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Science Reporter

Outstanding performance by BYJU'S students in IAS 2021

Congratulations to our toppers

| **03** Ranks in Top 10 | **12** Ranks in Top 25 | **25** Ranks in Top 50 |

RANK 01
Shruti Sharma

RANK 5
Utkarsh Dwivedi

RANK 6
Yaksh Chaudhary

RANK 12
Yasharth Shekhar

RANK 13
Priyamvada Mhaddalkar

RANK 14
Abhinav Jain

RANK 15
Challapalle Yaswanthkumarreddy

RANK 16
Anshu Priya

RANK 19
Diksha Joshi

RANK 20
Arpit Chauhan

RANK 21
Dilip Kainikkara

RANK 25
Shruti Rajiakshmi

RANK 29
Bhavishya

RANK 31
Avinash V

RANK 33
Jaspinder Singh

RANK 35
Kartikeya Jaiswal

RANK 37
V Sanjana Simha

RANK 40
Kushal Jain

RANK 44
Anjali Shrotriya

RANK 47
Naman Kumar Singla

RANK 50
Abhijit Ray

Outstanding performance by BYJU'S students in IAS 2020

Congratulations to our toppers

02 Ranks in Top 10 | **18** Ranks in Top 50 | **36** Ranks in Top 100

RANK 02
Jagrati Awasthi

RANK 8
Kartik Jivani

RANK 13
Gaurav Budania

RANK 14
Karishma Nair

RANK 17
Sarthak Agarwal

RANK 25
Vaibhav Rawat

RANK 26
Pulkit Singh

RANK 28
Divya Mishra

RANK 30
Divyanshu Choudhary

RANK 31
Megha Swaroop

RANK 32
Rallapalli Jagat Sai

RANK 35
Aparna Ramesh

RANK 37
Narwade Vinayak

RANK 38
Varuna Agarwal

RANK 41
Aswathy Jiji

RANK 42
Pooja Gupta

RANK 46
Jubin Mohapatra

RANK 50
Abhishek Shukla

Incredible Results

CSE 2019

4 Ranks in top 10	13 Ranks in top 50	22 Ranks in top 100

Rank 3 Pratibha Verma

Rank 6 Vishakha Yadav

Rank 8 Abhishek Saraf

Rank 10 Sanjita Mohapatra

CSE 2018

11 Ranks in top 50	28 Ranks in top 100	183 Ranks in the final list

Rank 11 Pujya Priyadarshni

Rank 16 Dhodmise Trupti Ankush

Rank 21 Rahul Jain

Rank 24 Anuraj Jain

Rank 31 Mainak Ghosh

CSE 2017

5 Ranks in top 50	34 Ranks in top 100	236 Ranks in the final list

Rank 3 Sachin Gupta

Rank 6 Koya Sree Harsha

Rank 8 Anubhav Singh

Rank 9 Soumya Sharma

Rank 10 Abhishek Surana

CSE 2016

8 Ranks in top 50	18 Ranks in top 100	215 Ranks in the final list

Rank 2 Anmol Sher Singh Bedi

Rank 5 Abhilash Mishra

Rank 12 Tejaswi Rana

Rank 30 Prabhash Kumar

Rank 32 Avdhesh Meena

CSE 2015

5 Ranks in top 50	14 Ranks in top 100	162 Ranks in the final list

Rank 20 Vipin Garg

Rank 24 Khumanthem Diana Devi

Rank 25 Chandra Mohan Garg

Rank 27 Pulkit Garg

Rank 47 Anshul Agarwal

CSE 2014

6 Ranks in top 50	12 Ranks in top 100	83 Ranks overall selections

Rank 4 Vandana Rao

Rank 5 Suharsha Bhagat

Rank 16 Ananya Das

Rank 23 Anil Dhameliya

Rank 28 Kushaal Yadav

Rank 39 Vivekanand T.S

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8th March to 11th April, 2022	Geography	Geography					
12th April to 16th May, 2022	Economics	Economics	Economics				
17th May to 17th June, 2022	Modern History + Post Independent India	Modern History + Post Independent India	Modern History + Post Independent India	Modern History + Post Independent India			
20th June to 21st July, 2022	Polity	Polity	Polity	Polity	Polity		
22nd July to 26th August, 2022	Ethics + Governance	Ethics + Governance	Geography	Geography	Geography	Geography	
29th August to 30th September, 2022	International Relations + World History	International Relations + World History	International Relations + World History	Economics	Economics	Economics	Economics
3rd October to 7th November, 2022	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Modern History + Post Independent India	Modern History + Post Independent India	Modern History + Post Independent India
9th November to 12th December, 2022	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Polity	Polity
13th December to 13th January, 2023	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT	Geography
16th January to 16th February, 2023		Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture
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26th April to 30th May, 2023			Focus Prelims	Focus Prelims	Focus Prelims	Focus Prelims	Internal Security + CSAT
31st May to 11th June, 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023
