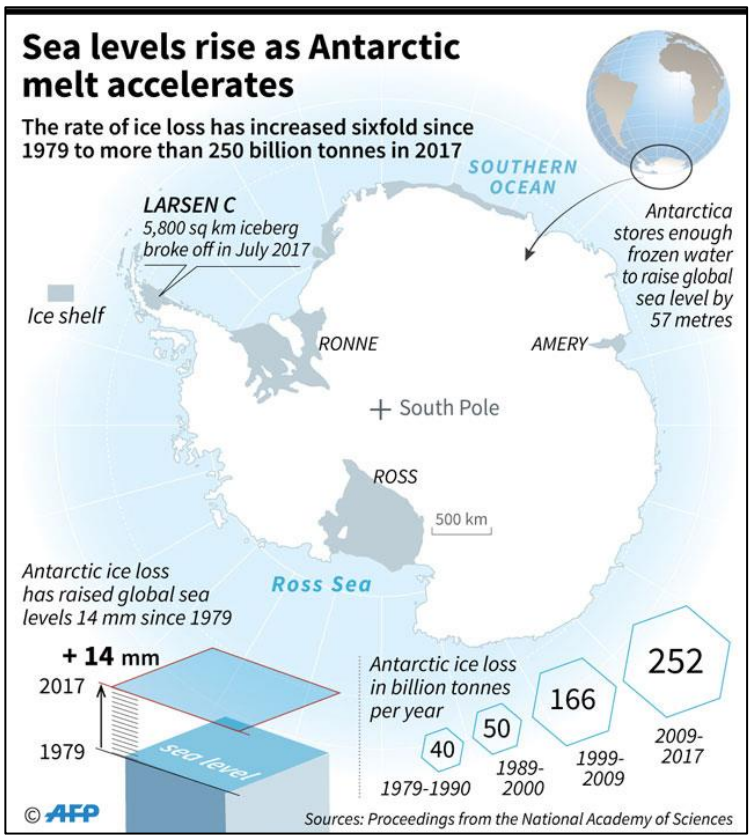
Recently, new research has found that rapidly melting Antarctic ice is dramatically slowing down the flow of water through the world's oceans, and could have a disastrous impact on global climate, the marine food chain and even the stability of ice shelves.



Pre connect:

Key points of the research:

- According to research as temperatures rise, freshwater from Antarctica's melting ice enters the ocean, reducing the salinity and density of the surface water and diminishing that downward flow to the sea's bottom.
- While past research has looked at what could happen to similar overturning circulation in the North Atlantic – the mechanism behind the doomsday scenario that would see Europe suffer from an Arctic blast as heat transport falters – less has been done on Antarctic bottom water circulation.
- Scientists relied on around 35 million computing hours over two years to crank through a variety of models and simulations up to the middle of this century, finding deepwater circulation in the Antarctic could weaken at twice the rate of decline in the North Atlantic.



Effects of Melting glaciers

- **On sea level rise:** Melting glaciers add to rising sea levels, which in turn increases coastal erosion and elevates storm surge as warming air and ocean temperatures create more frequent and intense coastal storms like hurricanes and typhoons.
  - Specifically, the Greenland and Antarctic ice sheets are the largest contributors of global sea level rise.
- **Effect on weather patterns:** The glacial melt we are witnessing today in Antarctic and Greenland is changing the circulation of the Atlantic Ocean and has been linked to collapse of fisheries in the Gulf of Maine and more destructive storms and hurricanes around the planet.
- **Effect of Sea ice loss on humans and wildlife:** As sea ice and glaciers melt and oceans warm, ocean currents will continue to disrupt weather patterns worldwide.
  - Industries that thrive on vibrant fisheries will be affected as warmer waters change where and when fish spawn.
  - Coastal communities will continue to face billion-dollar disaster recovery bills as flooding becomes more frequent and storms become more intense. People are not the only ones impacted.
- **Leaving more CO2 in the atmosphere**
  - The study's findings also suggest the ocean would not be able to absorb as much carbon dioxide as its upper layers become more stratified, leaving more CO2 in the atmosphere.

Deglaciation

- Deglaciation refers to the uncovering of land and water that was previously covered by ice.
- The process corresponds to the retreat of the glacier terminus or the ice sheet margin toward its source area.
- This occurs when the ice mass transfer from the accumulation zone to the ablation zone is not sufficient to replace the ice lost by melting or calving.
- As glaciers and ice sheets are highly sensitive to climate variations, their mass balance budget will primarily reflect prevailing climate conditions: cooling (ice advance), warming (ice decay), and stable (ice stagnation).
- In the case of the deglaciation, more ice will melt in the ablation area than could be replaced by precipitation (mostly as snow) in the accumulation area, resulting in a net glacier/ice sheet margin retreat.

➢ Disrupting the base of the food chain

- The effect of meltwater on global ocean circulation has not yet been included in the complex models used by the IPCC to describe future climate change scenarios, but it is going to be considerable.
- Ocean overturning allows nutrients to rise up from the bottom, with the Southern Ocean supporting about three-quarters of global phytoplankton production, the base of the food chain.

India's Initiatives to Antarctic:

✓ Indian Antarctic Bill, 2022 passed from parliament which aims at having India's own national measures for protecting the Antarctic environment as also the dependent and associated ecosystem.

✓ India has two operational research stations at Antarctica – Maitri and Bharati.

- Dakshin Gangotri was first station to be built before 1985 but is no longer operational.

✓ India is working for the renewable energy and trying to reduce the effect of global warming and climate change.

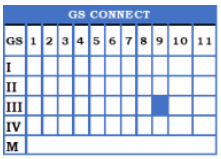
PEPPER IT WITH
Indian Antarctic Bill, 2022, Deglaciation, climate change

Way forward:

- Every country should plan to tackle the effect of global warming and implement properly those steps.
- World should be together on the issue of climate change and developed countries should take their responsibility and help developing and least developed countries for fighting with climate change.
- UN initiative to mitigate global warming effect as well as work on International Solar alliance and other international groups.

IPCC Synthesis Report

News Excerpt:



Recently, IPCC has released the final report, known as the Synthesis Report, of its sixth assessment cycle.

About IPCC Report

- IPCC report is a how-to guide to defuse the climate time-bomb.
- It is a survival guide for humanity.
  - As it shows, the 1.5-degree limit is achievable. But it will take a quantum leap in climate action.
- This report is a clarion call to massively fast-track climate efforts by every country and every sector and on every timeframe.

Key points of the report

➢ The new report lays out the present impact of soaring global temperature and imminent ramifications in case the planet continues to get warmer.

➢ Due to the current global warming levels, almost every region across the planet is already experiencing climate extremes, an uptick in deaths due to heatwaves, reduced food and water security and damage to ecosystems, causing mass extinction of species on land and in the ocean.

➢ vulnerable communities who have historically contributed the least to climate change are being disproportionately affected

- more than three billion people live in areas that are "highly vulnerable" to climate change — people living in these regions were "15 times more likely to die from floods, droughts and storms between 2010-2020 than those living in regions with very low vulnerability".

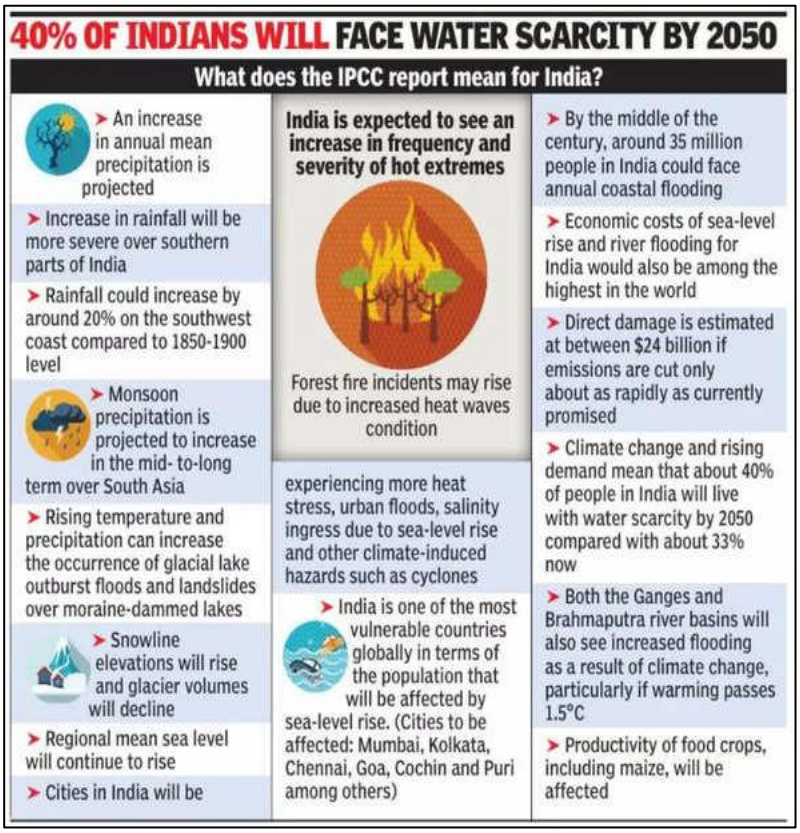
➢ Things can get worse if the world crosses the 1.5 degree Celsius temperature limit, a target agreed to in the Paris Agreement.

- This would result in an unpredictable global water cycle, drought and fires, devastating floods, extreme sea level events and more intense tropical cyclones.

➢ According to the scientists involved in writing the report, India would also face these dire consequences of global warming and needs to take immediate action to curb the temperature.

Recommendation

- ✓ IPCC added in report that there is still a chance to avert this mass-scale destruction, but it would require an enormous global effort to slash greenhouse gas emissions in half by 2030 and completely phase them out by 2050.
- ✓ The urgent need of limiting the use of fossil fuel, the report urges governments and policymakers to increase finance to climate investments, expand the clean energy infr astructure, reduce nitrogen pollution from agriculture, curtail food waste, adopt measures to make it easier for people to lead low-carbon lifestyles and much more.
- ✓ According to the report the risks we face – drought, rising seas, floods – are happening, and will happen, at lower levels of warming.
    - We must halve our emissions in this decade and limit warming to 1.5°C.
    - We must bend the emissions curve down, global emissions need to peak before 2025."
- ✓ The Synthesis Report underlines the requirement of climate-resilient development, which is finding ways to adapt to climate change or reduce greenhouse gas emissions that provide wider benefits.
    - It further mentions that to be effective, these measures must be rooted in our diverse values, world views and knowledge around the globe — including Indigenous knowledge.



Climate Change and 'hot lightning' strikes

- ❖ Recently, a new study Published in the journal Nature Communications has found that the soaring global temperatures could lead to more "hot lightning" strikes in many parts of the world.
- ❖ According to the researchers, lightning is a major cause of triggering wildfires and is responsible for producing the largest wildfires in some regions, including the Western United States.
    - Lightning-caused wildfires are dangerous as they spread rapidly before a strong response can be implemented and release substantial amounts of carbon, nitrogen oxides and other trace gases into the atmosphere.
- ❖ The researchers found that approximately 90 per cent of lightning-ignited fires might have started by "hot lightning" strikes.
    - Also known as long continuing current (LCC), this type of lightning strike can last from around 40 milliseconds to nearly a third of a second.
- ❖ According to researchers lightning with continuing currents can transport more energy from cloud to ground than typical lightning. When lightning with continuing currents attach to ground or vegetation, they produce more Joule heating and higher temperature than typical lightning, increasing the probability of ignition.

About Lightening

- ❖ Lightning is a rapid and massive electrical discharge that takes place between storm clouds and the ground, or within the clouds themselves.
- ❖ Scientists believe that for lightning to occur, positive and negative charges must separate within a cloud.
    - This happens, according to the National Oceanic and Atmospheric Administration (NOAA), when the water droplets in the bottom part of the cloud are moved upwards, where the much colder atmosphere freezes them into small ice crystals.
    - A 'stepped leader' of negative charge descends from the cloud seeking out a path toward the ground. As the negative charge gets close to the ground, a positive charge, called a streamer, reaches up to meet the negative charge. The channels connect and the lightning stroke.

Effort from Indian side

- Indian government proposed a five-fold strategy for India to play its part in helping the world get closer to 1.5 degrees Celsius on CoP26.
    - 'Panchamrita' promises include:
        - India will get its non-fossil energy capacity to 500 giga-watt by 2030
        - India will meet 50 per cent of its energy requirements till 2030 with renewable energy
        - India will reduce its projected carbon emission by one billion tonnes by 2030
        - India will reduce the carbon intensity of its economy by 45 per cent by 2030
        - India will achieve net zero by 2070
- Lifestyle for Environment (LiFE) is an India-led global mass movement to nudge individual and community action to protect and preserve the environment.
- India worked to reduce fossil fuel by International solar alliance and other international organization and countries.

Effort from the world

- The world is coming together to deliver efficient, climate-friendly cooling for all, including through enhanced national climate plans.
- A coalition of government, corporate and non-governmental leaders, the alliance champions accelerated energy efficiency, helping individual countries prepare roadmaps to boost efficiency.
- Thirty-six small island developing States and their partners have come together to share strategies and galvanize momentum in the transition to renewable and resilient energy systems.
- **Coalition for Disaster-Resilient Infrastructure:** Governments, UN organizations, multilateral banks, businesses and knowledge institutions are collaborating to build resilience to climate and disaster risks into infrastructure systems.
- **Campaign for Nature:** This growing coalition of more than 100 conservation organizations calls on policymakers to commit to a science-driven, ambitious new deal for nature.

Way forward

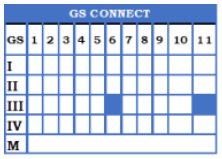
* Shifting to low-carbon, plant-forward diets can help mitigate agricultural emissions as well as have important health co-benefits from improvements in dietary risk factors and mortality from non-communicable diseases.
* Governments across the world should identify vulnerable populations, assess the influence of existing policies, programs, and health systems' capacities in building resilience, and identify future adaptation needs.

PEPPER IT WITH

IPCC Reports, UNEP, Net Zero Emissions, INDC

SCIENCE & TECHNOLOGY

ISRO's Reusable Launch Vehicle



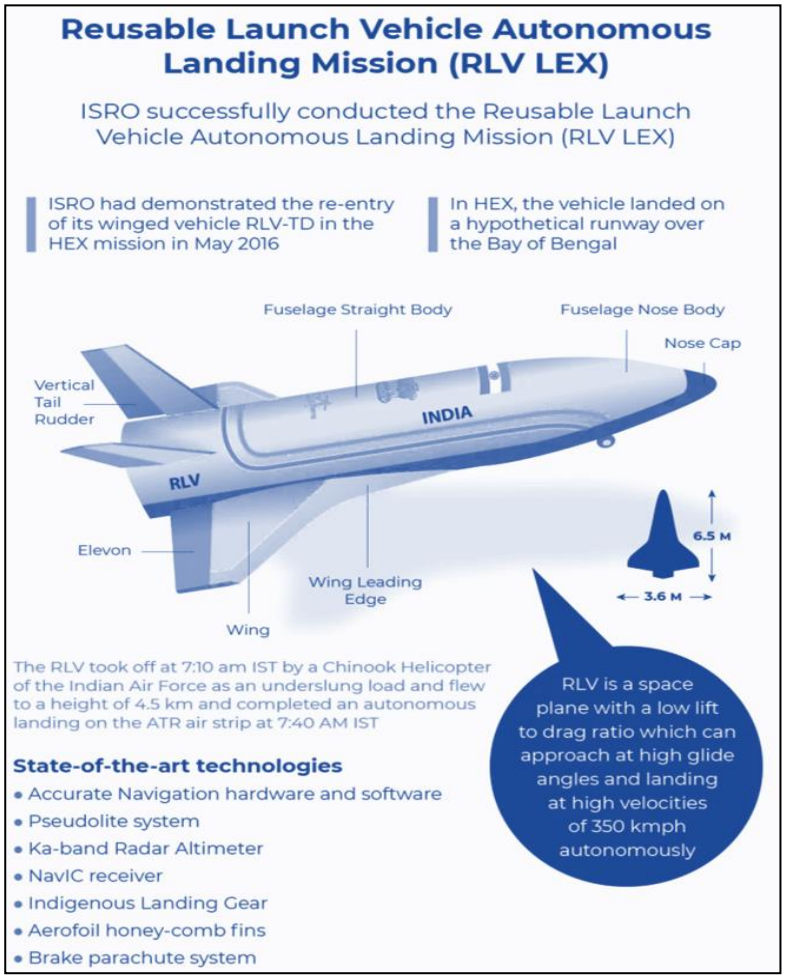
News Excerpt

Recently, the Indian Space Research Organization and its partners successfully demonstrated a precise landing experiment for a Reusable Launch Vehicle.

Pre-Connect

About ISRO's RLV TD project

- **Reusable Launch Vehicle –Technology Demonstrator (RLV-TD)** is one of the most technologically challenging endeavors of ISRO towards developing essential technologies for a fully reusable launch vehicle to **enable low-cost access to space.**
- The configuration of RLV-TD is similar to that of an aircraft and combines the complexity of both launch vehicles and aircraft.
- The RLV-TD will be used to develop technologies like
  - Hypersonic flight (HEX),
  - Autonomous landing (LEX),
  - Return flight experiment (REX),
  - Powered cruise flight, and
  - Scramjet Propulsion Experiment (SPEX).



Objectives of RLV-TD

- **ISRO's RLV** is an attempt to create core technologies for a fully reusable launch vehicle, which would make space travel more **affordable**.
- The new system will further solidify the Indian space agency's position as the **most cost-effective launch service provider** in the **multibillion-dollar satellite launch market**.
- The primary purpose behind developing the reusable system is to strengthen **ISRO's position in the launch market,** which SpaceX currently dominates due to the company's **reusable Falcon-9 rockets.**
- The system's primary goal is to develop a **hypersonic aero thermodynamic** characterization of the **wing body.** Other objectives of the system include:
  - Evaluation of autonomous Navigation, Guidance and Control (NGC) schemes
  - Integrated flight management
  - Thermal Protection System Evaluation

Significance

- ✓ The **RLV LEX mission** was significant since it was the **first time that an Indian spacecraft** was able to land successfully **without the assistance of humans.**
- ✓ This autonomous landing replicated all of the characteristics of a **Space Re-entry Vehicle, including a high landing speed, the absence of a landing crew,** and **landing precision** from the same trajectory as the return trip.
- ✓ In addition, landing characteristics such as the **ground's relative velocity**, **the landing gears' sink rate**, and **actual body rates** were achieved, imitating the conditions that a spacecraft returning from **orbital re-entry may experience**.
- ✓ This flight test validated several essential technologies, including-

- an autonomous navigation, guidance, and control system;
- reusable thermal protection system; and
- Re-entry mission management.

Possible Advantages

- A reusable launch vehicle is considered **a low-cost, reliable, and on-demand mode of accessing space** as the costs act as a major deterrent to space exploration.
- Applying the **cutting-edge technology developed** for the **RLV LEX** to other operational launch vehicles of ISRO makes it possible to **reduce overall launch costs.**
- The vehicle is similar to an aircraft that can be used for either **cargo transport or military purposes.**

Global Agencies using RLV technologies

NASA:

- Reusable space vehicles have been in existence for a long time with NASA space shuttles carrying out dozens of human space flight missions.

Space X:

- The use case for reusable space launch vehicles has revived with the private space launch services provider Space X demonstrating partially reusable launch systems with its **Falcon 9 and Falcon Heavy rockets** since 2017.
- **SpaceX** is also working on a fully reusable launch vehicle system called **Starship.**

Challenges

- **Emerging technology**-The development of RLV is still in the nascent stage. Therefore, it needs adequate R&D. Several countries are working on it to make it a rugged platform.
- **Lack of Infrastructure**- Reusability necessitates adding additional systems, **landing gear**, or **fuel to return and land**. Because of this, the **rocket's mass and dimensions** will increase, resulting in improved launch preparation requirements.
- **Expensive Servicing cost-**The reusable stage requires **maintenance and repairs** every time it's used. As a result, it may not be suitable for reuse because the costs associated with restoring it will be higher than those related to creating a new phase.

PEPPER IT WITH

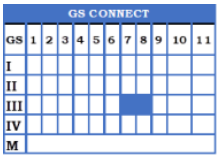
3D Printing, Cryogenic stage rockets, PSLV, GSLV, SSLV.

Conclusion

India has moved one step closer to realizing its dream of having a reusable launch vehicle. Soon, it would be possible to showcase India's technological prowess and the country's progress in space exploration by using a highly developed version of the RLV.

RNA Viruses

News Excerpt



RNA viruses, with their high potential for mutation and epidemic spread, are the most common class of pathogens found as new causes of human illness.

Pre-Connect

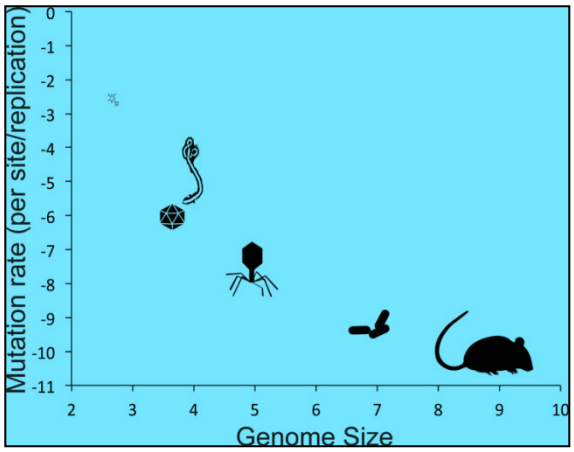
About RNA

- **Ribonucleic acid (RNA)** is a **nucleic acid** present in all living cells that has structural similarities to DNA.
- RNA is most often **single-stranded**.
- RNA molecule has a **backbone** made of alternating **phosphate groups** and the **sugar ribose**, rather than the **deoxyribose** found in DNA.
- Attached to each sugar is one of four bases:
  - Adenine (A),
  - Uracil (U),
  - Cytosine (C) or guanine (G).
- Different types of RNA exist in cells:
  - messenger RNA (mRNA),
  - ribosomal RNA (rRNA) and
  - transfer RNA (tRNA).
- Some RNAs are involved in **regulating gene expression**. Certain viruses use RNA as their genomic material.

Reasons for DNA preferred over RNA

- Since life forms evolved and became multi-cellular, organisms needed to make sure that the mechanism for copying the genetic material was more robust and hence preferred DNA.

- The enzymes responsible for copying DNA, collectively known as **DNA polymerases**, possess this error-correction property, known as '**proofreading'.**
- This proofreading ability allowed the total DNA of higher organisms, known as the **genome**, to be longer and more complex.
- On the other hand, the RNA counterparts to DNA polymerases, known as **RNA polymerases,** do not possess the ability to proofread.
- As a result, when RNA is the genetic material, the genomes typically tend to be shorter. Longer genomes would contain **proportionately higher mistakes**, and such genomes would be eliminated by **natural selection**.
- **Corona virus** illustrates this point since their genomes are typically **three- or four times** the size of those of other RNA viruses. They can afford the longer genomes due to the presence of a unique protein, in addition to the RNA polymerase, that performs the **proofreading function.**



- **RNA polymerases** are also **capable of recombination**, a process that allows them to stitch together multiple pieces of different viral RNAs. For example, the **XBB variant of SARS-CoV-2** is the product of the **BA.2.10.1.1** and **BA.2.75.3.1.1.1 variants**.

Implications of RNA based Viruses

- The most popular disease-causing viruses bear RNA, not DNA, including the causative agents of **COVID-19, AIDS, polio, influenza, dengue, chikungunya, Ebola, Zika, Hepatitis C, rabies, Marburg, yellow fever, and Japanese encephalitis.**
- Except for HIV, which is responsible for AIDS, all of these viruses contain an **error-prone RNA polymerase.** HIV uses a slightly different mechanism to replicate, but the enzyme responsible shares the error-prone nature of its siblings.
- The better-known **DNA viruses** included members of the p**ox family (smallpox and chickenpox) and Hepatitis B.**
- Domination of RNA viruses over human disease lays the error-prone nature of their polymerases. This singular property allows the virus to acquire multiple adaptations that serve as tools in the viral arsenal.
- The RNA polymerase enables these viruses to exist in a form as a **quasi-species**. This means that a given virus can exist in multiple variant forms simultaneously in each host. Such an existence directly results from these viruses' **error-prone replication.**

A **zoonosis** (zoonotic disease) is an infectious disease that is transmitted between species from **animals to humans or vice-versa**

Consequences of RNA as genetic material

- **Drug Resistance-**
  - This genetic structure gives viruses the ability to create odd variants that possess a **survival advantage** against a **vaccine or a drug.**
  - Such variants will undergo **further natural selection**, and the virus will continue to **proliferate.**
- **Low-fidelity replication-**
  - Due to the **small size of the viral genome**, in RNA viruses the viral load in a very short period after infection becomes enormous. This high viral output, together with the **diversity, overwhelms the immune system.**
- **Zoonosis-**
  - A process in which nature of viral replication occurs as such that the **viruses can 'jump' across species**. This is because the **high error rate and the short generation time** enable the virus to adapt to newer conditions much faster, allowing the infection to spread easily among newer hosts.
  - This is why up to **89% of all human infectious** RNA viruses are considered to be a result of **zoonotic transmissions.**

PEPPER IT WITH

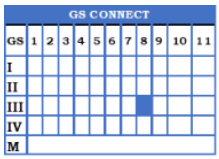
Epistatic mutation, Quasispecies, Stamping machine mode, Template switch recombination

Conclusion

The RNA viruses are hugely diverse, not only in their genome structures and replication strategies, but also in their "lifestyles," which can differ significantly, even between closely related viruses. Ultimately, application of cutting-edge sequencing technologies, mathematical analyses, and virology studies to a range of viruses will enhance our understanding of the genesis and functional consequences of RNA virus genetic instability.

Piezoelectric effect

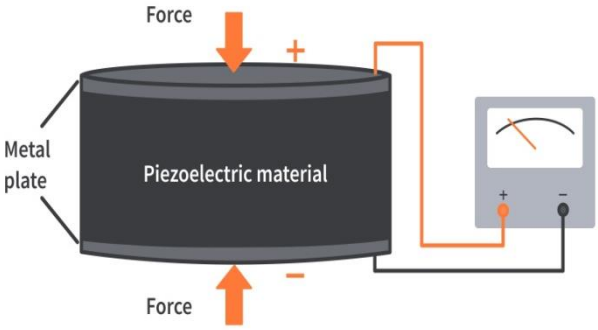
News Excerpt



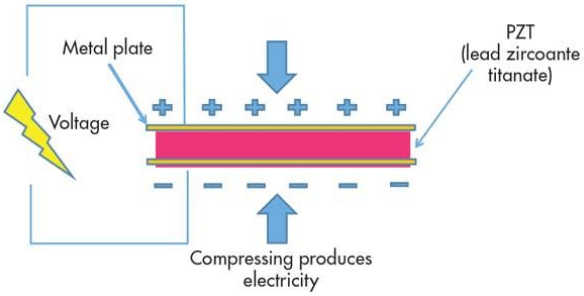
Recently, for the first-time scientists have reported evidence of the piezoelectric effect in liquids. The effect has been known for 143 years and in this time has been observed only in solids.

Pre-Connect

About Piezoelectric effect



- The term piezoelectricity comes from the Greek word **piezo** meaning to **squeeze or press**, electric in Greek means **amber.** Amber also happened to be a source of **electrical charge.**
- Piezoelectricity was discovered by two French scientists' brothers, **Jacques and Pierre Curie**, in **1880.**
- The Piezoelectric Effect can be defined as the ability of particular materials for generating **an electric charge** in reply toward applied mechanical pressure.
- One of the exclusive characteristics of this effect is **reversible.** That means the materials display the straight piezoelectric-effect, and also display the reverse piezoelectric-effect.
- **Quartz is silicon dioxide** (SiO_2). The quartz crystal consists of silicon and oxygen atoms at the four vertices of a three-sided pyramid; each oxygen atom is shared by two pyramids.
- These pyramids repeat themselves to form the **crystal.** The effective charge of each pyramid is located slightly away from the centre.
- When a **mechanical stress** is applied, that is when the crystal is squeezed; the position of the charge is pushed further from the centre, giving rise to a **small voltage**. This is the source of the effect.



- These are used in a variety of applications, such as in **sensors, actuators, and energy harvesting devices**. Some examples of common piezoelectric materials include **quartz, ceramics, and certain types of crystals**. It is used in **analog wristwatches, ultrasound equipment and clocks also**.

New findings

- The new finding challenges the theory that describes this effect as well as opens the door to previously unanticipated applications in electronic and mechanical systems.
- The effect was found in pure **1-butyl-3-methyl imidazolium bis(trifluoromethyl-sulfonyl)imide** and **1-hexyl-3-methyl imidazolium bis(trifluoromethylsulfonyl)imide** – both ionic liquids (i.e. liquids made of ions instead of molecules) at room temperature.

Surprise Factor

- The reason the piezoelectric effect has only been expected in solids thus far is that the body being squeezed needs to have an organized structure, like the **pyramids of quartz.**
- Liquids don't have such structure; instead, they take the shape of their container.

PEPPER IT WITH

Self-Powered Desalination Plant, Supercharged biotech rice

New applications

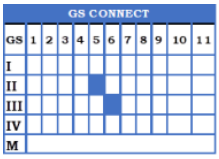
- The discovery opens the door to **applications that have previously not been accessible with solid-state materials** and [room-temperature ionic liquids] are **more readily recyclable and pose fewer environmental issues** than many currently used piezoelectric materials in many instances.
- The liquids also displayed the inverse piezoelectric effect: they became distorted when an electric charge was applied. This fact could be used to control how the liquids bent light passing through them by passing different currents through them. That is, using this **simple control mechanism, vials of these liquids** could be lenses with **dynamic focusing abilities.**
- Having a theory to explain the **liquids' behavior** could reveal why these liquids behave the way they do, which in turn could reveal better ways to develop newer applications.

Energy harvesting with piezoelectricity

- ✓ Since there is a possibility of generating tiny bit of electricity by pressing one piezoelectric crystal once, there's a chance of production of significant amount of electricity by pressing many crystals over and over again.
- ✓ Inventors have proposed all kinds of ideas for **storing energy** with **hidden piezoelectric devices**, from
  - **Shoes** that convert your **walking movements** into **heat to keep your feet warm**
  - **Cell phones** that charge themselves from your body movements,
  - **Passing of peoples and vehicles on roads that can power streetlights,**
  - **Contact lenses** that capture energy when you blink, and
  - Even gadgets that make energy from the **pressure of falling rain**.

Quantum Computing-based Telecom Network

News Excerpt



Recently, Telecom minister announced that the country's first quantum computing-based telecom network link has now become operational in the national capital.

Pre-Connect

About Quantum Computing

- **Quantum** computers harness the **laws of quantum mechanic**s to perform certain calculations exponentially faster than today's supercomputers.
- Quantum computers rely on **qubits** to run and solve multidimensional quantum algorithms**.**
- Quantum computing solves mathematical problems and runs quantum models using the tenets of quantum theory.

About Quantum Theory

- ➢ Development of quantum theory began in 1900 with a presentation by German physicist **Max Planck** to the German Physical Society. Planck introduced the idea that energy and matter exist in individual units.
- ➢ Further developments by a number of scientists over the following 30 years have led to the modern understanding of quantum theory.
- ➢ Quantum theory explains the **nature and behavior of energy and matter** on the quantum, or atomic and subatomic levels.

About Qubit

- ✓ A qubit, or quantum bit, is equivalent to a bit in classical computing. Just as a bit is the basic unit of information in a classical computer, a qubit is the basic unit of information in a quantum computer.
- ✓ Qubits can be made from trapped ions, photons, artificial or real atoms or quasi-particles, while binary bits are often silicon-based chips.

Functional Aspects

- Quantum computers use **quantum bits, or qubits,** which process information very differently. While classical bits always represent either **one or zero**, a qubit can be in a **superposition** of one and zero simultaneously until its state is measured.
- In addition, the states of multiple qubits can be entangled, meaning that they are linked quantum mechanically to each other. **Superposition** and **entanglement** give quantum computers capabilities unknown to **classical computing**.
- Qubits can be made by manipulating atoms, electrically charged atoms called **ions, or electrons,** or by Nano-engineering so-called **artificial atoms**, such as circuits of superconducting qubits, using a printing method called **lithography.**

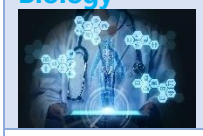
Government Initiatives

- ❖ **National Mission to study quantum technologies:** The Indian government launched a Mission with an allocation of 8,000 crore.
- ❖ **Quantum research facility:** Quantum research facility in Madhya Pradesh has been launched by the army and the Department of Science and Technology co-launched another facility in Pune.
- ❖ **QuEST:** The Department of Science and Technology launched the **Quantum-Enabled Science and Technology (QuEST)** initiative to invest INR 80 crores to lay out infrastructure and to facilitate research in the field.
- ❖ **Quantum Computer Simulator (QSim) Toolkit:** It provides the first quantum development environment to academicians, industry professionals, students, and the scientific community in India.

Uses and Applications

Quantum computing has the potential to offer the following benefits:

- **Speed and security**- Quantum computers are incredibly fast compared to classical computers. For example, quantum computing has the potential to speed up financial portfolio management models.
    - As per The World Economic Forum "quantum computing could make today's cyber security obsolete." This is because the technology underlying modern cryptography uses combinatorics.
- **Ability to solve complex processes-** Quantum computers are designed to perform multiple complex calculations simultaneously. This can be particularly useful for factorizations, which could help develop decryption technologies.
    - For Example: Artificial Intelligence helps in efficient manufacturing by identifying the cause of rare failures in their manufacturing processes.
- **Simulations-** Quantum computers can run complex simulations. They're fast enough to be used to simulate more intricate systems than classical computers.
    - For example, this could be helpful for molecular simulations, which are important in prescription drug development.
    - DNA gene sequencing, such as radiotherapy treatment optimization/brain tumor detection, could be performed in seconds instead of hours or week.
- **Optimization**-With quantum computing's ability to process huge amounts of complex data, it has the potential to transform artificial intelligence and machine learning.

Domains	Quantum communications	Quantum computing	Quantum simulation	Quantum sensing & metrology
Telecom and ICT 	Quantum safe communication (e.g., Quantum Key Distribution(QKD),Quantum Random Number Generation(QRNG))	Infrastructure optimization planning and operations; Artificial Intelligence (AI)	Infrastructure simulations: e.g., traffic, energy, resources	Clock synchronization; more accurate sensors
Industry 4.0 	Quantum safe communication (e.g., Quantum Key Distribution(QKD),Quantum Random Number Generation(QRNG))	Optimization planning and operations; Artificial Intelligence (AI)	Industrial processes simulations Quantum Twin	Automation; more accurate sensors
Precision Medicine and Biology 	Security and protection of patients' data	Improved diagnostics; drug design	Proteomics, Genomics, Drug simulations	Improved sensing for diagnostics imaging
Energy, Oil and Gas 	Security for critical infrastructure	Optimization; Logistics	Predictions and risks analysis	Through-ground imaging
Finance 	Secure transactions	Portfolio management	Portfolio management and trading simulations	Clocks for trade synchronization
Smart Cities and Transport 	Security and data protection	Traffic, resources optimization complexity management	Predictions and risks analysis	Timing synchronization; more accurate sensors; quantum LiDAR

Limitations and Challenges

Although the benefits of quantum computing are promising, there are still huge obstacles to overcome:

- **Interference-** The slightest disturbance in a quantum system can cause a quantum computation to collapse by a process ***known as decoherence.*** A quantum computer must be totally isolated from all external interference during the computation phase. Some success has been achieved with the use of qubits in intense magnetic fields.
- **High Maintenance Cost-** Quantum computers are highly unstable and must be held in expensive refrigerators maintained at near-absolute zero temperatures due to their sensitivity towards environmental disturbances.
- **National Security threat**- An adversary with quantum decryption capabilities, for instance, could theoretically access encrypted information with ease, putting most current communications infrastructure at risk of exploitation.
- **Error correction**- Qubits aren't digital bits of data and can't use conventional error correction. Error correction is critical in quantum computing, where even a single error in a calculation can cause the validity of the entire computation to collapse. Hence they can't benefit from conventional error correction solutions used by classical computers.
- **Output observance-** Retrieving output data after a quantum calculation is complete risks corrupting the data. Developments such as database search algorithms that rely on the special wave shape of the probability curve in quantum computers can avoid this issue.

PEPPER IT WITH

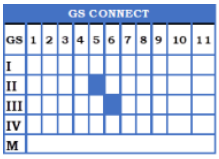
Grid computing, Object-relational mapping, Biometrics

Conclusion

With a solid research base and workforce founded on significant and reliable government support, it can lead to the creation of innovative applications by industries, thereby stimulating economic growth and job creation, which will feed back into a growing quantum-based economy. The government's financial and organizational support will also ensure that both public and private sectors will benefit. It will establish standards to be applied to all research and help stimulate a pipeline to support research and applications well into the future.

LIGO-India Project

News Excerpt

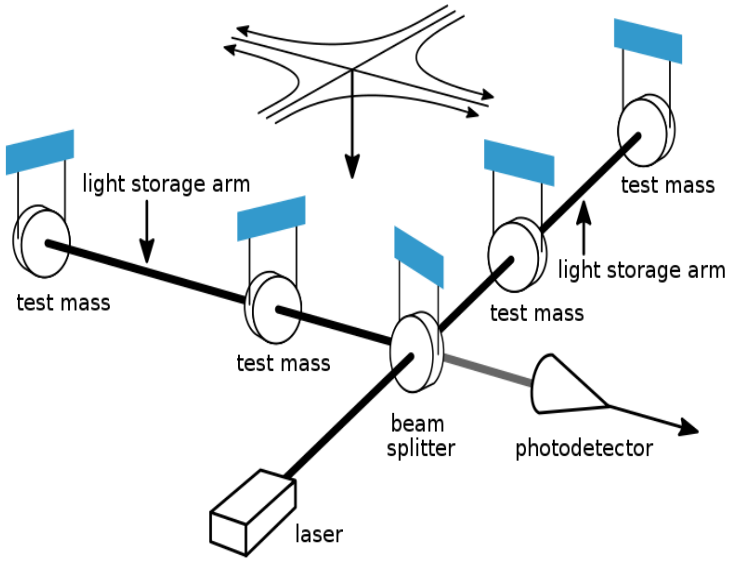


Recently, the government has given permission to begin India's Laser Interferometer Gravitational-Wave Observatory, or LIGO, project. It will be the country's biggest scientific facility to probe the universe by detecting and studying gravitational waves.

Pre-Connect

About LIGO

- **LIGO** is an international network of laboratories that detect the ripples (**gravitational waves)** in space-time produced by the movement of large celestial objects like **stars and planets**.
- These ripples were first postulated in **Albert Einstein's general theory of relativity** that encapsulates our current understanding of how gravitation works.
- The **LIGO detectors** are sensitive to distance changes that are several orders of magnitude smaller than the **length of a proton.**
- The experiment works by releasing **light rays simultaneously** in both chambers. Normally, the light should return at the same time in both chambers.



- However, if a gravitational wave passes through, one chamber gets elongated while the other gets squished, resulting in a **phase difference** in the returning light rays. Detecting this phase difference confirms the presence of a gravitational wave.

General theory of relativity

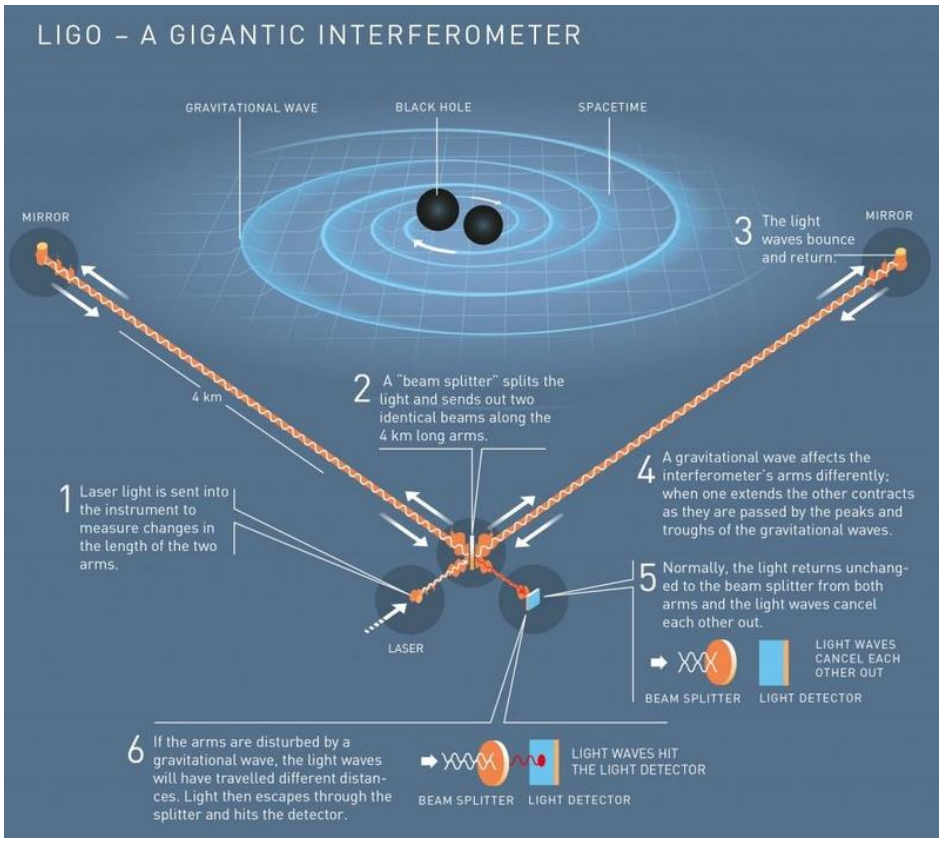
- Albert Einstein developed this theory from 1907 to 1915. The general theory of relativity is also known as the **theory of gravitation.**
- According to this theory, the gravitational force between two bodies completely depends on their masses and on the distance between the two bodies.

About LIGO-India Project

- The **LIGO-India project** is an initiative aimed at detecting **gravitational waves** from the universe.
- It involves the construction of **2 vacuum chambers** that are perpendicular to each other and **4 kilometers** long each with mirrors at the end, making them the most sensitive interferometers in the world.
- The project is expected to commence scientific runs from 2030 and will be located in the **Hingoli district of Maharashtra**, approximately 450 km east of Mumbai.
- LIGO-India is part of the plan to expand the network of this experiment and is envisioned as a collaborative initiative between an **Indian consortium of research institutions** and the **LIGO Laboratory in the United States**, as well as its international partners like **Germany, Australia, and the United Kingdom.**
- **Funding** for the LIGO-India facilities will come from the **Department of Atomic Energy (DAE)** and the **Department of Science and Technology (DST),** with DAE acting as the lead agency.