12th June to 14th July, 2023			Ethics + Governance	Ethics + Governance	Ethics + Governance	Ethics + Governance	Ethics + Governance
17th July to 18th August, 2023						Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper
1st September to 30th September, 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023

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8th March to 11th April, 2022	Modern History + Post Independent India	Modern History + Post Independent India					
12th April to 16th May, 2022	Polity	Polity	Polity				
17th May to 17th June, 2022	Geography	Geography	Geography	Geography			
20th June to 21st July, 2022	International Relations + World History	Economics	Economics	Economics	Economics		
22nd July to 26th August, 2022	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Modern History + Post Independent India	Modern History + Post Independent India	Modern History + Post Independent India	Modern History + Post Independent India	
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9th November to 12th December, 2022	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Economics
13th December to 13th January, 2023	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Social Issues & Social Justice + Essay + Compulsory Language Paper	Modern History + Post Independent India
16th January to 16th February, 2023		International Relations + World History	International Relations + World History	International Relations + World History	International Relations + World History	International Relations + World History	International Relations + World History
17th February to 22nd March, 2023			Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management
23rd March to 25th April, 2023				Focus Prelims	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT
26th April to 30th May, 2023				Focus Prelims	Focus Prelims	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture
31st May to 11th June, 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023
12th June to 14th July, 2023				Ethics + Governance	Ethics + Governance	Ethics + Governance	Ethics + Governance
17th July to 18th August, 2023							Social Issues & Social Justice + Essay + Compulsory Language Paper
1st September to 30th September, 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023

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March (13, 19, 20, 26 & 27) + April (02, 03, 09, 10, 16 & 17)	Economics	Economics			
April (23, 24 & 30) + May (01, 07, 08, 14, 15, 21, 22 & 28)	Modern History + Post Independent	Modern History + Post Independent	Modern History + Post Independent		
May (29) + June (04, 05, 11, 12, 18, 19, 25 & 26) + July (02 & 03)	Geography	Geography	Geography	Geography	
July (10, 16, 17, 23, 24, 30 & 31) + August (06, 07, 13 & 14)	Ancient India + Medieval India + Art & Culture	Polity	Polity	Polity	Polity
August (20, 21, 27 & 28) + September (03, 04, 10, 11, 17, 18 & 24)	International Relations + World History	International Relations + World History	Economics	Economics	Economics
September (25) + October (01, 02, 08, 09, 15, 16, 22, 23, 29 & 30)	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management	Modern History + Post Independent	Modern History + Post Independent
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December (11, 17, 18, 24 & 31) + January '23 (07, 08, 14, 15, 21 & 22)	Ethics + Governance	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT	Internal Security + CSAT
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March '23 (05, 11, 12, 18, 19, 25 & 26) + April '23 (01, 02, 08 & 09)	Focus Prelims	Focus Prelims	International Relations + World History	International Relations + World History	International Relations + World History
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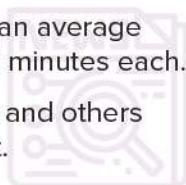
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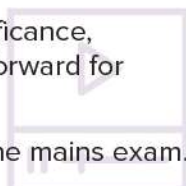
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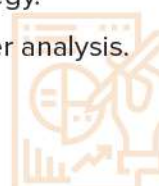
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POLITY

1. A word of advice to the Delhi police

Syllabus: Important judicial cases.