Three operational observatories in the world

- Hanford and Livingston- United States ,
- Virgo- Italy
- Kagra- Japan



Significance of the LIGO-India project

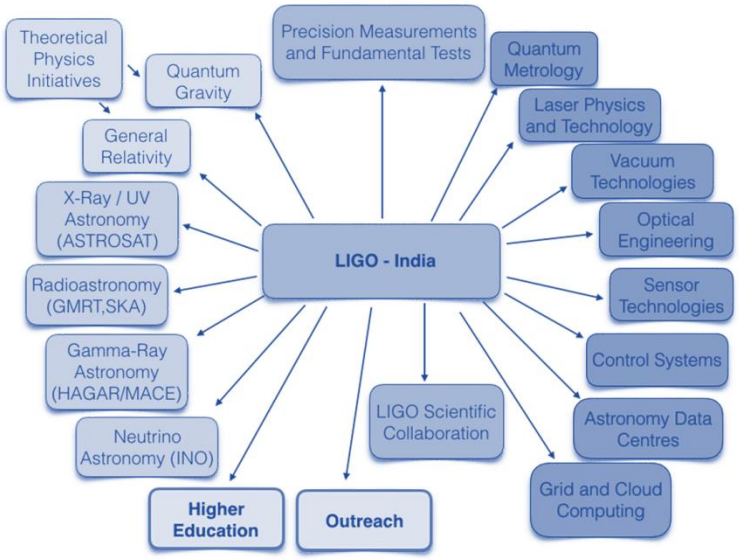
- ✓ The LIGO-India project is significant as it will be the **fifth node** of the planned network, thereby bringing India into a prestigious international scientific experiment.
- ✓ This project will make India a unique platform that combines the **frontiers of science and technology** of the **quantum** and the **cosmos.**
- ✓ It has the potential to provide unprecedented insights into the **mysteries of the universe**, including the **nature of black holes**, **neutron stars,** and other **celestial phenomena**.

Scientific Benefits

- The scientific benefits of LIGO-India are enormous. Adding a new detector to the existing network will increase the expected event rates, and will boost the detection confidence of new sources by:
  - Increasing the sensitivity,
  - Sky coverage and
  - Duty cycle of the network.
- But the dramatic improvement from LIGO-India would come in the ability of localizing Gravitational Wave (GW) sources in the sky. Sky-location of the GW sources is computed by combining data from geographically separated detectors **('aperture synthesis').**
- Adding a new detector in India, geographically well separated from the existing LIGO-Virgo detector array, will dramatically improve the source-localization accuracies (5 to 10 times), thus enabling us to use GW observations as an excellent astronomical tool.

Impact

- **On Indian Science:**
  - A major initiative like LIGO-India will further inspire frontier research and development projects in India. The nature of the experiment is **intrinsically multidisciplinary.**
  - It will **bring together scientists and engineers** from different fields like optics, lasers, gravitational physics, astronomy and astrophysics, cosmology, computational science, mathematics and various branches of engineering.
  - In order to fully realize the potential of multi-messenger astronomy, the LIGO-India project will join forces with **several Indian astronomy projects.**
  - Potential collaborators include the **Astrosat project**, future upgrades of **the India-based Neutrino Observatory** and **optical/radio telescopes.**



- **On Industry**:
  - The **high-end engineering requirements** of the project (such as the world's largest ultra-high vacuum facility) will provide unprecedented opportunities for Indian industries in collaboration with academic research institutions.
  - LIGO project has facilitated major industry-academic research partnerships in USA and Europe, and has produced several important **technological spin offs**. LIGO-India will provide similar opportunities to Indian industry.

PEPPER IT WITH

Advanced LIGO, Gravitational Waves, James Webb Space Telescope, eLISA (Evolved Laser Interferometer Space Antenna),

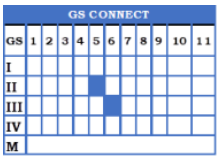
- **Education and public outreach:**
  - A cutting-edge project in India can serve as a local focus to interest and inspire students and young scientists.
  - The LIGO-India project involves **high technology instrumentation** and its dramatic scale will spur interest and provide motivation to young students for choosing experimental physics and engineering physics as career options.
  - **The 'multi-spectral' reach** to physics will attract a large number of talented and motivated young researchers and students to the program, as it has done in other countries.
  - Also, the observatory will be one of the very few research facilities in India of this scale, **international relevance** and **technological innovation** to which the general public and students can have access.

Conclusion

India has not yet built a cutting-edge scientific facility on this scale on its own soil, something that can have huge spin-off benefits for its science and technology sector. The India-based Neutrino Observatory, one such facility that has been planned in India, has been facing delays. LIGO, therefore, is crucial to demonstrating India's intent and capability to pull-off complex science projects on its own.

India's Space Policy

News Excerpt



Recently, the government approved the Indian Space Policy 2023 that seeks to institutionalize the private sector participation in the space sector, with ISRO focusing on research and development of advanced space technologies.

Pre-Connect

About ISRO

- **Indian Space Research Organisation (ISRO)** is the space agency of India involved in science, engineering and technology to harvest the benefits of outer space for India and the mankind.
- ISRO is a major constituent of the **Department of Space (DOS)** which executes the Indian Space Program primarily through various Centre's or units within ISRO.
- ISRO was previously the **Indian National Committee for Space Research (INCOSPAR)**, set up by the Government of India in 1962, as envisioned by **Dr. Vikrama Sarabhai.**

- ISRO was formed on August 15, 1969 and superseded INCOSPAR with an expanded role to harness space technology. DOS was set up and ISRO was brought under DOS in 1972.

About Indian Space Policy

- The Indian Space Policy 2023 is a **comprehensive set of guidelines** that outlines the roles and responsibilities of different entities in the Indian space sector.
- The policy is expected to pave the way for much-needed clarity in space reforms and **encourage private industry participation** in the space economy.
- It aims to encourage and institutionalize private sector participation in India's space sector, with the Indian Space Research Organisation (ISRO) primarily focusing on research and development of **advanced space technologies**.
- It will provide the private sector with greater access to ISRO's infrastructure, technology and expertise to support their space-related activities.

Key features of the policy

- ✓ **The delineation of roles and responsibilities** of three important entities in the Indian space sector. These entities are
  - **The Indian Space Research Organisation (ISRO)-**
    - ISRO, the premier space agency of India, will focus its energies on developing new technologies, systems, and research and development.
    - The operational aspect of ISRO's missions will be handled by NSIL, a space sector Public Sector Undertaking (PSU) that will work in a **demand-driven mode** to cater to the needs of the industry.
  - **The New Space India Limited (NSIL)-**
    - ✓ NSIL will be responsible for strategic activities related to the space sector. The objective of NSIL is to augment **private industry participation** in the space economy and create a **self-reliant space industry** in India
  - **The Indian National Space Promotion and Authorization Center (IN-SPACe)-**
    - ✓ IN-SPACe, on the other hand, will serve as the interface between ISRO and non-governmental entities.
- ✓ **The entry of the private sector** into **end-to-end space activities.**
  - Private companies will be allowed to build satellites, rockets, and launch vehicles, and engage in data collection and dissemination.
  - It encourages private companies to invest in creating new infrastructure for the space sector and use ISRO facilities for a small charge.

PEPPER IT WITH

New Space India Limited, IN-SPACe, SAMVAD Program, Defence Space Agency (DSA), Starlink-SpaceX, Space debris, Weaponisation of outer space, Project NETRA

Category	Benefits of starting abroad	Challenges of starting in India	Avenues for improvement
Input driven	Better access to capital	Lack of access to capital	Access to grants/funding opportunities
	Better access to talent/ resources	Difficulty in accessing resources	Better procurement policy
Process driven	Clarity in space policy regime	Uncertain policy/regulatory environment	Building a supportive ecosystem
	Conducive space start-up ecosystem	Bureaucracy/red tapism	
	Encouragement from space agencies	ISRO's rigid mentality	Undertaking structural changes
	Encouragement from government	Lack of government support	
Output Driven	Better access to clientele	Outreach problem	Redefining the role of space agency

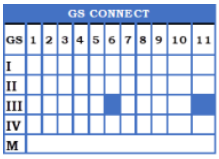
Conclusion

Outer Space is full of inspiration for those who dream big. Only a robust and structured interface between the industry, ISRO, and academic institutions can put India on the infinite Outer Space map, if there can be one.

SECURITY

Directed Energy Weapons and Hypersonic Weapons

News Excerpt



India's Air Chief Marshal has recently emphasized the importance of developing Directed Energy Weapons (DEWs) and Hypersonic Weapons and integrating them into its airborne platforms to achieve the desired range and accuracy.

Pre-Connect

- The Air Chief Marshal's statement reflects India's growing interest in developing advanced military technologies to enhance its defence capabilities.
- India has been investing heavily in research and development in recent years to develop advanced weapons systems to strengthen its defence posture.

Directed Energy Weapons and Hypersonic Weapons

- Directed Energy Weapons (DEWs) are weapons that use focused energy to damage or destroy their targets.
- They can use various types of energy such as lasers, microwaves, and particle beams.
- DEWs can be used for various purposes, including drone defence systems, missile defence, and disabling enemy electronics.
- Hypersonic weapons are weapons that can travel at speeds of Mach 5 to Mach 10, which is five to ten times the speed of sound.
- These weapons can be used to strike targets with high precision and at long ranges.

Advantage and Disadvantages of Directed Energy Weapons and Hypersonic Weapons:

- ✓ DEWs have several advantages over conventional ammunition, including high precision, low cost per shot, logistical benefits, and low detectability.
- ✓ They also transmit lethal force at the speed of light and their effects can be tailored by varying the type and intensity of energy delivered against targets.
- ✓ However, they have some disadvantages, such as limited range, high cost, and countermeasures that can reduce their effectiveness.
- ✓ Further, the development of hypersonic weapons and DEWs can lead to an arms race, causing increased tensions and instability.

There are three main systems which come under directed energy weapons:

Laser (Light Amplification by Stimulated Emission of Radiation)-based systems:

- ❖ Different types of lasers exist, of which chemical, solid-state and free-electron lasers are the most relevant.
- ❖ Out of the different laser types, chemical lasers are the most mature.
- ❖ Free-electron lasers are a more recent discovery and therefore, the least developed for weapon use. The laser weapons beginning to be deployed are solid-state (fibre) lasers.
- ❖ A laser can be used for two types of attack, thermal and impulse kill.
- ❖ The feature that makes a laser particularly attractive for the destruction of space systems is its potential to deliver a narrow beam, at a great distance, at the speed of light.

Radio frequency systems:

- ❖ This category includes high-powered microwaves as well as millimetre waves.
- ❖ These types of systems are more technologically mature than laser-based systems and are already in operational use.

Particle beam systems:

- ❖ Particle beam systems are the least mature of the three types of DEW.
- ❖ These systems, unlike the others, fire atomic and sub-atomic particles.
- ❖ Particle beam systems would emit either charged or neutral particles.
- ❖ Neutral particle beam systems hold particular interest, given these could be used outside of the atmosphere.
- ❖ A particle beam could bore a hole in the outer shell of a missile, a satellite or an aircraft and cause serious damage to electronics inside or explode the high explosives trigger of a nuclear weapon.

Significance of such weapons for India

- These weapons have potential to revolutionize future warfare, providing advanced platforms, weapons, sensors, and networks.
- These technologies could enhance India's defence capabilities and act as a deterrent against hostile nations like China and Pakistan.
- Several other countries, including Russia, France, Germany, the UK, Israel, and China, are reportedly developing DEWs, and some have already employed them in their militaries. The US has also accused Cuba of carrying out sonic attacks, known as the Havana Syndrome.
- DRDO has also initiated a project called Directionally Unrestricted Ray-Gun Array (DURGA) II, which aims to develop a 100-kilowatt lightweight DEW.
- Both DRDO and Indian Space Research Organization (ISRO) have developed and tested hypersonic technology in India.

- DRDO successfully tested the Hypersonic Technology Demonstrator Vehicle (HSTDV) in 2021, which can travel at six times the speed of sound.
- India is working on developing an indigenous hypersonic cruise missile that is capable of carrying both conventional and nuclear payloads. This missile is being developed as part of **India's Hypersonic Technology Demonstrator Vehicle Programme**.

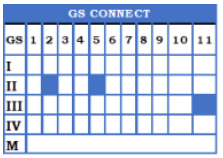
PEPPER IT WITH
Laser Weapon, Microwave Weapon, Avangard

Conclusion

It becomes imperative that India too must adopt and catch up with the latest technology and be aware of the developments that are taking place in this domain. In this Amrit Kaal, the Indian defence sector is going through magnificent phases of transformation, which takes along the ambitious Indian vision of 'Atma Nirbharta', self-reliance.

Armed Forces (Special Powers) Act (AFSPA)

News Excerpt



Citing improved security in the Northeast, the Indian government has decided to further reduce the jurisdiction of 'disturbed areas' under the Armed Forces (Special Powers) Act, 1958 (AFSPA) in Assam, Nagaland and Manipur.

Pre-Connect

- AFSPA was promulgated by the British in response to the Quit India movement in 1942.
- After Independence, India decided to continue with the law in view of insurgency in Assam and Manipur.
- The Armed Forces (Assam and Manipur) Special Powers Ordinance 1958 was promulgated on May 22, 1958.
- Later, it was replaced by the Armed Forces (Assam and Manipur) Special Powers Act, 1958 on September 11, 1958.
- Initially, the AFSPA was imposed in insurgency-affected areas of the hills of undivided Assam that were identified as "disturbed areas". Nagaland Hills were among those areas. Later on, all seven states in the Northeast were brought under the AFSPA.
- The law was also enforced in Jammu and Kashmir(1990) and Punjab(1983) during years of militancy.
- AFSPA has been deployed in areas where there have been issues with public order, and where there is a high level of extremism and insurgency.

Constitutional and Legal Provisions related to AFSPA:

Constitutional Provision:

- **Article 355-** it shall be the duty of the union to protect every state against external aggression and internal disturbances and to ensure that the government of every state is carried on in accordance with the provision of the constitution.

Statutory provisions: Armed Force Special Powers Act, 1958:

- **Section 3-** Power has been conferred to the central government or governor of the state, or the administrator in case of UT to declare an area as a disturbed area after notification in the official gazette.
- **Section 4 (a)-** Gives power to any commissioned or non-commissioned officer to open fire or otherwise use force, even to the causing of death, on any person who is acting in contravention of any law or order for the time being in force in the disturbed area.
- **Section 4 (c)-** Gives power to any commissioned or non-commissioned officer to arrest any person without warrant who has committed the cognizable offense or against whom a reasonable suspicion exists that he has committed or is about to commit a cognizable offense.
- **Section 4(d)-** Gives power to any commissioned or non-commissioned officer to enter and search any place without warrant any premise to make an arrest or to restore any person believed to be wrongfully restrained or confined.
- **Section 5-** Armed forces have to hand over the arrested person to the local police station with the least possible delay.
- **Section 6-** This section gives complete immunity and indemnity to persons acting under this law as far as those actions were committed in disturbed areas. No prosecution or any other legal proceedings can be initiated except on the previous sanction of the central government.

Current status of AFSPA:

- The Central government from April, 2022, had reduced disturbed areas under Armed Forces Special Powers Act (AFSPA) in Nagaland, Assam and Manipur. Taking another important decision, again from April 1, 2023, disturbed areas under AFSPA in these three states are being further reduced.
- Last year, the Centre removed AFSPA from several districts across Assam, Nagaland and Manipur. The notification was removed from the entire state of Assam, except nine districts and one sub-division of another district. In Manipur, 15 police station areas of six districts were taken out of the disturbed area notification. In Nagaland, it was withdrawn from 15 police stations of seven districts.
- Hence till now it was applicable fully only in 31 districts and partially in 12 districts of four states in the Northeast Assam, Nagaland, Manipur and Arunachal Pradesh till last year.

- With the latest decision, starting April 1, 2023 the Disturbed Areas notification will be lifted from one more district in Assam, four more police stations in Manipur and three more police stations in Nagaland.
- In 2008, Punjab became the first state to withdraw the AFSPA.
- The Armed Forces (Special Powers) Act, 1958, was completely withdrawn in Meghalaya in 2018, Tripura in 2015 and Mizoram in the 1980s.
- Currently AFSPA remains in force in four states of north east i.e. Arunachal Pradesh, Assam, Nagaland, Manipur and also in Jammu and Kashmir.

A disturbed area is one which is declared by notification under Section 3 of the AFSPA. The Central Government, or the Governor of the State or administrator of the Union Territory can declare the whole or part of the State or Union Territory as a disturbed area. The areas declared by the government as disturbed areas are beyond the purview of Judicial review. According to The Disturbed Areas (Special Courts) Act, 1976 once declared 'disturbed', the area has to maintain status quo for a minimum of 3 months.

Issues with AFSPA:

- ✓ **Abuse of power**:
  - Immunity granted by the act has to lead to misuse of power by the armed forces like fake encounters, sexual assaults, enforced disappearances, etc.
  - The credibility of Indian democracy is questioned by such an abuse of power.
  - It also grants soldiers executive powers to enter premises, search, and arrest without a warrant.
- ✓ **Threat to fundamental rights**:
  - Especially when it perpetuates in a particular area for years, it leads to the suspension of fundamental rights and liberties guaranteed to the citizen by the constitution of India.
  - Human right violation by armed personnel alienates the people.
  - In the 1950s, Nagaland and Mizoram faced the maximum onslaught of AFSPA. There were allegations against security forces of mass killings and rape.
- ✓ There are some areas in the North East region of India where insurgency got bolstered because of AFSPA.
- ✓ **Violation of Article 22**:
  - Article 22 deals with detention and preventive detention. According to this, a person can only be detained if he/she is an enemy alien or if the person is detained under the provisions of preventive detention law.
  - AFSPA despite not being a preventive detention law provides for detaining a person just on suspicion of him/her carrying out any crime and hence is a violation of Article 22.
- ✓ **Protests against the law:** As a mark of protest against this law, an activist named Irom Sharmila began a hunger strike in 2000, which continued for 16 long years.

Supreme Court Views on AFSPA

- ❖ Supreme Court has upheld the constitutionality of AFSPA in a 1998 judgment (Naga People's Movement of Human Rights v. Union of India).
- ❖ In this judgment, the SC held that a suo-motu declaration can be made by the Central government, however, it is desirable that the state government should be consulted by the central government before making the declaration;
- ❖ The declaration has to be for a limited duration and there should be a periodic review of the declaration;
- ❖ While exercising the powers conferred upon him by AFSPA, the authorized officer should use minimal force necessary for effective action.

Need of AFSPA

- **Effective functioning**- It allows armed forces to function effectively in insurgency and militancy-affected areas. In order to make the armed forces feel confident and empowered it is important to enshrine them with such powers.
- **Security of nation**- provisions of this act have played a crucial role in maintaining law and order in disturbed areas, thus protecting the sovereignty and security of the nation.
- **To protect the members of the armed forces**- It is crucial for protecting the armed forces who constantly face a threat to their lives at the hands of insurgents and militants, its withdrawal would result in poor morale.
- **To aid and assist armed forces:** When the army is deployed in insurgent areas, It needs policing powers that need search and arrest, which has been provided through AFSPA.
- India has seen a number of insurgencies in different states- particularly Kashmir and North East. Each of these insurgencies gets the support of either Pakistan or China.
- Extraordinary powers are necessary as the armed forces face asymmetrical warfare. It is essential to empower them with such powers.

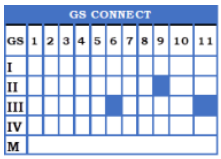
Conclusion

The government should consider the imposition and lifting of AFSPA on a case-by-case basis and limit its application only to a few disturbing districts instead of applying it for the whole state. The government and the security forces should also abide by the guidelines set out by the Supreme Court, and the National Human Rights Commission (NHRC).

PEPPER IT WITH
Martial law, Internal emergency, Emergency Provisions, Linlithgo

First Anti Spyware Declaration

News Excerpt



Recently The United States and ten other nations issued the first-ever significant anti-spyware declaration. US President issued an executive order prohibiting the US federal government from using spyware.

Pre-Connect

Spyware

- Spyware is a type of malicious software or malware that is installed on a computing device without the end user's knowledge.
- It invades the device, steals sensitive information and internet usage data, and relays it to advertisers, data firms or external users.
- Any software can be classified as spyware if it is downloaded without the user's authorization.
- Spyware is controversial because, even when it is installed for relatively innocuous reasons, it can violate the end user's privacy and has the potential to be abused.

Types of spyware

Infostealers: As the name suggests, infostealers are programs that have the ability to scan infected computers and steal a variety of personal information.

Password Stealers: Password stealers are very similar to infostealers, the only difference being that they are specially designed to steal login credentials from infected devices.

Keyloggers: Sometimes referred to as system monitors, keyloggers are spyware programs that record the keystrokes typed on a keyboard connected to an infected computer.

Banker Trojans: Banker Trojans are programs that are designed to access and record sensitive information that is either stored on or processed through online banking systems.

Modem Hijackers: With the gradual shift from dial-up to broadband in the last decade, modem hijackers have become a thing of the past.

Some Examples of the spyware are: CoolWebSearch, Gator, Internet Optimizer, TIBS Dialer, Zlob

About the Declaration

- The declaration was issued by the governments of Australia, Canada, Costa Rica, Denmark, France, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States.
- The countries said they were committed to preventing the export of technology and equipment to end-users who are likely to use them for "malicious cyber activity."
- The countries would share information with each other on spyware proliferation and misuse, including to better identify these tools.
- U.S. President also signed an executive order intended to curb the malicious use of digital spy tools around the globe targeting U.S. personnel and civil society.
- The partner countries committed to counter the misuse of commercial spyware.

The impact of the declaration

- ✓ Until now, countries have been hesitant to take a clear stand against spyware due to many countries' intelligence and law-enforcement agencies needing such tools to fight terrorism, organized crime and drug lords.
- ✓ This new statement could usher in a new more aggressive crackdown on spyware industry.
- ✓ The misuse of these tools presents significant and growing risks to our national security, including to the safety and security of our government personnel, information, and information systems, this declaration will help us reducing these risks.
- ✓ It will help in ensuring breach of universal human rights, the rule of law, and civil rights and civil liberties.