Mains: Protests by Wrestlers.

Context: Protests by India's medal-winning wrestlers.

Background Details:
- On 28th April 2023, cases of sexual harassment were registered by the Delhi Police against the president of the Wrestling Federation of India (WFI).
  - The cases are registered under the Protection of Children from Sexual Offences (POCSO) Act and outraging the modesty of a woman under the IPC.
  - The investigation of the two cases is under process.
- Wrestlers are constantly demanding the arrest of the accused.

Associated Concerns:
- Some of the allegations date back to 2022, reflecting a delay in lodging a complaint.
  - If the delay is more than three months, the reasons for the delay need to be explained satisfactorily.
- If a complaint has elements of the cognizable offence, then the mandate of the Supreme Court (in Lalita Kumari vs Govt. of Uttar Pradesh and others (2014)) should not be violated.
- The veracity (accuracy) of allegations (of a cognizable offence) should not be inquired before registering an FIR.
- In this matter, the insistence of the Delhi police on holding a preliminary inquiry and a delay in registering cases does not seem to be justified.
- As per the conditions laid down in Selvi vs State of Karnataka (2010), narco-analysis tests are conducted on a suspect or on a witness (but not on a victim).
- Moreover, the statement recorded by a judicial magistrate under Section 164 of the Criminal Procedure Code (CrPC) is useful only if the judicial magistrate is called by the trial court for examination.

Conditional Arrest:
- Allegations pertaining to sexual assault at the workplace may attract Section 8 or/and Section 10 (punishment for aggravated sexual assault as the president of the WFI was in the position of authority) or/and Section 12 (sexual harassment) of the POCSO Act in the case of a minor victim.
- It will attract Section 354 (outraging modesty of a woman) or/and 354A (sexual harassment) of the IPC in the case of other victims.
- As per section 41 of CrPC, an arrest is not mandatory unless it is justified (as highlighted by SC in Arnesh Kumar vs State of Bihar & Anr. (2014) that evidence was tampered with to prevent a proper investigation of the offense.

Way Ahead:
- The Delhi Police should complete the investigation expeditiously and present the final report in court.
  - In the case of an offence punishable with imprisonment of less than 10 years, the investigation should be completed within 60 days of arrest to prevent the detainee from being released on bail.
- If the victims are consistent in their allegations and protesting at such a scale, their allegations should not be falsified.
- If the victims are not satisfied with the progress of the case, they can approach the Delhi High Court.

Nut Graf:
Any delay in the investigation of the wrestlers' case will not only invite adverse consequences but will also impact the public confidence in Delhi Police. The investigation should be completed in a timely manner, considering the importance of medal-winning wrestlers for the country.

2.   Immunity for President

Syllabus: Structure, Organization & Functioning of the Executive

Prelims: Article - 298-299

Mains: Functions and responsibilities of the President of India

Context: In a recent decision, the Supreme Court ruled that the government cannot claim immunity from the legal provisions of a contract entered into in the President's name under Article 299 of the Constitution.
● The case was an application made against the Centre by Glock Asia-Pacific Limited, a pistol manufacturing business, for the appointment of an arbitrator in a tender-related dispute.

What is Article 299 of the Indian Constitution?
● Article 298: It gives the Centre and the states the authority to engage in commerce or business, acquire, possess, and dispose of property, and enter into contracts for whatever purpose.
● Article 299 states that all contracts signed in the exercise of the Union's or a State's executive power must be expressed to be made by the President or the Governor of the State.
  ○ Persons acting on behalf of the President or the Governor in the manner ordered and authorised by them [Article 299 (1)].
  ○ Article 299 (2) says that neither the President nor the Governor can be personally held liable for such contracts.

Procedure to be Followed for Making a Contract:
● In 1954, the Supreme Court ruled that there must be a specific mechanism in place for contracts to be made by agents operating on behalf of the government; otherwise, unlawful contracts could drain public funds.
● It means that contracts that do not comply with Article 299(1) cannot be enforced by any contracting party.
● Article 299 (2), on the other hand, states that neither the President nor the Governor can be held personally accountable for such contracts.

What are the Requirements for Government or State Contracts?
The Supreme Court established essential requirements for government contracts under Article 299 in 1966.
Before a binding contract against the government can be formed, three conditions must be met:
● The contract must expressly state that it will be made by the Governor or the President.
● It must be completed in writing
● And by such persons and in such manner as the Governor or the President may order or authorise.

What was the Case?
● The case was an application made against the Centre by Glock Asia-Pacific Limited, a pistol manufacturing business, for the appointment of an arbitrator in a tender-related dispute.
● Any person whose relationship with the parties or counsel of the dispute comes under the 7th Schedule (of the Act) will be ineligible to be appointed as an arbitrator, according to the Arbitration and Conciliation Act, 1996.
● The 7th Schedule deals with situations in which the arbitrator is an employee, consultant, advisor, or has any other previous or present business relationship with a party.

The Apex Court's Ruling:
● The court stated, in reference to the 246th Law Commission Report, that where the party nominating an arbitrator is the State, the duty to find an impartial and independent adjudicator is considerably more onerous.
● As a result, the court dismissed the Centre's reliance on Article 299, stating that Article 299 only establishes the formality required to commit the government to contractual liability.
● Thus, the substantive law relating to the Government's contractual liability can be found in the general laws of the territory.
● In addition, the court nominated former Supreme Court judge Justice Indu Malhotra "as the Sole Arbitrator to adjudicate upon the disputes" in the case.

3. Right to default bail

Syllabus: Judiciary – Judgments & Cases

Mains: Reforms in Bail Law

Context: In a recent order, the Supreme Court directed subordinate courts to resolve pending default bail applications without relying on its own judgement in the Ritu Chhabaria against Union of India case, despite the fact that central investigation agencies were 'having problems' in filing chargesheets.

What is Default Bail?
- This is a right to bail that arises when the police fail to finish an investigation in respect of a person in judicial custody within a certain time frame.
- Statutory Bail is another name for it.
- Section 167(2) of the Code of Criminal Procedure (CrPC) states as much.
- If the police are unable to finish an investigation within 24 hours, Section 167 (1) requires them to take the suspect to the nearest Judicial Magistrate and seek orders for either police or judicial custody.
- A Magistrate can order an accused person to be kept in police custody for 15 days under Section 167(2) of the Code. Beyond the 15-day police custody period, the Magistrate can authorise the accused's detention in judicial custody, where the accused cannot be detained for more than:
  - Ninety days when an authority is investigating an offence punishable by death, life imprisonment, or imprisonment for at least ten years;
  - Or sixty days when an authority is investigating any other offence.
  - This duration may differ in various other special statutes, such as the Narcotic Drugs and Psychotropic Substances Act.
    - The duration is 180 days under the Narcotic Drugs and Psychotropic Substances Act.
- Provided the investigation is not completed by the end of this period, the person will be released "if he is willing to and does furnish bail." This is referred to as default bail.

What is the Ritu Chhabaria Case?
- According to the Ritu Chhabaria ruling, "the right of default bail under Section 167(2) of the Criminal Procedure Code (CrPC) is not merely a statutory right, but a fundamental right that flows from Article 21 of the Constitution" to protect accused persons from the "unfettered and arbitrary power of the State."
- In Ritu Chhabaria, the court ruled that an incomplete chargesheet issued by the investigating agency without the completion of the inquiry does not preclude the accused from seeking default bail.
- To prevent the accused from seeking default bail, investigating authorities often issued incomplete or supplemental charge sheets within the 60/90-day term.