Conclusion

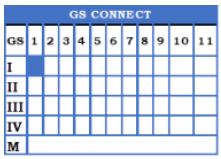
This declaration will allow countries to work collectively for the first time as they develop and implement policies to discourage the misuse of commercial spyware and encourage the development and implementation of responsible use principles that are consistent with respect for universal human rights, the rule of law, and civil rights and civil liberties.

PEPPER IT WITH
Ransomware, Malware, Paris Call

ART & CULTURE

Basohli Painting

News Excerpt



The world-famous Basohli Paintings from the Kathua district in Jammu and Kashmir has obtained the Geographical Indication (GI) Tag.

Pre-Connect

Basohli Painting

- Basohli Paintings is a fusion of Hindu mythology, Mughal miniature techniques and folk art of the local hills, evolved in the 17th and 18th centuries as a distinctive style of painting.
- This style of painting derives its name from the place of its origin - hill town of Basohli about 80 Km from the centre of district Kathua in the state of Jammu & Kashmir.
- These paintings are marked by striking blazing colors, red borders, bold lines and rich symbols.
- The faces of the figures painted are characterized by the receding foreheads and large expressive eyes, shaped like lotus petals.
- The painting themselves are mostly painted in the primary colors of Red, Blue and Yellow.
- The most popular themes of Basohli Paintings come from Shringara literature like Rasamanjari or Bouquet of Delight (a long love poem written in 15th century by Bhanudatta of Tirhut Bihar), Gita Govinda and Ragamala.
- This style of painting was first introduced to the world in the annual report (1918-19) of the Archaeological Survey of India published in 1921.
- At that time this style was yet to be properly categorized and studied. Ananda K. Coomaraswamy was the first to publish them, in Rajput Paintings in 1916.

Other Products that have got GI Tag from Jammu and Kashmir:

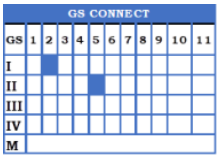
1. Kani Shawl
2. Kashmir Pashmina
3. Kashmir Sozani Craft
4. Kashmir Paper Machie
5. Kashmir Walnut Wood Carving
6. Khatamband
7. Kashmiri Hand Knotted Carpet
8. Basmati Rice
9. Kashmir Saffron

PEPPER IT WITH

Pahari School of Painitngs, Kangra School of Paintings, Mughal Paintings

Vedic Heritage Portal

News Excerpt



Recently the Union Home Minister inaugurated Vedic Heritage Portal at Indira Gandhi National Centre for the Arts (IGNCA) campus.

Pre-Connect

Vedas

- The word 'Veda' comes from the root 'vid', which means "to know". Veda means knowledge.
- There are two kinds of knowledge. Shruti, that which is heard or revealed and Smriti, that which is remembered.
- The Vedas are Shruti and other scriptures like the Puranas and the epics Mahabharata and Ramayana are Smriti.
- The Vedas are considered as eternal truths revealed to great rishis of ancient times. The Vedas are considered to be the oldest Hindu texts.
- Scholars believe that they were written down some 2,500 years ago, though the tradition often dates them to the beginning of Kali-yuga (circa 3000 BCE).
- Some Hindus say that there was originally only one Veda, the Yajur, which was later divided into four.
- Scholars, however, usually consider the Rig-Veda the oldest of all Hindu writings.

Vedic Heritage Portal

- The portal is a repository of vedic knowledge and traditions from across the country.
- The portal is an effort to map the vedic heritage of the country.
- It is a one-stop solution for researchers and others who would like to search any information regarding the Vedic heritage.

PEPPER IT WITH

Upanishads, Puranas, Brahamanas, Aryanakas

- It gives detailed information about oral traditions, textual tradition in form of published books/manuscripts, or implements (yajna-related objects).
- Over 550 hours of audio-visual content of more than 18,000 Vedic mantras have been uploaded on the website.
- 'Vedas' are an intangible heritage of humanity as per the United Nations Educational, Scientific and Cultural Organization (UNESCO).
- The aim of this portal is to collate information for making Vedas accessible to people and provide a forum for further dialogue.
- The Vedic Heritage Portal is available in a mix of English and Hindi, besides audio content in Sanskrit.
- Research articles and lectures on scientific subjects explaining the relevance of 'Vedic knowledge' in the perspective of modern science are also documented on the portal.

The following is an overview of the four Vedas.

1. The Rig-Veda: The most important and according to the scholars, oldest of the Vedas. It is divided into ten books (called mandalas) and has 1028 hymns in praise of various deities. These include Indra, Agni, Vishnu, Rudra, Varuna, and other early or "Vedic gods." It also contains the famous Gayatri mantra and the prayer called the Purusha Shukta (the story of Primal Man).

2. The Yajur-Veda: A priestly handbook for use in the performance of yajnas (sacrifices) It is divided into two sections, the earlier "black" and the more recent "white."

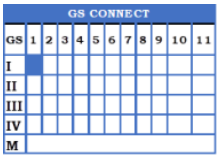
3. Sama-Veda: This consists of chants and melodies to be sung during worship and the performance of yajna.

4. Atharva-Veda: Contains hymns, mantras and incantations, largely outside the scope of yajna.

Bihu Dance

News Excerpt

Assam's Traditional Bihu Dance Enters Guinness Book of World Records.



Pre-Connect

Bihu Dance

- The Bihu dance is a folk dance from the Indian state of Assam related to the festival of Bihu.
- This joyous dance is performed by both young men and women.
- It is characterized by brisk dance steps, rapid hand movement, and a rhythmic swaying of the hips in order to represent youthful passion, reproductive urge and 'Joie-de-vivre'.
- Dancers wear traditionally colorful Assamese clothing.
- There are three Bihu festivals namely 'Bohag Bihu' celebrated in the month of 'Bohag' (Baisakh, the middle of April), 'Magh Bihu' celebrated in the month of 'Magh' (the middle of January), and 'Kati Bihu' celebrated in the month of 'Kati' (Kartik, the middle of October).
- Each of the Bihu festival has its own significance and is celebrated with its own traditions.
- The most important and colourful of the three Bihu festival is the Spring festival "Bohag Bihu" or Rangali Bihu celebrated in the middle of April. Songs sung in Bihu are woven around themes of love and often carry erotic overtones. People adorn traditional attires like Dhoti, Gamocha and Chadar, Mekhala.

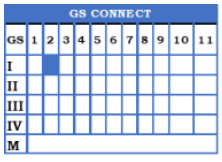
PEPPER IT WITH

Festivals of North East, Folk Dances of North East, Indian Classical Dances

Shyamji Krishna Verma

News Excerpt

Recently on 30th March the Prime Minister paid tributes to revolutionary freedom fighter Shyamji Krishna Varma on his 93rd death anniversary.



Pre-Connect

About Shyamji Krishna Varma:

- He was born on 4th October, 1857 in Mandvi town of Kutch district of Gujarat.

- He completed his education in India, before moving on to teach Sanskrit at the Oxford University.
- He was a barrister in London, when in 1905 he was barred from practising law by the Inner Temple following charges of sedition for writing against the colonial government.
- In 1905 he founded the India House and The Indian Sociologist, which rapidly developed as an organised meeting point for radical nationalists among Indian students in Britain at the time and one of the most prominent centres for revolutionary Indian nationalism outside India.
- The monthly Indian Sociologist became an outlet for nationalist ideas and through the Indian Home Rule Society, he criticized the British rule in India.
- He became the first President of Bombay Arya Samaj and was an admirer of Dayanand Saraswatie.
- In the face of criticism by the British, Varma, shifted his base from England to Paris and continued his movement.
- After the outbreak of the Second World War, however, he moved to Geneva in Switzerland and spent the rest of his life there. He died on March 30, 1930.
- He also served as the Divan of a number of states in India and was one of the foremost freedom fighters in the history of the freedom movement of India with high sense of patriotism and selfless service for the nation.
- A memorial called Kranti Teerth dedicated to him was built and inaugurated in 2010 near Mandvi.
- Spread over 52 acres, the memorial complex houses a replica of India House building at Highgate along with statues of Shyamji Krishna Varma and his wife.
- Urns containing Krishna Verma's ashes, those of his wife, and a gallery dedicated to earlier activists of Indian independence movement is housed within the memorial.

India House

- ❖ India House was founded in 1905 by freedom fighter Shyamji Krishna Varma.
- ❖ This was a time when 'revolutionary nationalism' had emerged as a potent political force in the Indian freedom struggle following the Partition of Bengal in 1905.
- ❖ The outrage over the Partition triggered the formation of radical underground societies in Bengal, Punjab and Maharashtra by spirited youth.
- ❖ These fiery, young nationalists were impatient with the Indian National Congress's approach to petition the British Government to grant India self-rule, and that too within the British Dominion. They wanted swarajya and were keen on driving the British out of the country, even if it meant using violence.
- ❖ One of the guiding lights of these revolutionaries in England was Shyamji Krishna Varma (1857-1930).

CONTEMPORARY ETHICS CASE STUDIES

1. As computers become more and more ubiquitous and control increasingly significant and complex systems, people are exposed to increasing harms and risks. This concern has grown with the number of critical life services controlled by computer systems in the governmental, airline, and medical arenas. Another dimension of this problem is the ability of emerging technologies to impact human life.

a) What are the issues of accountability associated with emerging technologies?

b) What moral responsibility do creators of a technology have for the adverse consequences that flow from flaws in that technology?

c) Do you think that a society that is heavily dependent on technology is at significant risk?

2. You are Praveen, a university student studying social welfare. You accepted an internship position in the fundraising department at Migrant care Centre. Migrant Care Centre is a non-profit organization in India that provides shelter for internally displaced migrants. In addition to shelter, Migrant Care centre provides food, clothing, and education. Most migrants stay at the shelter for several months before securing permanent housing.

One day, Mary, the director of development, asked you to accompany her to a fundraising dinner at a luxurious hotel. Mary was approached by Srinivasan, one of the state's biggest philanthropists. Srinivasan was known to donate to almost any cause as long as he found it to be what he considered "morally sound" and to the benefit of "hard-working Indians."

You noticed during conversation with Srinivasan, that most of Mary's answers to his questions about the shelter's clients were vague. When Srinivasan said that he was happy to lend a hand to any poor Indian citizen, Praveen knew he clearly did not understand that illegal immigrants from Bangladesh and Myanmar, were also the shelter's clientele. Mary said nothing to correct Srinivasan's misperception.

a) Who are the stakeholders, and what is at stake for each party?

b) **What are the moral dilemmas for you?**
c) **What would you do and why? Present a course of action.**

3. You are a social worker. You are taking care of a 25-year-old man for depression and anxiety. In the fourth session, the client reveals that he is gay. You belong to a faith tradition that believes that homosexuality is a sin, and whose leaders have been prominent in opposing same-sex marriage.

a) **What are the ethical dilemmas in the above case?**
b) **What will you do in the above scenario? Explain your reasoning.**

SCAN THIS QR FOR MODEL ANSWER

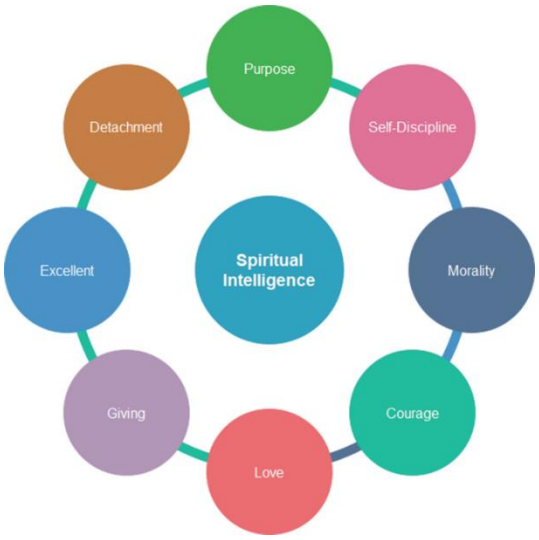
PHILOSOPHY OF THE MONTH

Bury the seed deep for new crop to come up

- In every individual there lies two selves. The lower self is known as the ego self and a larger self which known as the true self.
- The ego self is the self of passion and pride, of lust and hatred and greed. It is the self of selfishness and miserliness. This self gets magnified beyond all proportions sits on the threshold of an individual consciousness and easily captures a person and lead them astray.
- The true self on the other hand is self-supreme which majority are unaware about its existence. It is a potential that lies hidden within every individual when it unfolds wonderful things happen in daily life.
- To achieve the true self, one must annihilate his/her ego, becomes nothing not even zero just a dot. As once ego is annihilated one can acknowledge and experience his/her surroundings.
- In other words, every individual is like a seed, the periphery is finite, but deep within every individual are infinite possibilities. Just as a seed needs to give up its 'seedhood' to grow into a plant, unless an individual is ready to lose itself completely, he/she cannot grow anew.

Resolving unresolved through Spiritual quotient

- With evolving technology, there are various solutions to complex issues, platforms like ChatGPT and deep learning tools are almost working as human brains.
- Emotional intelligence helps in developing empathy, tolerance and understanding especially from unease triggered by an increasing focus on fast outcomes and high expectations. But still it does not fully address the underlying cause of discord between our external and internal mental states.
- Intelligent quotient, IQ deals with empirical analysis, observations, and outcomes and Emotional intelligence, EQ, then becomes the palliative and deals with challenges in inter-human transactions.
- Then comes Spiritual intelligence SQ which transcends IQ and EQ and cajoles us to embark on the inner quest, identifying our source and acknowledging the essential oneness of all creation.
- Spiritual texts advocate Antarmukham, inner-focus and ask to focus within. It enables us to build awareness of the universal cosmic energy that pervades all creation.
- As we become more conscious of ourselves, we find a shift in our attitude and outlook towards life.
- Life becomes a larger scheme of things which is designed and interconnected within a cosmic web.
- SQ help us to become humbler and shed egoism. It helps us to understand that there are many factors beyond our control which have silently and significantly helped us.



- The inner awareness reduces hubris and awakens the spirit of gratitude in us.
- Finland topped World Happiness Index but paradoxically, Finland also ranks sixth in the use of antidepressants; loneliness being a major cause. This paradox validates that peace and tranquillity of mind can sustain only through the inner quest.

PT CONCATENATION

Pre-Monsoon Showers

About

Recently, IMD issued a forecast for a fresh spell of rainfall along with thunderstorms and hailstorms over northwest, east and northeast India.

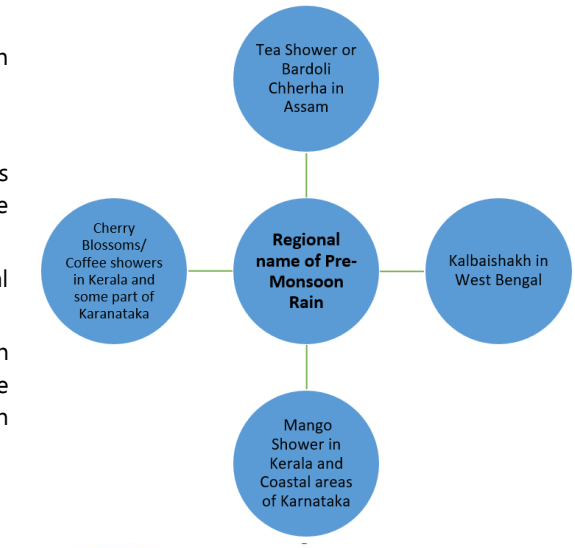
Pre-Monsoon shower

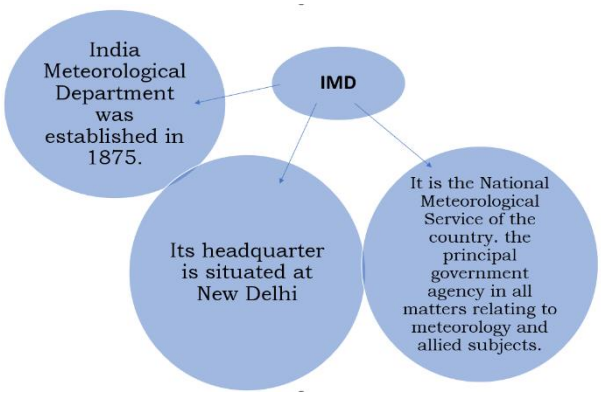
- The pre-monsoon rain is also known as April rain or summer rain and it is formed due to the storm over the Bay of Bengal. It is usually occurs in the second half of the month of April but difficult to predict on the arrival.
- It is a mixture of dry and moist winds, whose intensity gives rise to local storms, such as the occurrence of violent winds, heavy rain and hailstorms.
- The Pre-Monsoon Rain affects almost all the states of India, but its effect can be seen in two ways such as in some states of northern India reduces the intensity of heat waves, but it came with the blessing of showers in the Eastern and Southern India for the farmers.

Impact of Pre-Monsoon shower

- It is very important for tea plantation because this shower increases the quality and productivity of the tea farming. Hence, it is called 'Tea Shower' in Assam.
- Whereas, it brings greenery to spring rice crops in West Bengal where is called Kalbaishakh.
- The Litchi is one of the sub-tropical evergreen fruits. This shower brings happiness to the fruit producers of Bihar because it makes litchi edible and increase the sweetness of the local mango.

LINK IT WITH: Pre-Monsoon shower, Monsoon, IMD





Translocation of tigers

About

Recently, the government is considering sending some tigers to Cambodia, where the big cat has gone extinct. India signed a memorandum of understanding with Cambodia in November to assist it with "all technical details and knowledge" regarding the reintroduction of the tiger in the country.

Reason for tiger's extinction

- Habitat destruction and poaching
- Lack of large habitat because tigers need large habitats to roam in and a significant prey base to hunt.
- As forests were cut down for development activities and as human habitats extended into forests, the tiger's habitat came under stress.
- Tigers were killed for their valuable body parts.
    - According to the World Wildlife Fund (WWF), "Every part of the tiger—from whisker to tail—has been found in illegal wildlife markets.

Tiger status in the world

- Thirteen countries make up the tiger range of the world — Bangladesh, Bhutan, China, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam.
- In 2010, these countries had met and adopted a goal to double their tiger population by 2022.

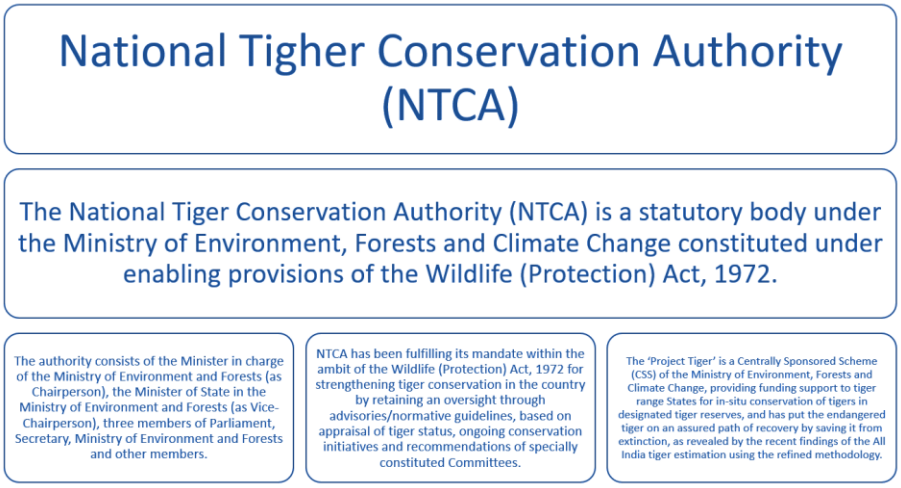
IUCN

- The International Union for Conservation of Nature (IUCN) is an international organization working in the field of nature conservation and sustainable use of natural resources.
- It is involved in data gathering and analysis, research, field projects, advocacy, and education.
- IUCN was established in 1948. It was initially called the International Union for the Protection of Nature (1948–1956) and has also been formerly known as the World Conservation Union (1990–2008).
- It headquarters is situated in Gland, Switzerland.

WWF

- The World Wide Fund for Nature (WWF) is a Swiss-based international non-governmental organization founded in 1961 that works in the field of wilderness preservation and the reduction of human impact on the environment.
- It was formerly named the World Wildlife Fund.
- It was established in 1961 and headquartered in Gland, Switzerland.

- India reached the goal before that year, and, with its current population of about 3,000 tigers, harbours more than 70% of the global wild tiger population.
  - The animal has gone extinct in Laos and Vietnam.
- The Indochinese tiger found in Cambodia is smaller than the Royal Bengal tiger, but they are the same subspecies.
- According to the WWF, "since 2017, IUCN has recognised two tiger subspecies, commonly referred to as the continental tiger and the Sunda Island tiger.
- All remaining island tigers are found only in Sumatra, with tigers in Java and Bali now extinct. These are popularly known as Sumatran tigers.



- The continental tigers currently include the Bengal, M alayan, Indochinese and Amur (Siberian) tiger populations, while the Caspian tiger is extinct in the wild. The South China tiger is believed to be functionally extinct."

LINK IT WITH: NTCA, World Wildlife Fund, IUCN,

Einstein tile

About

Mathematicians have discovered a single shape that can be used to cover a surface completely without ever creating a repeating pattern.

Einstein tile

- Mathematicians have long wondered if there existed an "einstein tile" – a shape that could be singularly used to create a non-repeating (aperiodic) pattern on an infinitely large plane.
- Here, "einstein" is a play on German ein stein or "one stone" – not to be confused with Albert Einstein, the famous German physicist.

Aperiodic tiling

- A set of tile-types (or prototiles) is considered to be aperiodic if copies of these tiles can only form patterns without repetition.

Penrose tiling

New discovery

- ✓ The latest discovery, a 13-sided shape which has been named "the hat" by its proponents, has presented a deceptively simple solution.
- ✓ The hat comprises eight copies of a 60°–90°–120°–90° kite, glued edge-to-edge, and can be generalised to an infinite family of tiles with the same aperiodic property.
- ✓ The shape also retains its aperiodic qualities when varying the lengths of the sides, meaning that the solution is actually a continuum of similar shapes.

- ✓ In the 1970s, Nobel prize-winning physicist Roger Penrose found a set of only two tiles that could be arranged together in a non-repeating pattern ad infinitum. This is now known as Penrose tiling and has been used in artwork across the world.

LINK IT WITH: Penrose tiling, Aperiodic tiling

Applications and implications

- ✓ First, aperiodic tiling will help physicists and chemists understand the structure and behaviour of quasicrystals, structures in which the atoms are ordered but do not have a repeating pattern.
- ✓ Second, the newly discovered tile might be a springboard for innovative art. "You're going to see people putting these in a bathroom because it's just cool.

Call Before You Dig App

About:

Recently, Indian Prime Minister launched the 'Call Before u Dig' (CBuD) app, to facilitate coordination between excavation agencies and underground utility owners to prevent damage to utilities due to digging.

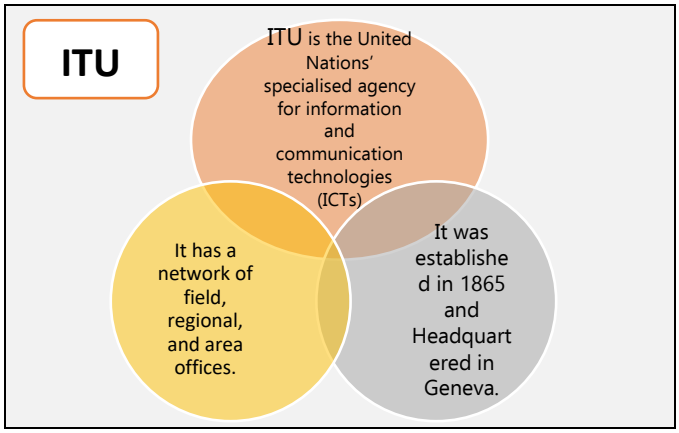
Call Before u Dig

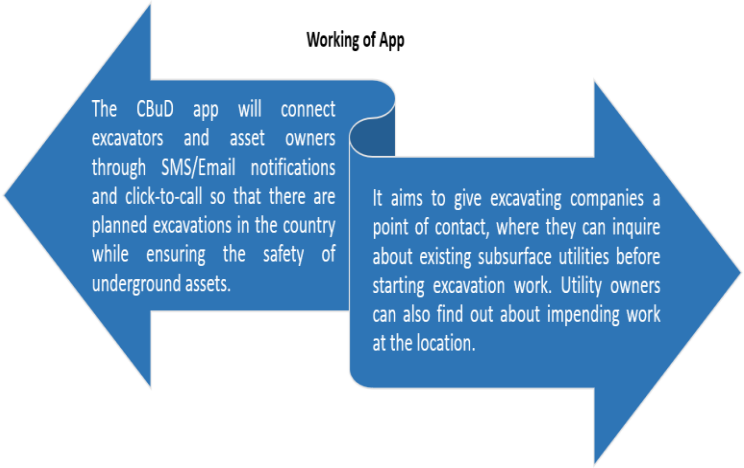
- It is an initiative of the Department of Telecommunications, Ministry of Communications.
- It aims to prevent damage to underlying assets like optical fibre cables that occurs because of uncoordinated digging and excavation, leading to losses of about Rs 3,000 crore every year.
- It will save potential business loss and minimise discomfort to the citizens due to reduced disruption in essential services like-
  - road,
  - telecom,
  - water,
  - gas and electricity.

LINK IT WITH: ITU, Call Before u Dig' (CBuD) app

6G Testbed

- ❖ Along with the CBuD app, Indian PM unveiled Bharat's 6G Vision Document and inaugurated the new International Telecommunication Union (ITU) Area office and Innovation Centre.
- ❖ The 6G Testbed was also launched.
  - It will provide academic institutions, industries, start-ups, and MSMEs, and industry, among others, a platform to test and validate evolving ICTs.
- ❖ The Bharat 6G Vision Document and 6G Testbed will provide an enabling environment for innovation, capacity building and faster technology adoption in the country.





Eravikulam National Park

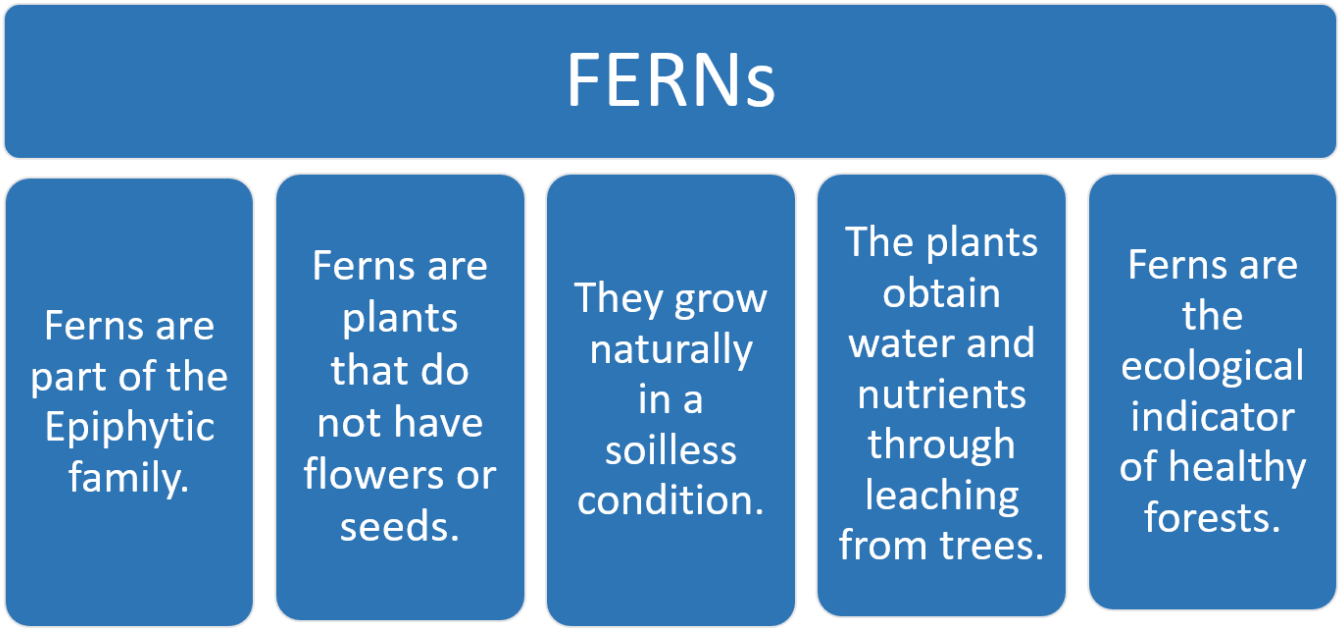
About

Eravikulam National Park (ENP) has a new attraction — a Fernarium set up inside the park. This is the first time such a fern collection has been established in the hill station.

Eravikulam National Park

- It was declared a Sanctuary in 1975 with the intention of protecting the indigenous population of Nilgiri Tahr (highly endangered mountain goat).
- However, in 1978, it was declared as a National Park considering it's ecological, faunal, geomorphological and Zoological Significance.
- This is also the land of "Neelakurinji", the flower that blooms once in twelve years.
- It is natural habitat of Nilgiri tahr in Munnar.
- ENP is one of the rich biodiversity areas, and the new initiatives aim to provide visitors with awareness about the park's biodiversity.
- The climatic condition inside the ENP is more suitable for growing ferns.
    - A large number of ferns are on the trees inside the park.

LINK IT WITH: Eravikulam National Park, Neelakurinji, Nilgiri Tahr, Ferns



Fatty liver disease

About:

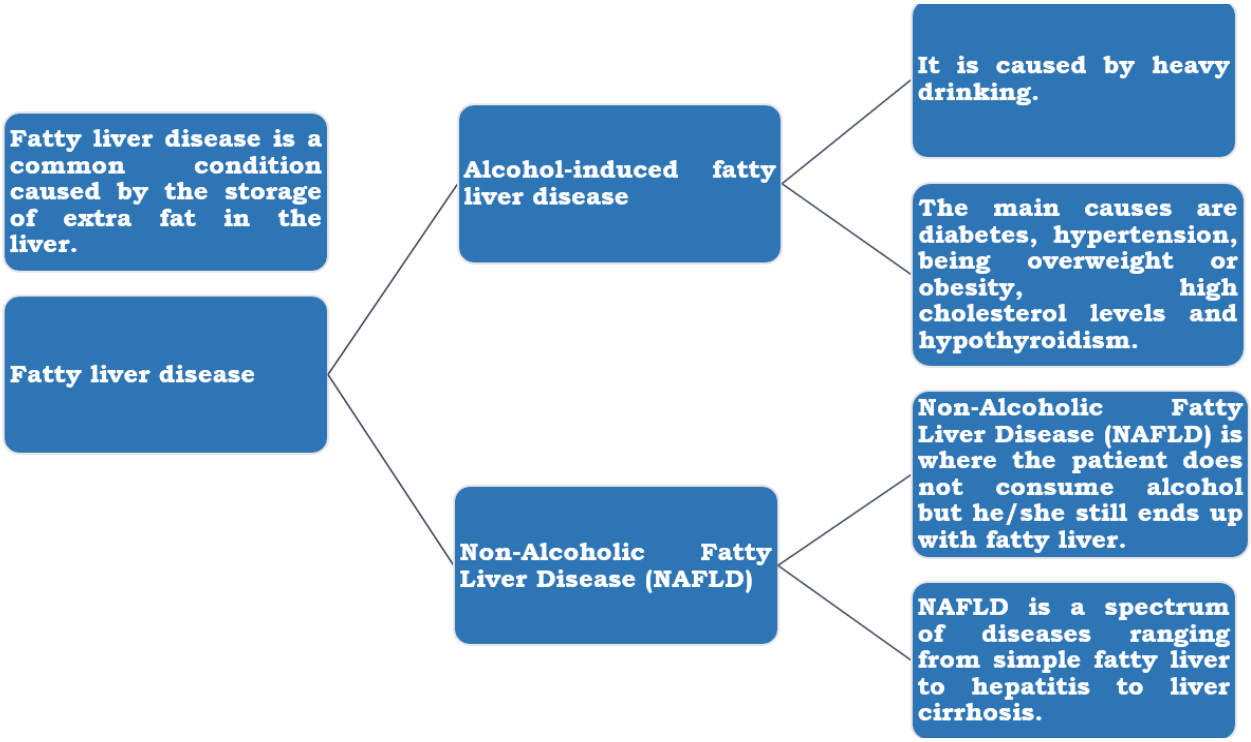
According to recent research, every one-hour decrease in sleep time from the recommended seven-eight hours, the risk of fat deposition in the liver increased by 24%.

- Sleep is a vital function of human life and accounts for up to one-third of the lifespan.
- Contrary to normal belief, during sleep, the brain is not 'resting' but is engaged in various activities necessary to improve well-being, increase life, and especially impact the liver.
- The minimum required duration for 'healthy' sleep is seven hours.

Key points of research

- When 10,000 persons with sleep disorders were followed up for one year, incident fatty liver disease was noted in 14, while in those without sleep disorders, it was only six.
- Non-alcoholic fatty liver disease association was significantly higher among persons with shorter sleep duration (less than six hours per night) and excessive daytime sleepiness.

- Inadequate sleep duration was strongly associated with an elevated risk of developing non-alcoholic fatty liver disease, and adequate sleep helped prevent it.
- Compared with non-nappers, long daytime nappers (more than 60 minutes) had a higher risk of developing non-alcoholic fatty liver disease.



LINK IT WITH: Fatty liver disease,

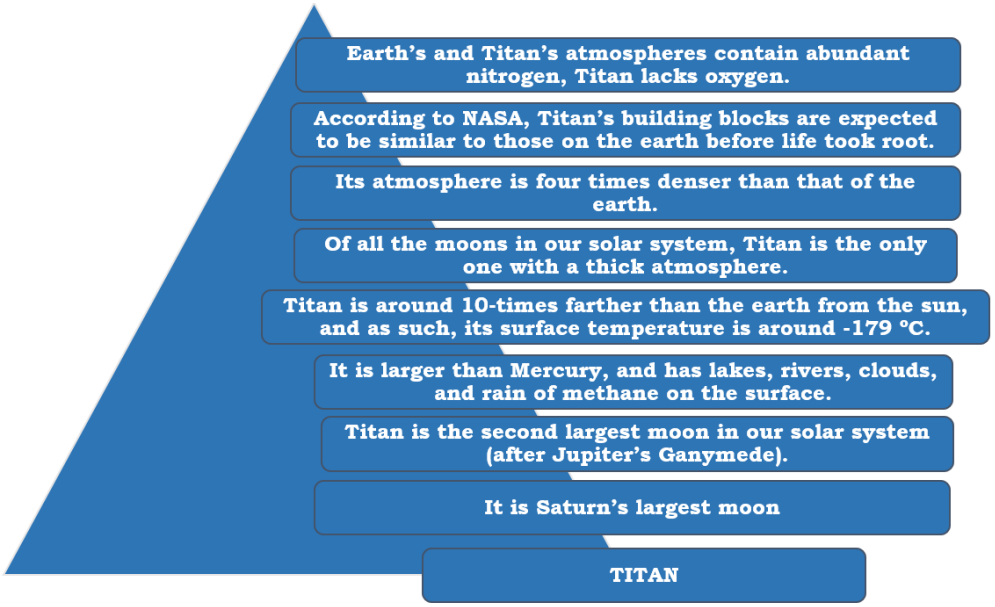
NASA'S Dragonfly mission

About

After lining up ambitious moon and Mars exploration missions, U.S. space agency National Aeronautics and Space Administration (**NASA**) has set its eyes on Saturn's largest moon, Titan.

Dragonfly Mission

- **NASA's Dragonfly mission** to explore Titan is scheduled for launch in 2027, and the spacecraft is expected to arrive at its destination in around 2034.
- Dragonfly will stay aloft above the surface of the moon with less energy than it would need on other bodies.
- The spacecraft is an eight-bladed drone-like craft called a quadcopter that will make short flights around the surface.



- The Dragonfly mission is part of NASA's 'New Frontiers' programme, which also includes the New Horizons mission to Pluto and the Kuiper Belt; Juno to Jupiter; and OSIRIS-REx to the asteroid Bennu.
- The **'New Frontiers' programme** is designed to explore the solar system with medium-class spacecraft missions that conduct high-science-return investigations.

LINK IT WITH: Titan, Dragonfly mission, NASA

Parambikulam Tiger reserve

About

Recently, the national tiger census has brought cheers registering a 6.74%, increase in the population across the country but the situation is particularly alarming in Kerala as there is a sharp decline in Wayanad Sanctuary, the biggest tiger habitat in Kerala, and Parambikulam Tiger Reserve.

Parambikulam Tiger Reserve

- Parambikulam Tiger Reserve, which also includes the erstwhile Parambikulam Wildlife Sanctuary, is a 643.66 square-kilometres (248.5 sq mi) protected area lying in Palakkad district and Thrissur district of Kerala state.
- It is in the Sungam range of hills between the Anaimalai Hills and Nelliampathy Hills.
- Parambikulam Wildlife Sanctuary was declared as part of the Parambikulam Tiger Reserve.
- The Tiger Reserve is the home of four different tribes of indigenous peoples including the Kadar, Malasar, Muduvar and Mala Malasar settled in six colonies.
- Parambikulam Tiger Reserve implements the Project Tiger scheme along with various other programs of the Government of India and the Government of Kerala.
- Considering its biological richness, abundance of wildlife and landscape beauty makes Parambikulam Tiger Reserve in one of the most attractive place in the entire Western Ghats.

LINK IT WITH: NTCA, National Tiger census, Wayanad Sanctuary, Periyar Tiger Reserve

National Technical Research Organisation

About

Recently, eight govt entities hit by info-stealing malware and National Technical Research Organisation (NTRO), a specialised intelligence agency under the National Security Advisor, wrote to the affected agencies on March 24 informing them of the attack.

National Technical Research Organisation

- The National Technical Research Organisation (NTRO) is a technical intelligence agency under the National Security Advisor in the Prime Minister's Office, India.
- It has the same "norms of conduct" as the Intelligence Bureau (IB) and the Research and Analysis Wing (R&AW).
- The National Technical Research Organisation (NTRO), originally known as the National Technical Facilities Organisation (NTFO), is a highly specialised technical intelligence gathering agency.
- The agency specializes in multiple disciplines, which include remote sensing, SIGINT, data gathering and processing, cyber security, geospatial information gathering, cryptology, strategic hardware and software development and strategic monitoring.
- NTRO has been one of the most proactive members of US NSA-led 10-member counter-terrorism platform called SIGINT Seniors Pacific (SSPAC) for the last 10 years.
- It was established in 2004 and headquartered in New Delhi.
- The National Critical Information Infrastructure Protection Centre, an agency under the control of National Technical Research Organisation, has been created to monitor, intercept and assess threats to crucial infrastructure and other vital installations from intelligence.

Malware

Malware is a catch-all term for any type of malicious software designed to harm or exploit any programmable device, service or network. Cybercriminals typically use it to extract data that they can leverage over victims for financial gain.

- ❖ NTRO has been tracking and reporting the activities of Raccoon Stealer malware, which is available as Malware-as-a-service (MaaS). It is an information stealer malware that retrieves sensitive data from infected machines.
- ❖ It said "recent analysis" revealed that a malicious campaign was launched "by an unknown threat actor using Raccoon malware" to target computer systems of the eight govt entities.

LINK IT WITH: NTRO, Malware

Green Steel

About

Recently, Govt approved 13 Task Forces for defining the roadmap for 'Green Steel'.

- The task forces with the involvement of experts and the industry stakeholders have been identified to deliberate on various aspects of 'Green Steel' production, and chalk out action points.
- The task force for 'Green Steel' will work on developing the taxonomy of the green steel, including terminology, definition, benchmarks, scoping, certification and others.

Green steel

- Green Steel refers to the production of steel without relying on fossil fuels.
    - Alternative low-carbon energy sources such as hydrogen, coal gasification, or electricity are used in place of traditional coal-fired plants, which results in reduced greenhouse gas emissions, lower costs, and improved steel quality.

Importance of Green steel

- The steel industry is a major consumer of energy and resources, and it also produces a significant amount of carbon dioxide (CO_2) emissions.
    - But the use of low-carbon hydrogen, including blue and green hydrogen, can further decrease the carbon footprint of the steel industry.
- In order to make primary production processes cleaner, various alternatives are being considered. One such alternative is Carbon Capture, Utilization, and Storage (CCUS) which aims to reduce carbon emissions.
- Another alternative is using low-carbon hydrogen as a substitute for conventional energy sources. Direct electrification through the electrolysis of iron ore is another method for cleaner primary production processes.

LINK IT WITH: Steel production in India, green steel, green fuel

Snailfish

About

Recently, a fish has been caught more than 5 miles (8 kilometres) under the surface of the ocean for the first time ever - and filmed even deeper - by a joint Japanese-Australian scientific expedition.

Snailfish Scientific Classification	
Kingdom	**Animalia**
Phylum	**Chordata**
Class	**Actinopterygii**
Order	**Scorpaeniformes**
Family	**Liparidae**

Snailfish

- The snailfish, of the Pseudoliparis belyaevi species, are the first to be caught below 8,000 metres.
    - It wasn't immediately clear how big the fish were, but the species has been recorded as reaching a length of close to 11 centimetres (4.3inches).
- Surfaced snailfish have "melted" or "exploded" due to the drastic change in atmospheric pressure and because of the heat. This makes them difficult to study, so scientists usually defer to studying their bones instead.
- They have adapted to living in habitats with overwhelming pressure due to genetic adaptations. Their genes protect their genome and make their bones softer.
- Snailfish don't have swim bladders unlike many other types of fish. Instead, they produce a gelatinous substance that keeps them buoyant.
- Snailfish is the common name of a family of ray-finned fish known as Liparidae.
    - The members of this family are carnivorous, saltwater fish.
- Snailfish are mysterious deep-sea dwellers.
    - In fact, they are the deepest dwellers in the sea. These scaleless animals look more like tadpoles than fish and have distinctive shapes.

LINK IT WITH: snailfish, scientific expedition

Prosopis chilensis

About

An alien invasive plant is threatening to pulverise native vegetation across 21 islands in the Gulf of Mannar Biosphere Reserve (GoMBR), an avian distribution study has revealed.

- Prosopis chilensis is trouble for these islands divided into the Tuticorin, Vembar, Kilakkarai, and Mandapam groups.

Prosopis chilensis

- It is known as Chilean mesquite.
- Prosopis chilensis is a species of tree in the genus Prosopis, belonging to the family Fabaceae.
- Prosopis chilensis is a drought-resistant plant native to the arid regions of four South American countries — Argentina, Bolivia, Chile, and Peru.
- Prosopis chilensis is a medium-sized deciduous tree.
- Prosopis chilensis is used as a shade tree and for firewood. The leaves are used as fodder for livestock and the pods and seeds are of high nutritive value and are ground to make an animal feed.

LINK IT WITH: GoMBR, Chilean mesquite

Gulf of Mannar Biosphere Reserve

- The GoMBR, India's first marine biosphere reserve, is one of the important habitats for coastal birds migrating as far as the Arctic Circle.
- The Gulf of Mannar, running down south from Rameswaram to Kanyakumari in Tamil Nadu.
- The Gulf of Mannar endowed with three distinct Coastal ecosystems namely coral reef, seagrass bed and mangroves are considered one of the world's richest region from a marine biodiversity perspective
  - It is known for its unique biological wealth and is a store house of marine diversity of global significance.
- This Marine Biosphere Reserve encompasses a chain of 21 islands and adjoining coral reefs off the coasts.
- The Gulf of Mannar has drawn attention of conservationists even before the initiation of the Man and Biosphere (MAB) program by the UNESCO in 1971.

Sand battery

About

Recently, Finland has installed the world's first sand battery that can store heat from renewable energy sources for months.

- According to the Finnish developer, the battery, made of sand collected from construction sites, can solve the problem of round-the-year energy supply, a known limitation of renewable energy sources that can be harnessed intermittently.

Sand Battery

- A "sand battery" is a high temperature thermal energy storage that uses sand or sand-like materials as its storage medium. It stores energy in sand as heat.
- Its main purpose is to work as a high-power and high-capacity reservoir for excess wind and solar energy. The energy is stored as heat, which can be used to heat homes, or to provide hot steam and high temperature process heat to industries that are often fossil-fuel dependent.
- Sand batteries can ensure round-the-year availability of clean energy.

LINK IT WITH: Clean Energy, sand battery

Labour 20

About

Recently, A two-day first Labour 20 (L20) meeting held at Amritsar in Punjab.

Labour 20

- L20 is one of the engagement groups under G20.
- The Labour 20 (L20) is one of the 6 outreach groups within G20 and represents the interests of workers at the G20 level.
- It is convened by the International Trade Union Confederation (ITUC) and Trade Union Advisory Committee to the OECD (TUAC).
- It comprises leaders and representatives of trade union centres of G20 countries who provide analyses and policy recommendations aimed at addressing labour-related issues.
- Bharatiya Mazdoor Sangh, India's largest labour organisation, is hosting the L20 inception meeting under India G20 presidency along with other leading trade unions of the country.

G20

- The Group of Twenty (G20) is the premier forum for international economic cooperation.
- It plays an important role in shaping and strengthening global architecture and governance on all major international economic issues.
- The G20 was founded in 1999 after the Asian financial crisis as a forum for the Finance Ministers and Central Bank Governors to discuss global economic and financial issues.

- Trade union delegates, experts and labour leaders from 20 countries, besides trade union leaders and labour experts from India, are participating in the event.
- The Inception meeting of L20 India's presidency of the G20 in 2023 is a watershed moment to collaborate with the world on critical global issues.

LINK IT WITH: OECD, G20

Butterfly Eco park in Tripura

About

A butterfly park developed by the forest department in Tripura is now a major attraction for tourists from different parts of the country and also Bangladesh.

Butterfly EcoPark

- The Butterfly EcoPark at Chottakhola, close to the Trishna WildLife sanctuary is the first butterfly park of northeast.
- It was inaugurated in 2016 on 5.5 hectares of land having 250 species of butterflies.
- The park is near the endangered bison park at Trishna wildlife sanctuary and Indo-Bangla Maitri Park to commemorate the Bangladesh liberation war.
- Here is a breeding facility for the winged creature and many plants which are favourite to the butterfly are planted for creating a good habitat for the insect and artificial foods are also distributed at times.
- There is plenty of scope to promote butterflies as a tourist attraction as the state has its own variety of vegetation having many plants with medicinal values that grow here naturally, and shelters more than 250 species of butterflies.
- All these butterflies have their own specific character and give the spectator an unforgettable experience.

LINK IT WITH: Ecopark, Butterflies

Butterflies

- Butterflies (and moths) are the only group of insects that have scales covering their wings, although some butterflies have reduced scales.
- They differ from other insects also by their ability to coil up their proboscis. Immatures.
- Butterflies are deemed to be indicators of a good ecological balance and healthy nature.
- The lifespan of butterflies is very short. They live only from 15 days to about 30 days.

Eco-Parks

EcoParks are self-sustaining systems that generate their own energy, harvest and clean their own water and produce their own food. The EcoPark model includes the construction of sustainable housing and community buildings, such as classrooms and clinics.

Irradiation of onions

About

The Centre is planning to irradiate onions with Gamma rays before sending them into cold storage on a pilot basis. Irradiation prevents sprouting and thus brings down post-harvest losses.

Irradiation

- Food irradiation is a technology t hat improves the safety and extends the shelf life of items by reducing or eliminating micro-organisms and insects. Like pasteurizing milk and canning fruits and vegetables, irradiation can make food safer for the users.
- The irradiation process involves exposing food to a specified dose of ionizing radiation inside a biologically shielded irradiation chamber.

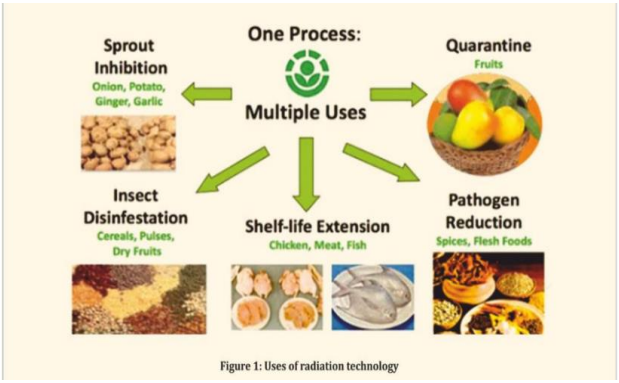


Figure 1: Uses of radiation technology

- Studies show that food irradiation presented no toxicological, nutritional or microbiological problems.
- In India, regulations on radiation processing have been notified under Food Safety and Standards (Food Products Standards and Food Additives) Amendment Regulations, 2016.

Procurement of onions

- The Centre is considering irradiating around 4,000 tonnes of rabi season onion after it kicks off procurement from April.
- Red onions are being procured by the National Agricultural Cooperative Marketing Federation of India and National Cooperative Consumers' Federation of India to support farmers amid falling prices.
- Kharif and late kharif onion or red onion is highly perishable and cannot be stored for over a month.

LINK IT WITH: gamma irradiation, Food irradiation

Gamma Irradiation

- The gamma irradiation process uses Cobalt 60 radiation to kill microorganisms on a variety of different products in a specially designed cell.
- The gamma irradiation sterilization process does not involve sufficient energy to cause the treated products to become radioactive; it will only harm the microorganisms on the products.
- Gamma ray irradiation is an effective form of preservation that extends the shelf life of the crops and reduces spoilage. The process also benefits the consumer by reducing the risk of illnesses caused by foodborne diseases.

Exercise Cobra Warrior

About

Recently, Indian Air force contingent comprising 145 Air Warriors participated in Exercise Cobra Warrior at the Waddington Air Force Base of the Royal Air Force in United Kingdom. The exercise was scheduled from 06 Mar 23 to 24 Mar 23.

- The IAF is participating in the exercise this year with five Mirage 2000 fighters, two C-17 Globemaster III and an IL-78 mid-air refueller aircraft.

Joint Exercises conducted by NAVY	
Country	**Exercise**
Australia	AUSINDEX
Bangladesh	IN-BN CORPAT
France	VARUNA
Indonesia	IND-INDO CORPAT
Oman	Naseem-al-Bahr
Russia	INDRA NAVY
Sri Lanka	SLINEX
Singapore	SIMBEX
UK	KONKAN
USA	MALABAR
Multilateral Exercise by India	MILAN

Joint Exercises conducted by Army	
Country	**Exercise**
Australia	Ex AUSTRA HIND
Bangladesh	Ex SAMPRITI
China	Ex HAND IN HAND
France	Ex SHAKTI
Indonesia	Ex GARUDA SHAKTI
Kazakhstan	Ex PRABAL DOSTYK
Kyrgyzstan	Ex KHANJAR
Maldives	Ex EKUVERIN
Mongolia	Ex NOMADIC ELEPHANT
Myanmar	IMBEX
Nepal	Ex SURYA KIRAN
Oman	AL NAGAH
Russia	Ex INDRA
Sri Lanka	Ex MITRA SHAKTI
Thailand	Ex MAITREE
UK	Ex AJEYA WARRIOR
USA	Ex YUDHABHAYAS
	Ex VAJRA PRAHAR

Exercise Cobra Warrior

- The Exercise Cobra Warrior is a multilateral Air exercise in which Air Forces from Finland, Sweden, South Africa, United States of America and Singapore would also be participating alongside Royal Air Force and IAF.
- The aim of the exercise is to participate in diverse fighter aircraft engagements and learn from the best practices of various Air Forces.

LINK IT WITH: Bilateral exercise, Indian Air force

Hemu Kalani

About

Recently, freedom fighter Hemu kalani's birthday was celebrated.

Hemu kalani

- Hemu's full name was Hemandas Kalani (23 March 1923 – 21 January 1943) and he was the son of Pesumal Kalani, a contractor, and Jethi Bai.
    - He was lovingly called 'Hemu' by his family.
- the Sindhi Hindu freedom-fighter Hemu Kalani, known later as the "Bhagat Singh of Sindh".
- Hemandas Kalani was a revolutionary and freedom fighter during the Indian Independence Movement.
- He was a leader of Swaraj Sena, a student organisation which was affiliated with All India Students Federation (AISF).
- He was one of the youngest revolutionaries to be martyred for the nation's freedom struggle, being executed by the British colonial authorities when he was only 19, two months before his 20th birthday.
- Hemu Kalani joined Mahatma Gandhi's Quit India movement when it was started in 1942.

LINK IT WITH: Quit India movement, Swaraj Sena

IMD TO ISSUE HEAT INDEX (HI) READING

About

The India Meteorological Department (IMD) is planning to issue Heat Index (HI) readings for weather stations across the country, including Delhi.

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Heat Index

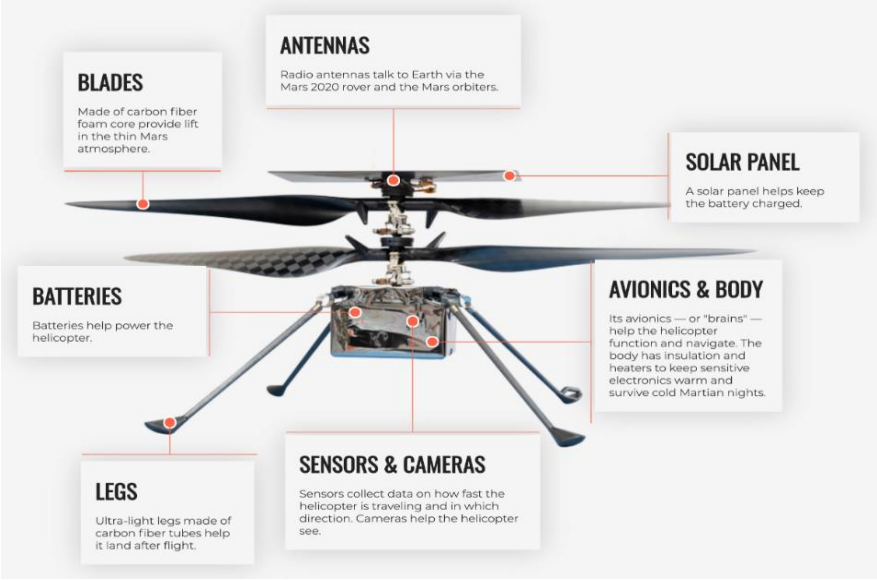
- The heat index tells us what the temperature feels like when humidity is also factored in and is provided by weather agencies.
- In other parts of the world, like the United States, the heat index is calculated, and colour-coded warnings are provided based on the impact a certain heat index can have on the body, like fatigue or the likelihood of heat strokes.
    - Indian Meteorological Department is planning to introduce a similar color-coded warning system in India.
- According to a recent study, the average heat index in India is increasing significantly at the rate of 0.56 degree Celsius per decade in the summer and 0.32 degree Celsius per decade during monsoon.

LINK IT WITH: IMD, Heat Index

NASA's Ingenuity Mars Helicopter

About

NASA's Ingenuity Mars Helicopter, the first aircraft on another world, completed a half-century of flights on April 13. On its 50th flight, Ingenuity travelled a distance of 322.2 metres over a period of 145.7 seconds.



Ingenuity Mars Helicopter

- The Mars Helicopter, Ingenuity, is a small, autonomous aircraft that will be carried to the surface of the Red Planet attached to the belly of the Perseverance rover.
- Its mission is experimental in nature and completely independent of the rover's science mission.
- Ingenuity is a small solar-powered helicopter that landed on the Martian surface on February 18, 2021, along with the Perseverance Rover.
- On April 19, the same year, it created history by completing the first powered extra-terrestrial flight in human history.

Ingenuity's records Importance

- While these distances may seem small for us here living on Earth, do remember that Mars is more than 225 million kilometres away right now.
- The distance between the two planets means that it takes between 5 to 20 minutes for a signal to travel from one to another.
- Ingenuity also has to survive the harsh conditions on Mars.
    - The low atmospheric density on the planet means that Ingenuity must work much harder than helicopters here on Earth in order to be able to fly.
    - Also, it has had to survive "continent-sized" dust storms in the past and other Martian hazards in the past.

LINK IT WITH: NASA, Perseverance Rover

Genome India Project

About

The Genome India Project, a Centre-backed initiative to sequence 10,000 Indian human genomes and create a database, is about two-thirds through.

The Genome India Project

- Taking inspiration from the Human Genome Project, the Department of Biotechnology (DBT) initiated the ambitious "Genome India Project" (GIP) on 3rd January 2020.
- This is a national project funded by Department of Biotechnology, Government of India, and spearheaded by Centre for Brain Research at IISc, Bangalore aiming to identify genetic variations through whole genome sequencing of 10,000 representative individuals across India in the first phase of the study.
- The 20 national institutes across the country are part of this project.
- The project has sequenced close to 7,000 genomes and 3,000 of these are already available for public access by researchers. They expect the 10,000 genomes to be completely sequenced by the end of the year.

Human Genome Project

- ❖ The Human Genome Project was a landmark global scientific effort whose signature goal was to generate the first sequence of the human genome.
- ❖ In 2003, the Human Genome Project produced a genome sequence that accounted for over 90% of the human genome.
- ❖ It was a large, well-organized, and highly collaborative international effort that generated the first sequence of the human genome and that of several additional well-studied organisms.

Creating a database of Indian genomes means that researchers anywhere can learn about genetic variants that are unique to India's population groups and use that to customise drugs and therapies.

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

LINK IT WITH: Human genome project, department of biotechnology

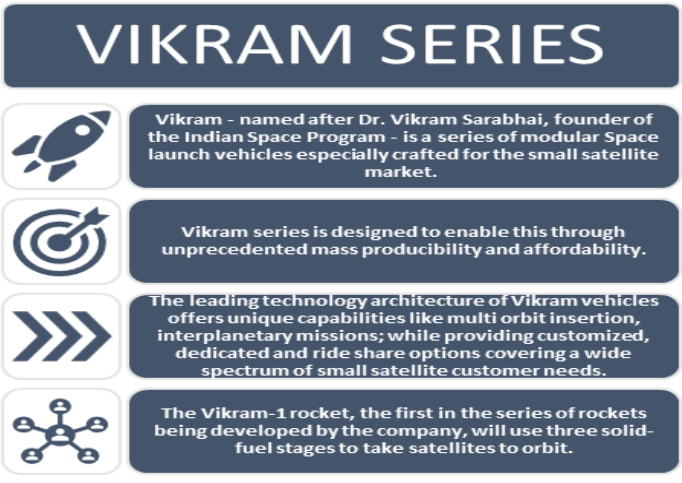
3D-printed cryogenic engine

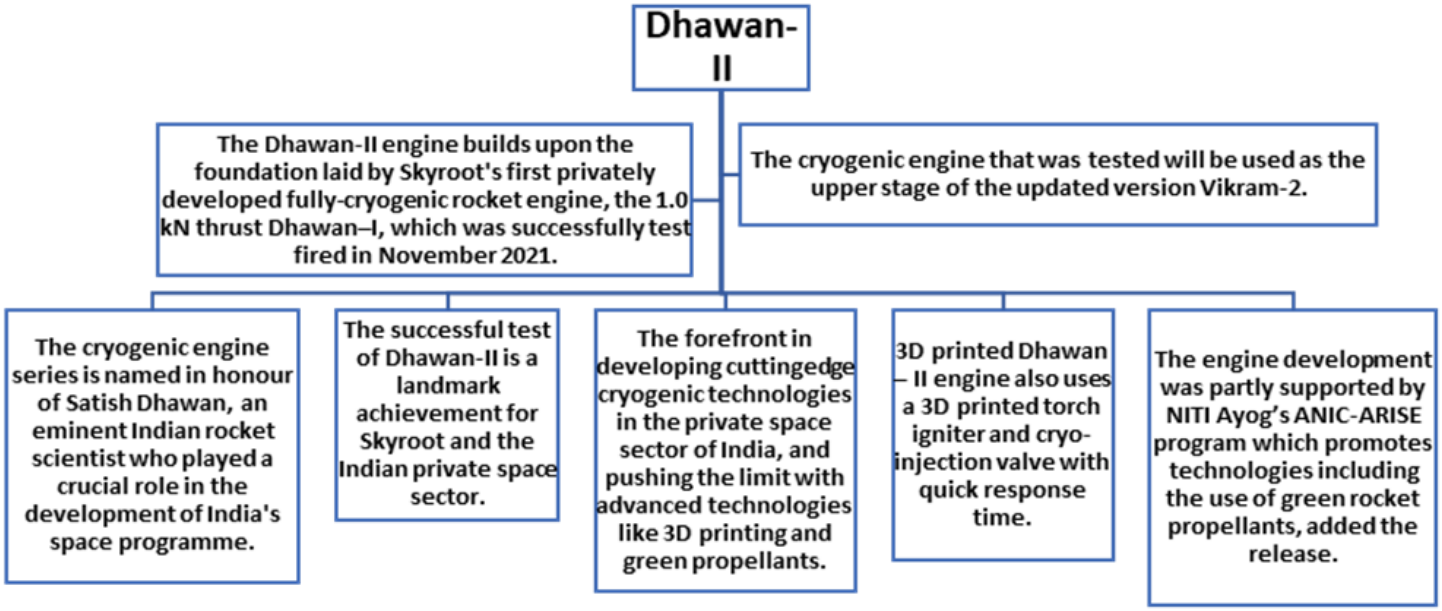
About

Recently, Skyroot Aerospace, India's pioneering private rocket builder, achieved a major milestone by successfully test-firing an advanced fully 3D-printed cryogenic engine for 200 seconds, a record for the company.

Skyroot Aerospace

- Skyroot Aerospace Private Limited is an Indian private aerospace manufacturer and commercial launch service provider.
- It is headquartered in Hyderabad, Telangana.
- The company was founded by former engineers and scientists from ISRO in 2018.
- It aims to develop and launch its own series of small lift launch vehicles especially crafted for the small satellite market.
- Skyroot is the first Indian rocket launching private company.





3D-printed cryogenic engine

- A cryogenic upper stage instead of a solid fuel stage enhances the payload carrying capacity of a rocket.
- The cryogenic rocket engines, which greatly enhances payload-carrying capabilities, uses two high-performance rocket propellants, Liquid Natural Gas (LNG) and Liquid Oxygen (LoX), which require cryogenic temperatures (below -150° C) for storage and operation.
    - Both fuels are environmentally friendly compared to other solid, semi-cryogenic and hypergolic propellants used in rocket industry.

LINK IT WITH: ISRO, IN-SPACE, NSIL

Magnetoresistance

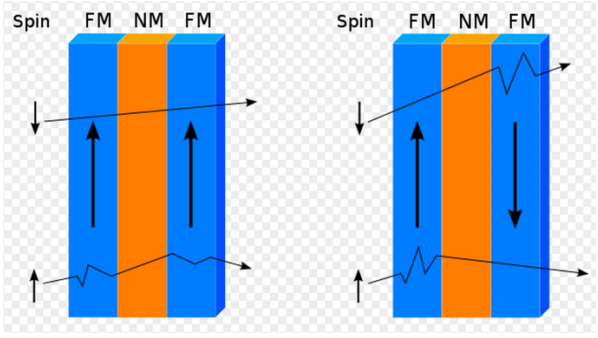
About

Recently, Researchers in the UK, led by Nobel laureate Andre Geim, have discovered another property of graphene – a single-atom-thick layer of carbon atoms bonded in a honeycomb pattern – that further distinguishes this 'wonder' material.

- They found that graphene displays an anomalous giant magnetoresistance (GMR) at room temperature.

Giant Magnetoresistance (GMR)

- GMR is the result of the electrical resistance of a conductor being affected by magnetic fields in adjacent materials.
- It is used in harddisk drives and magnetoresistive RAM in computers, biosensors, automotive sensors, microelectromechanical systems, and medical imagers.
- GMR-based devices are particularly used to sense magnetic fields.



An illustration of the circumstance in which GMR appears. The big arrows indicate the direction of the magnetic field. 'FM' stands for ferromagnetic material and 'NM' for non-magnetic material.

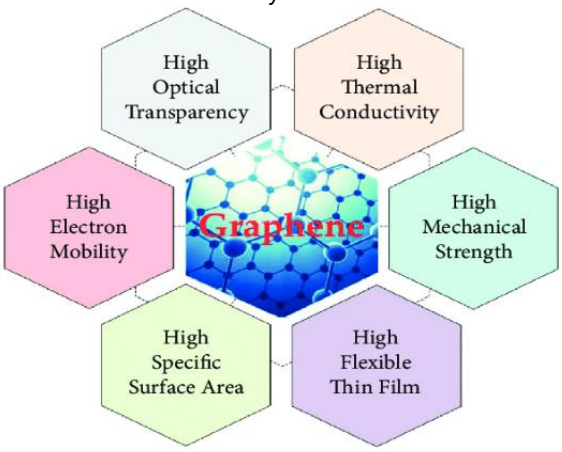
- The new study has found that a graphene-based device, unlike conventional counterparts, wouldn't need to be cooled to a very low temperature to sense these fields.

- The magnetoresistance observed in the graphene-based device was "almost 100-times higher than that observed in other known semimetals in this magnetic field range".
- Conventional GMR devices are cooled to low temperatures to suppress the kinetic energy of their constituent particles, keeping them from deflecting the electrons moving past them.
  - In graphene, the researchers found this suppression unnecessary.
- The effect is due to the way electrons in the conductor scatter off electrons in the ferromagnets depending on the orientation of the latter's spin, which is affected by the direction of the magnetic field.

LINK IT WITH: GMR, graphene, conductor

Graphene

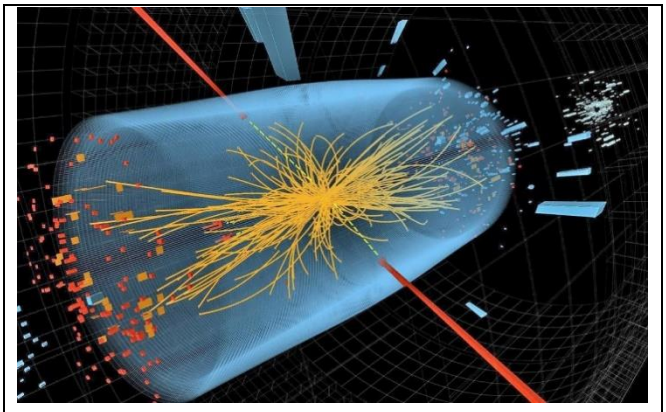
- Graphene is an allotrope of carbon consisting of a single layer of atoms arranged in a hexagonal lattice nanostructure.
- Graphene has a wide range of potential applications and uses due to its exceptional mechanical, electrical, and thermal properties. It is used in electronics, energy storage, sensors, coatings, composites, biomedical devices and many other.



Large Hadron Collider

About

Currently, engineers are warming up the LHC for its third season of operations, following upgrades that will have made the collider and its detectors more sensitive and accurate than before. It will start collecting data again from mid-May.



A typical candidate event inside the LHC, 'seen' by the CMS detector in which a collision between two beams has produced two high-energy photons (depicted by red towers) and other particles (yellow lines). The pale blue volume depicts the detector volume.

The Large Hadron Collider (LHC)

- The Large Hadron Collider (LHC) is the world's largest and most powerful particle accelerator.
  - It first started up on 10 September 2008
- The Large Hadron Collider (LHC) is three things-
  - First, it is large – so large that it's the world's largest science experiment.
  - Second, it's a collider. It accelerates two beams of particles in opposite directions and smashes them head on.
  - Third, these particles are hadrons.
- The LHC, built by the European Organisation for Nuclear Research (CERN), is on the energy frontier of physics research, conducting experiments with highly energised particles.
- A hadron is a subatomic particle made up of smaller particles.
  - The LHC typically uses protons, which are made up of quarks and gluons.
  - It energises the protons by accelerating them through a narrow circular pipe that is 27 km long.

LHC finding

- The LHC consists of nine detectors. Located over different points on the beam pipe, they study particle interactions in different ways.

- The ATLAS and CMS detectors discovered the Higgs boson in 2012 and confirmed their findings in 2013, for example.

- Every year, the detectors generate 30,000 TB of data worth storing, and even more overall. Physicists pore through it with the help of computers to identify and analyse specific patterns.
- The LHC specialises in accelerating a beam of hadronic particles to certain specifications and delivering it. Scientists can choose to do different things with the beam. For example, they have energised and collided lead ions with each other and protons with lead ions at the LHC.
- Using the data from all these collisions, they have tested the predictions of the Standard Model of particle physics, the reigning theory of subatomic particles; observed exotic particles like pentaquarks and tetraquarks and checked if their properties are in line with theoretical expectations; and pieced together information about extreme natural conditions, like those that existed right after the Big Bang.

CERN

- The European Organization for Nuclear Research, known as CERN, is an intergovernmental organization that operates the largest particle physics laboratory in the world.
- It was established in 1954 and headquartered in Meyrin, Geneva, Switzerland.
- CERN's main function is to provide the particle accelerators and other infrastructure needed for high-energy physics research — consequently, numerous experiments have been constructed at CERN through international collaborations.
- CERN is the site of the Large Hadron Collider (LHC), the world's largest and highest-energy particle collider.

LINK IT WITH: CERN, LHC

TEMPO Satellite of NASA

About

Recently, the cutting-edge device to monitor air pollution in North America with unparalleled accuracy was launched April 7, 2023.

- Cutting-edge device will be essential for comprehending the primary air pollutants' origins, distribution and effects.

TEMPO Satellite

- Tropospheric Emissions: Monitoring of Pollution (TEMPO) was launched aboard SpaceX's Falcon 9 rocket, hosted by Intelsat 40e (IS-40e), a geosynchronous satellite that relies on spot-beam technology.
- This tool will address contaminants such as nitrogen dioxide, sulphur dioxide, formaldehyde and aerosols that are known to have detrimental effects on human health and the environment.
- The device uses UV-Vis spectroscopy, which calculates the concentrations of atmospheric pollutants by measuring the sunlight reflected and absorbed by air contaminants.
- Outdoor air pollution caused an estimated 4.2 million premature deaths worldwide in 2016, according to the World Health Organization (WHO). Policymakers can use information from the new technology to establish targeted measures to reduce pollution and safeguard people's health.
- Using TEMPO's high-resolution data, scientists can identify vulnerable groups and locations disproportionately affected by air pollution. This will help them better understand air pollution's geographical and temporal patterns.
- The **technology was created by NASA's Earth System Science Pathfinder programme** and will be essential for comprehending the primary air pollutants' origins, distribution and effects.
- The advanced features of TEMPO are anticipated to usher in a new era of air pollution monitoring, giving experts, decision-makers and stakeholders, the crucial-data they need to make informed decisions on managing air quality and environmental policies.

Importance of TEMPO

- It can help to preserve the environment owing to its high-resolution data, real-time monitoring capabilities and capacity to measure multiple pollutants at once.
- TEMPO will offer valuable data for understanding the root causes, distribution and impact of air pollution, supporting evidence-based policies and strategies to mitigate pollution and safeguard human health.
- TEMPO's data will aid in attempts to evaluate the success of rules governing air quality and emission reduction strategies.
- TEMPO will collect data in real-time by scanning the Earth's atmosphere from space, identifying pollution hotspots, following pollution transport and evaluating the efficacy of emission reduction methods.
- The device will deliver vital information on air pollution in almost real-time.

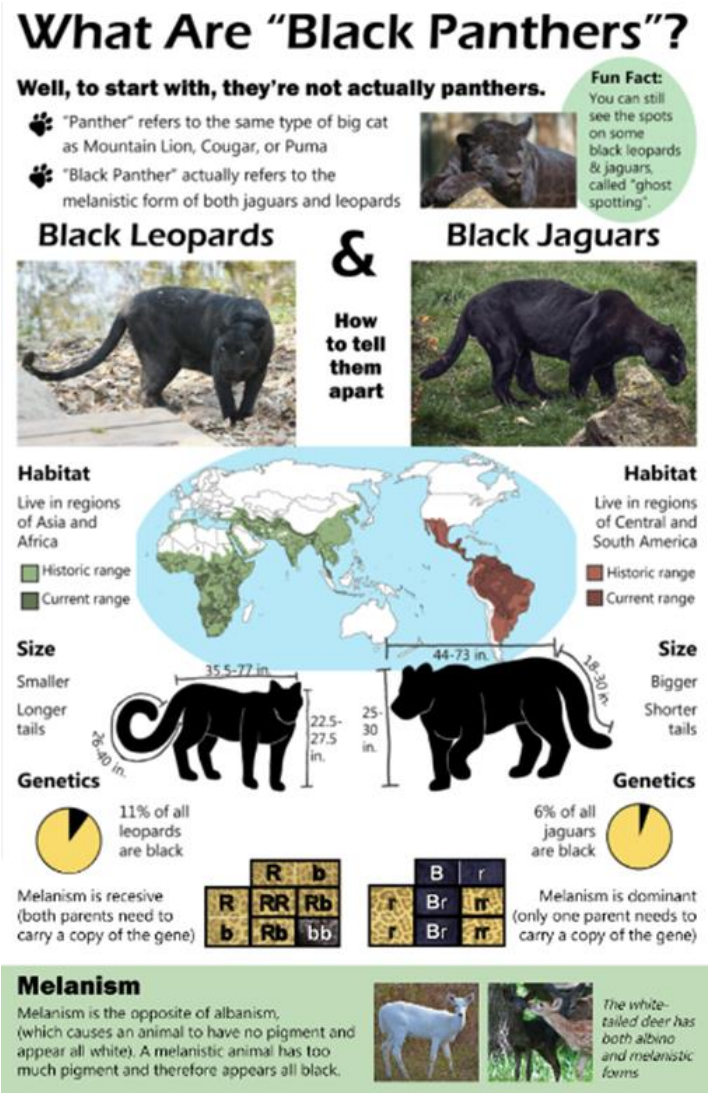
- This invention will contribute to creating ecological policies and regulations based on scientific data to reduce air pollution and its harmful environmental impact.
- A comprehensive picture of the atmosphere will be possible owing to TEMPO's capacity to track several contaminants simultaneously.

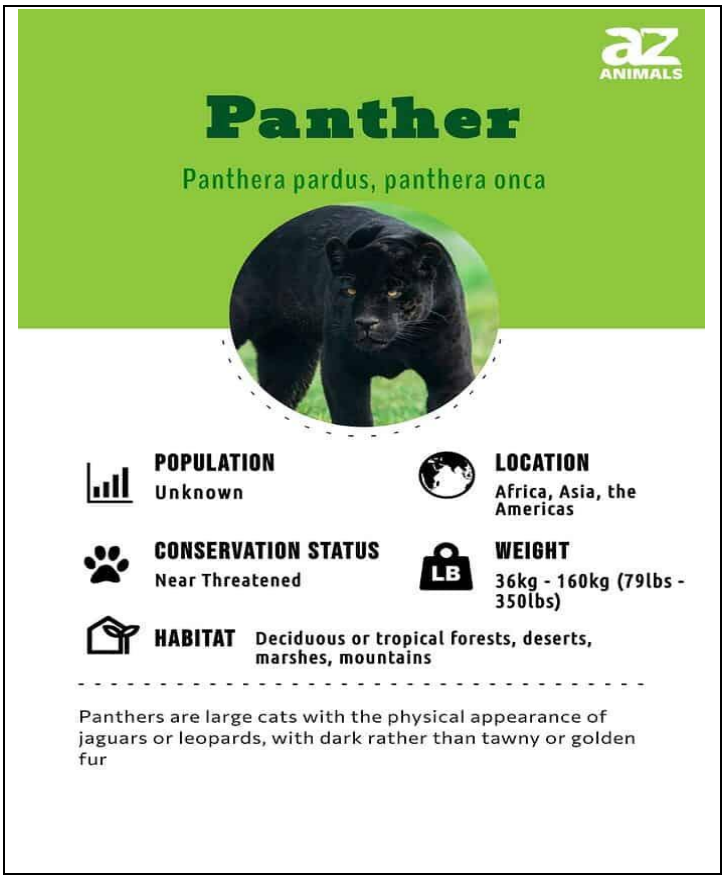
Limitations

- TEMPO is limited to observing air pollution in the troposphere, the Earth's lowest layer of the atmosphere. It might not fully capture the pollution levels in the upper atmosphere or an indoor setting.
- TEMPO's coverage is restricted to the North American continent and its data might not be relevant to other parts of the world.

LINK IT WITH: TEMPO, NASA

Netravali Wildlife Sanctuary





About

Recently, the black panther was rescued and will be released into the Netravali Wildlife Sanctuary in Goa.

Netravali Wildlife Sanctuary

- Netravali Wildlife Sanctuary is located in Sanguem Taluka of South Eastern Goa.
- The government of Goa declared Netravali as a wildlife sanctuary to protect its Western Ghat range.
- It covers an area of 211 sq. km, is connected to the Mhadei Wildlife Sanctuary and together they cover an area of 420 sq. km.
- The Netravali Wildlife Sanctuary which is an extremely significant source of fresh water is known to be named after the Netravali or Neturli which is an important tributary of the Zuari River.

- To the north of the Netravali wildlife sanctuary lies the Bhagwan Mahavir Wildlife Sanctuary and the Cotigao Wildlife Sanctuary lies to its south.
    - Some of the wildlife found here are the Great Pied Hornbills, Black Panther, Slender Loris and the Giant Squirrel.
    - Also a number of many other animals are found.

LINK IT WITH: Bhagwan Mahavir Wildlife Sanctuary, Cotigao Wildlife Sanctuary

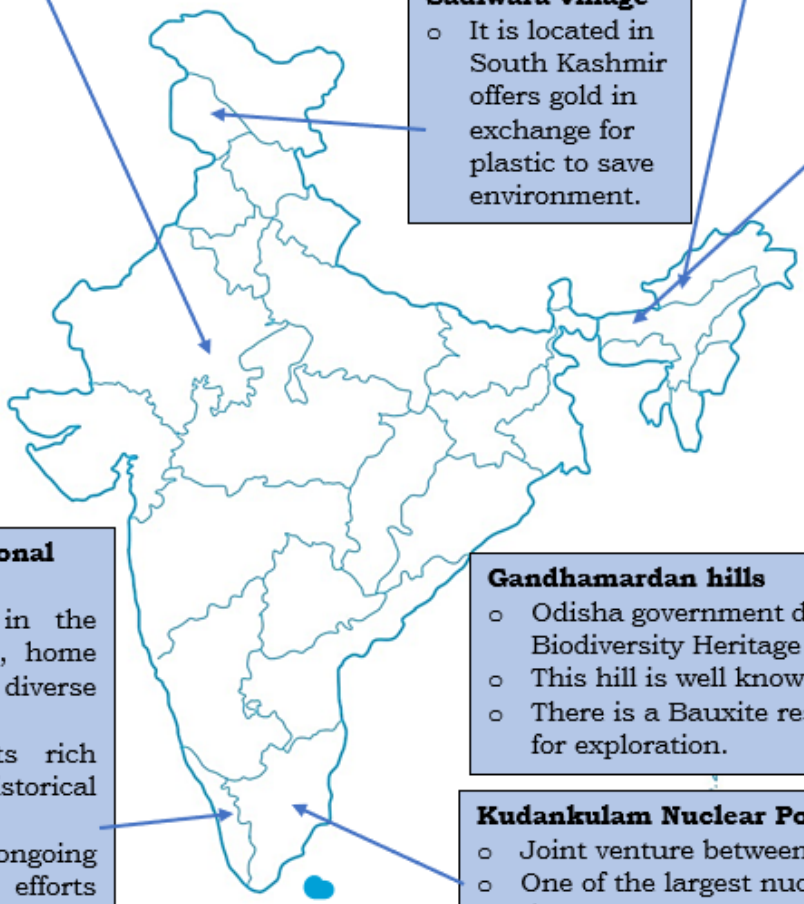
Black panther founded in other parts of India

- ✓ Periyar Tiger Reserve (Kerala)
- ✓ Bhadra Tiger Reserve, Dandeli-Anshi Tiger Reserve and Kabini Wildlife Sanctuary (Karnataka)
- ✓ Achanakmar Tiger Reserve (Chhattisgarh)
- ✓ Mhadei Wildlife Sanctuary (Goa)
- ✓ Mudumalai Tiger Reserve (Tamil Nadu)

MAP CONNECT : Places in News-India

The Eastern Rajasthan Canal Project (ERCP):
- It aims to bring water from the Chambal River to eastern parts of Rajasthan.
- Projects will lead to increased agricultural productivity and improved access to water for domestic and industrial use.
- One of the largest irrigation projects in the country.

Idu Mishmis:
- NTCA declares tiger reserve in Dibang, causing unrest among Idu Mishmi tribe.
- Tribe is well known for their rich culture and traditional lifestyle.
- They are expert weavers and woodcarvers. Also known for their unique and vibrant dances and music.



Sadiwara village
- It is located in South Kashmir offers gold in exchange for plastic to save environment.

Nongkhnum Island:
- Meghalaya Govt allocates 13 crore for Nongkhnum Island tourism development.
- It is located in West Khasi Hills.
- It is the largest river island in the state.
- Popular destination for adventure activities.

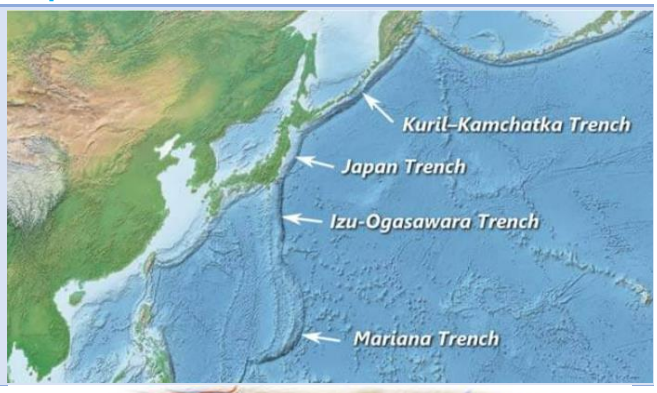
Silent Valley National Park:
- It is located in the Western Ghats, home to a unique and diverse ecosystem.
- Notable for its rich cultural and historical significance.
- Faces ongoing conservation efforts due to increasing human activities.

Gandhamardan hills
- Odisha government declared these hills as a Biodiversity Heritage Site.
- This hill is well known for medicinal plants.
- There is a Bauxite reserve which is planned for exploration.

Kudankulam Nuclear Power Project:
- Joint venture between India and Russia.
- One of the largest nuclear power stations in the country.
- Faces protests from local residents concerned about safety and environmental.

Katchatheevu Island:
- Uninhabited island located in the Palk Strait between India and Sri Lanka.
- It is important pilgrimage site for Roman Catholic and Hindu fishermen from Tamil Nadu.
- It is subjected to territorial disputes between India and Sri Lanka.

Places & Regions in News-World

Places & Region	Map
Izu–Ogasawara Trench ○ The Izu-Ogasawara Trench is also known as the Izu-Bonin Trench and the Bonin Trench. ○ It is also home to several active and dormant submarine volcanoes, including the Izu-Tobu volcano group. ○ The trench is an important site for scientific research on subduction zones, plate tectonics, and deep-sea biology.	
Lake Natron ○ It is a salt and soda lake located in northern Tanzania, near the Kenyan border. ○ The lake is a breeding ground for flamingos and other water birds, which feed on the algae and small crustaceans that thrive in the lake's unique conditions.	
Lorraine region ○ Lorraine is a French region situated in the northeastern part of the country, sharing borders with Germany, Belgium, and Luxembourg. ○ It is predominantly an agricultural region with the rivers Meuse and Moselle running through it, originating from the forested slopes of the Vosges. ○ Lorraine is renowned for its iron and steel industry and its crystal works.	
The Donbas of Ukraine (Donets Basin) ○ It is an eastern region of historical, economic, and cultural significance. ○ It has been a coal mining hub since the late 19th century, the Donbas coal mines are also among the world's most hazardous due to factors like great working depths and the risk of methane explosion, coal dust explosion, and rockburst dangers.	

Data of the Month- Environment Statistics of India

Environmental Conditions and Quality

Fig. 1.1: Trend of Annual Mean Temperature: 2001-2022

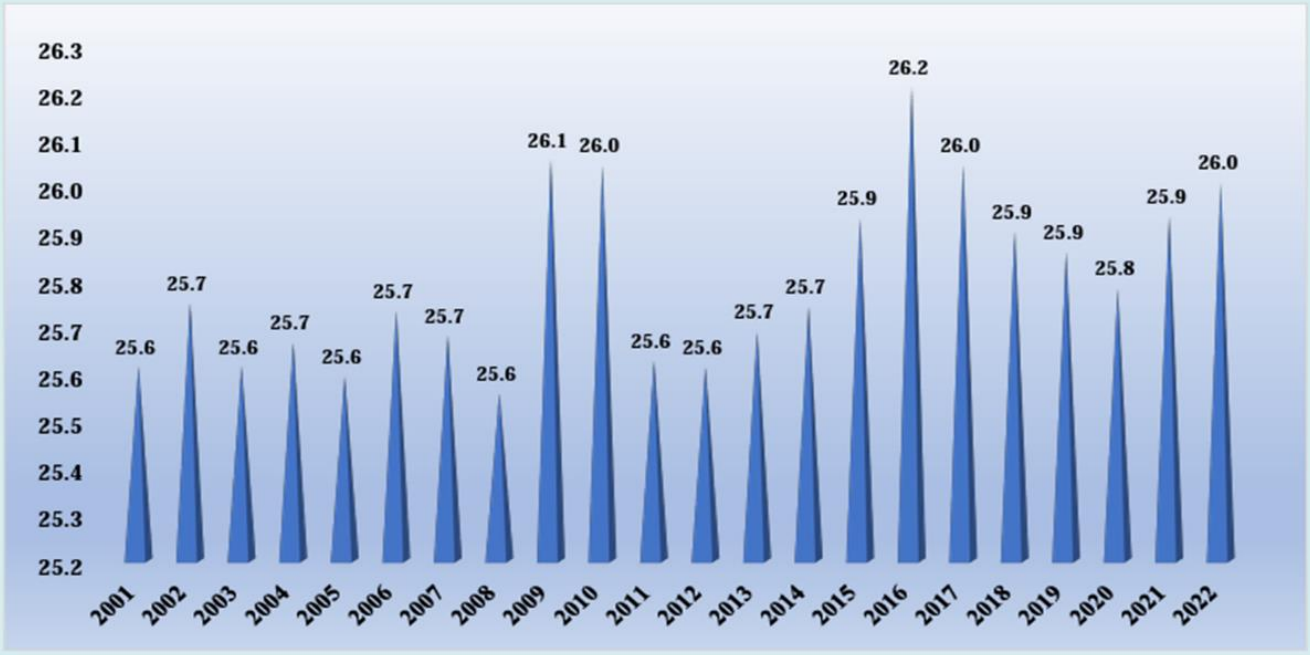


Fig. 1.2: Annual Rainfall (in cm): 2001-2022

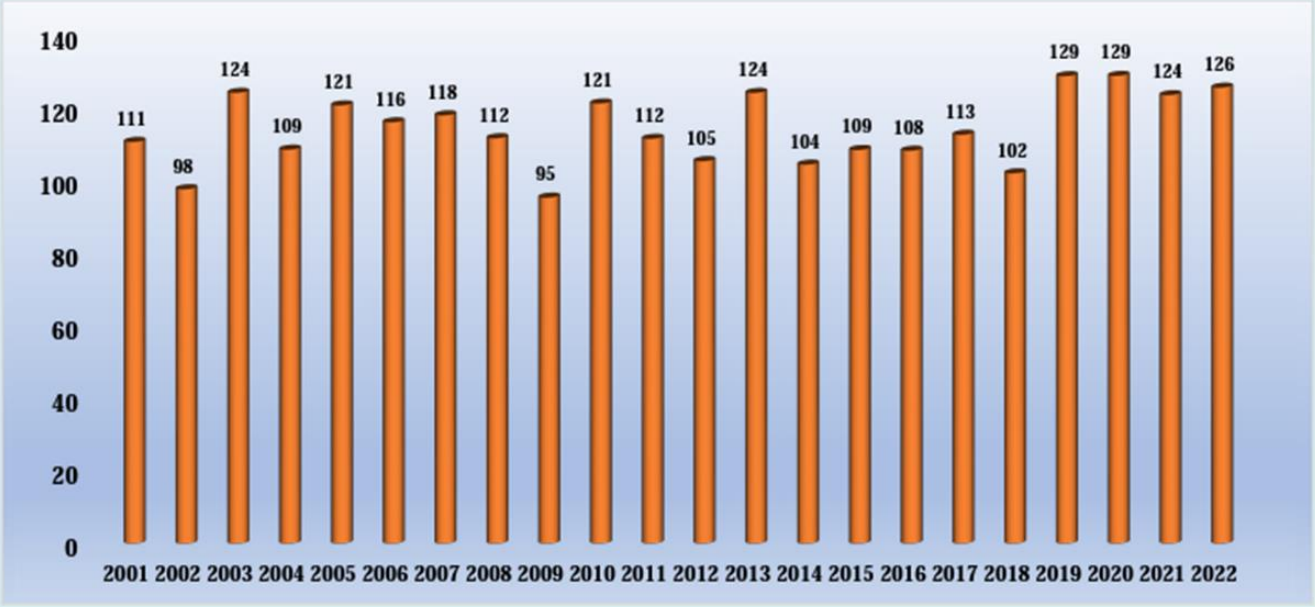


Fig. 1.7: Percentage of forest cover area India under various forest classes

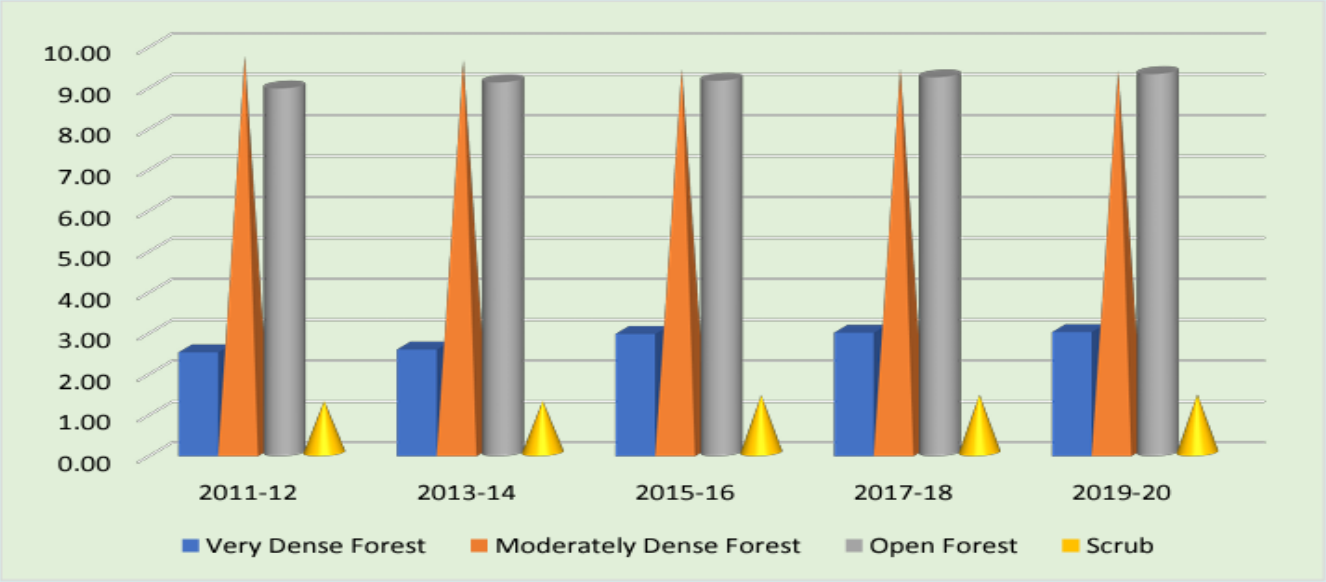


Fig. 1.8: Forest Cover in India under Various Forest Classes (%) in 2019-20

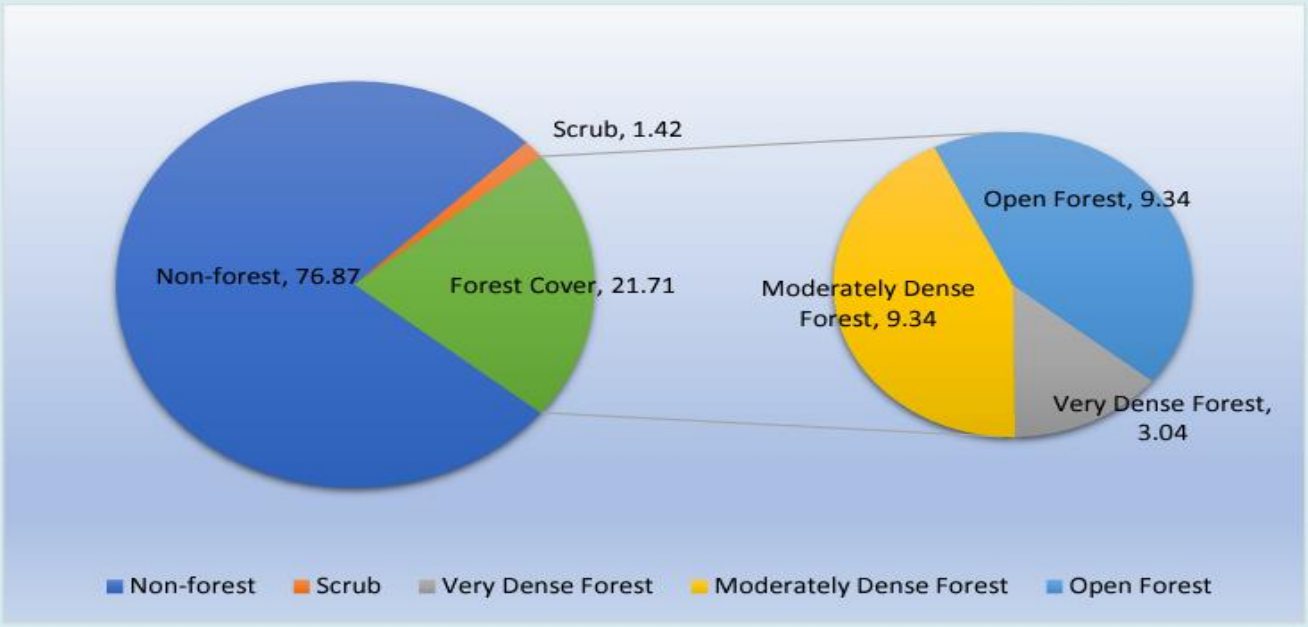
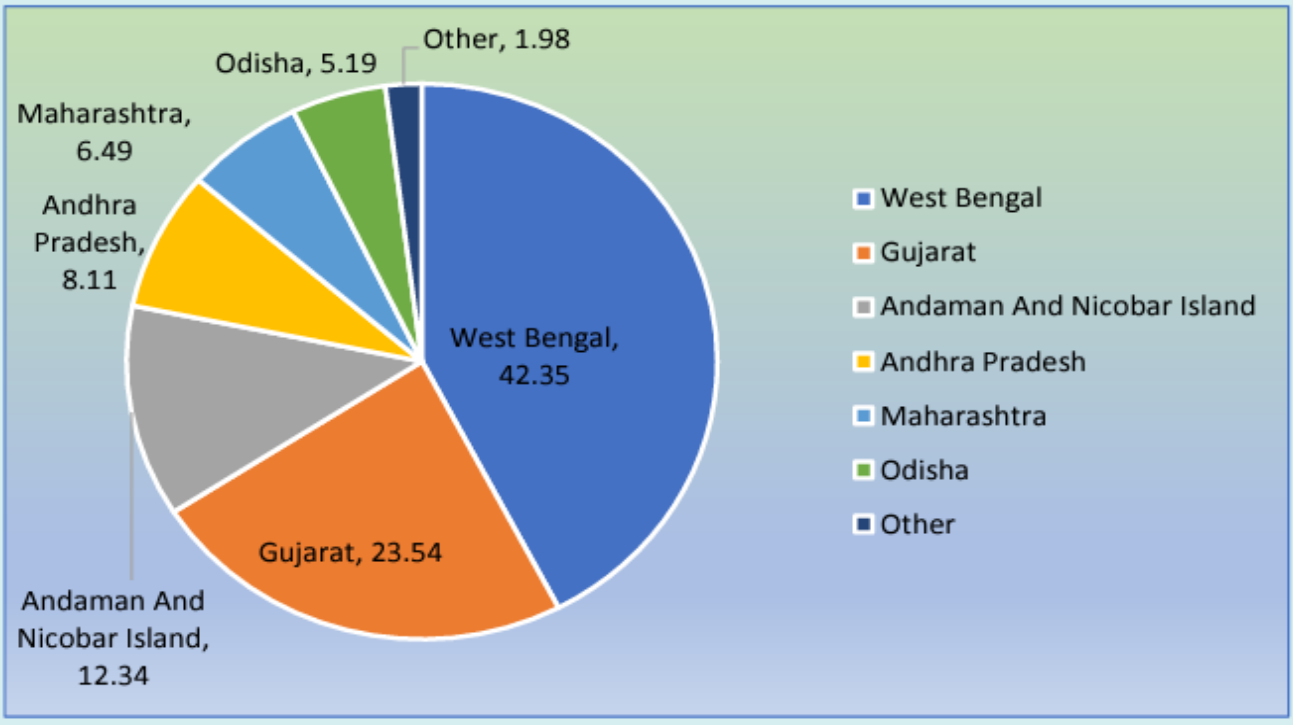


Fig. 1.9: State-wise Mangrove Cover (Sq.Km.), 2021

Fig.1.10 : State wise percentage of Mangrove Cover, 2021



THEMATIC ESSAYS

1. **The future of food security will depend on a combination of the ecological prudence of the past and the technological advances of today.**
2. **The basic idea of governance is to hold the society together so that it can develop and march towards certain goals.**
3. **Science is organized Knowledge; Wisdom is organized life.**

SCAN THIS QR FOR MODEL CONTENT

Concept Clearing Assignment

1. Discuss the prospects and challenges faced by India's Blue Economy.
2. Monetary policy is like juggling six balls, it is not 'interest rate up, interest rate down'. Critically analyse the statement in modern economic context of India.
3. What is the scope of nano fertilizers in India? What are the different initiatives of government on fertilizer subsidy?
4. Critically analyse the development and challenges faced by sugar industry in India.
5. What do you understand by the term "Right to Health"? Highlight the challenges related with implementation of Right to Health in India.
6. Explain the diplomatic challenges India faces with NATO expansion on one hand and increasing Russia-China cooperation on the other hand. Do you think India should increase its cooperation with NATO? Substantiate your views.
7. "With Britain joining the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the agreement becomes more lucrative for India". Comment.
8. What do you understand by Direct energy Weapons and Hypersonic Weapons. Discuss the significance of these weapons for India.
9. Critically analyse the role played by Armed Forces (Special Powers) Act (AFSPA) in ensuring Internal Security in India.
10. How Smart City Mission can play a role in urban development? What are the challenges associated with smart City Mission? Discuss in detail.
11. Indian Economy is going through a structural transformation. Discuss in detail the need for it and the issues associated with it.
12. "India has a vast and diverse maritime territory". In the light of this statement discuss about how Blue Economy can help in realizing its potential and also discuss about the challenges associated with it.
13. Analyze the multifaceted effects of El Niño-driven climate variability and extreme weather events on India's socioeconomic development, assess the challenges faced in mitigating these impacts, and propose a comprehensive strategy for long-term adaptation and resilience-building.
14. What is biomass co-firing, and how does it contribute to reducing carbon emissions in the power generation sector?
15. Discuss the eligibility criteria for obtaining recognition as a National or State political party in India and elucidate the implications of attaining such status.

PT Oriented Question

1. Consider the following statements regarding Smart Cities Mission:

1. It is an initiative of the Union Housing and Urban Affairs Ministry launched in 2015.
2. The mission covers urban population only in 100 cities.

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. Which of the following organization have published Technology and Innovation Report 2023:

(a) United Nations Conference on Trade and Development
(b) The World Intellectual Property Organization (WIPO)
(c) World Bank
(d) World Economy Forum

3. Shyamji Krishna Verma was associated with which of the following?

1. India House
2. Indian Sociologist
3. Arya Samaj

Select the correct answer using the code given below:

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

4. Consider the following statements about Basohli Paintings:

1. These paintings are a fusion of Hindu mythology, Mughal miniature techniques and folk art of the local hills, evolved in the 13th and 14th centuries
2. The painting are mostly painted in the primary colors of Red, Blue and Yellow.
3. These paintings originated in Kathua district in the state of Himachal Pradesh.

Which of the statements given above is/are correct?

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

5. Consider the following statements about Direct Energy Weapons:

1. They use focused energy to damage or destroy their targets.
2. They can use various types of energy such as lasers, microwaves, and particle beams.

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. Consider the following statements about Armed Forces (Special Powers) Act (AFSPA):

1. AFSPA was promulgated by the British in response to the Civil Disobedience Movement in 1930.
2. AFSPA was never enforced in Punjab.
3. Currently AFSPA remains in force in only states of Arunachal Pradesh, Nagaland, Manipur Assam and Jammu and Kashmir.

Which of the statements given above is/are correct?

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

7. Which of the following countries are part of the Anti Spyware declaration?

1. The United States of America
2. Germany
3. France
4. South Korea
5. Sweden

Select the correct answer using the code given below:

(a) 1 ,2 and 4 only (b) 1, 3 and 5 only
(c) 3, 4 and 5 only (d) 1, 2, 3, 4 and 5

8. Which of the following are quantitative tools of monetary policy?

1. Statutory Liquidity Ratio
2. Cash Reserve Ratio
3. Repo Rate
4. Moral Suasion
5. Marginal Standing Facility

Select the correct answer using the code given below:

(a) 1, 2, 3 and 5 only (b) 1, 2, 4 and 5 only
(c) 3, 4 and 5 only (d) 1, 2, 3, and 4 only

9. Consider the following statements regarding Dabba Trading:

1. Under it traders place a bet on stock price movements without incurring a real transaction.
2. It is allowed in India under Section 23(1) of the Securities Contracts (Regulation) Act (SCRA), 1956.

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

10. Consider the following statements regarding Large Hadron Collider:

1. It is the world's largest and most powerful particle accelerator.
2. It is built by the European Organisation for Nuclear Research (CERN).
3. It typically uses protons, which are made up of quarks and gluons.

Which of the statements given above is/are correct?

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

11. Tempo satellite has been launched by NASA for which of the following?

(a) To track space debris
(b) To detect gravitational waves
(c) To monitor pollution
(d) None of the above

12. Consider the following statements about Genome India Project:

1. It was initiated by Department of Biotechnology (DBT) in 2010.
2. It aims to identify genetic variations through whole genome sequencing of 10,000 representative individuals across India in the first phase of the study.
3. It is a collaboration of 20 institutions spearheaded by Centre for Brain Research at IISc.

Which of the statements given above is/are correct?

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

13. Consider the following statements regarding Gross Value Added:

1. It is defined as the value of output minus the value of intermediate consumption.
2. It is a measure of the contribution to GDP made by an individual producer, industry or sector.

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

14. Which of the given statement is correct regarding Zoonosis?

(a) It is a non-infectious disease and adversely affects liver.
(b) It is a genetic disease transferred through generations.
(c) It is an infectious disease that is transmitted between species from animals to humans.
(d) It is an auto-immune disorder infections triggered by adverse environment.

15. Consider the following statements regarding Quantum Computing:

1. It relies on qubits to run and solve multidimensional quantum algorithms.
2. It can be used in modeling photosynthesis.

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

16. Consider the following statements regarding LIGO project:

1. It is an international network of laboratories that detect the sound waves.
2. It works by releasing light rays simultaneously in both chambers involved.

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

17. Bio-firing technology sometimes seen in news is associated with:

(a) Practice of igniting fire using biomass in steel industries.
(b) Practice of substituting a part of the fuel with biomass at coal thermal plants.
(c) Practice of preventing forest fires.
(d) Practice of igniting fire using biomass in the chemical industry.

18. Consider the following pairs :

	Animals	IUCN Status
1.	Puma	Near threatened
2.	Jaguar	Vulnerable
3.	Snow Leopard	Near threatened
4.	Tiger	Endangered

How many pairs given above are correctly matched?

(a) One pair only (b) Two pair only
(c) Three pair only (d) All four pairs

19. Consider the following statements regarding W12+ Blueprint:

1. It is a platform of United Nations Environment Programme (UNEP).
2. It hosts case studies of programs that addresses common water security challenges.

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

20. Which of the following Articles of Constitution is/are associated with Right to Health?

1. Article 21
2. Article 38
3. Article 47

Select the correct answer using the codes below:

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

21. Consider the following statements regarding Registered Unrecognized Political Parties (RUPP):

1. These parties have not secured enough percentage of votes in the assembly to become a state party.
2. These are parties have never contested elections since registration.

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

22. Consider the following statements regarding special courts:

1. These are established under the Special Courts Act of 1979.
2. These courts have permanent judges who look after cases.
3. These courts which look after challenged unconstitutional laws as per rights and freedom.

Which of the statements given above is/are incorrect?

(a) 1 only (b) 2 and 3 only
(c) 3 only (d) 1 and 3 only

23. Which of the following are the after effects of pre monsoon showers ?

1. It increases the quality and productivity of the tea farming.
2. It increases the sweetness in Lichi.
3. It decreases the productivity of coffee.

Select the correct answer using the codes given below:

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

24. Which of the given countries is/are part of tiger range of the world?

1. Bhutan
2. Russia
3. Vietnam
4. Japan

Select the correct answer using the codes given below:

(a) 1 and 2 only (b) 2 and 3 only
(c) 1, 2 and 3 only (d) 1, 2, 3 and 4

25. Prosopis chilensis recently mentioned in the news, is a

(a) Indigenous species
(b) Adventive *species*
(c) Alien Invasive Species
(d) Exotic Species

26. The black cotton soil of India has been formed due to the weathering of- (UPSC 2021)

(a) Brown forest soil
(b) Fissure volcanic rock
(c) Granite and schist
(d) Shale and limestone

27 "Leaf litter decomposes faster than in any other biome and as a result the soil surface is often almost bare. Apart from trees, the vegetation is largely composed of plant forms that reach up into the canopy vicariously, by climbing the trees or growing as epiphytes, rooted on the upper branches of trees". This is the most likely description of- (UPSC 2021)

(a) Coniferous forest
(b) Dry deciduous forest
(c) Mangrove forest
(d) Tropical rainforest

28. What are the advantages of fertigation in agriculture? (UPSC 2020)

1. Controlling the alkalinity of irrigation water is possible.
2. Efficient application of Rock Phosphate and all other phosphatic fertilizers is possible.
3. Increased availability of nutrients to plants is possible.
4. Reduction in the leaching of chemical nutrients is possible.

Select the correct answer using the code given below:

(a) 1, 2 and 3 only
(b) 1, 2 and 4 only
(c) 1, 3 and 4 only
(d) 2, 3 and 4 only

29. In India, the term "Public Key Infrastructure" is used in the context of- (UPSC 2020)

(a) Digital security infrastructure
(b) Food security infrastructure
(c) Health care and education infrastructure
(d) Telecommunication and transportation infrastructure

30. Bollgard I and Bollgard II technologies are mentioned in the context of- (UPSC 2021)

(a) Clonal propagation of crop plants
(b) Developing genetically modified crop plants
(c) Production of plant growth substances
(d) Production of biofertilizers

Answer Key

1. A	11. C	21. C
2. A	12. C	22. B
3. D	13. C	23. A
4. B	14. C	24. C
5. C	15. C	25. C
6. B	16. B	26. B
7. B	17. B	27. D
8. A	18. B	28. C
9. A	19. B	29. A
10. D	20. D	30. B

FEEDBACK FORUM