The recent direction of SC is alarming because:
- It could jeopardise the right to default bail.
- Investigative authorities' concerns may take precedence over the accused's constitutional rights.
- The decision could have major consequences for the accused's constitutional rights.
- Administrative convenience should not be at the expense of procedural legitimacy.

What are the Arguments in favour?
- **Presumption of Innocence:** Default bail supports the basic idea of "innocent until proven guilty." It ensures that people who have been suspected of a crime but have not been convicted are not held indefinitely awaiting trial.
- **Protecting Civil Liberties:** Individuals' civil liberties and rights are protected by default bail. It ensures that people are not detained without sufficient evidence and a proper trial, fostering fairness and justice.
- **Promoting Rehabilitation and Integration:** If found not guilty, default bail allows accused individuals to remain in their communities for rehabilitation and integration while still working and supporting their families, boosting their prospects of successful reintegration.
- **Preventing Abuse of Power:** Default bail protects against potential misuse of authority by investigative agencies. It forbids authorities from unlawfully detaining persons without presenting evidence or drafting charges within a reasonable time frame.
- **Balancing Detention and Liberty:** Default bail achieves a balance between preventing potential flight risks and protecting an individual's right to liberty. It enables the court to determine whether continuous detention is necessary depending on the prosecution's capacity to present evidence within the time range specified.
- **Reducing Overcrowding in Prisons:** Default bail aids in the reduction of jail overcrowding by ensuring that individuals who are not swiftly accused or have weak charges are not imprisoned unnecessarily. This adds to the more efficient use of jail resources.

What are the Arguments Against Default Bail?
- **Risk of Granting Bail to Potentially Dangerous Individuals:** When the prosecution fails to bring charges within the time limit, default bail is granted. Automatic bail may be risky in such instances if the accused is possibly dangerous or a menace to society. It may jeopardise public safety and impede effective law enforcement.
- **Undermining the Investigation Process:** Automatic bail provisions may jeopardise the investigating process. If the accused is released on default bail without charges being filed, additional evidence collecting may be hampered, as will the prosecution's ability to create a compelling case. This could result in a lack of justice and a slow resolution of cases.
- **Accountability and Public Perception:** It may convey the appearance that accused individuals are escaping justice or being held accountable for their alleged misdeeds.
- **Undermine the rights of the Victims:** Automatic bail may obstruct victims' rights to prompt justice and may create a sense of injustice or disparity in the treatment of different parties engaged in the case.

What should be the Way Forward?
- **Review and Refine Time restrictions:** Based on case complexity, review and adjust existing time restrictions for bringing charges to guarantee comprehensive investigation and minimise unnecessary delays.
- **Allow Judicial discretion:** Allowing courts the ability to reject default bail in cases that endanger public safety or impede the investigation process may allow judges to make informed choices based on particular circumstances.
- **Enhanced Examination and Conditions:** Implement more tight oversight and enforce suitable conditions for issuing default bail, such as stringent reporting requirements.
- Invest in infrastructure, improve investigation capacities, increase judges and court employees, and apply case management procedures to expedite legal proceedings.
- **Adhere to the Victim-Centred Approach:** Recognise victims' rights and interests by giving timely information on case developments and, when appropriate, involve them in the bail decision-making process to ensure a balanced approach.

4.   Recusal of judges

Syllabus: Judiciary – Judgments & Cases

Mains: Recusal of Judges and related concerns

Context: Justice MR Shah of the Supreme Court refused to recuse himself from hearing a petition by former Indian Police Service (IPS) officer Sanjiv Bhatt.

What is Judicial Recusal?
- Judicial recusal occurs when a judge recuses himself or herself from a case due to a conflict of interest or a reasonable fear of bias.
- This is done to ensure that the case is decided fairly and that the conclusion is not swayed by the judge's personal biases.
- The practice of judicial recusal is based on the fundamental concept of due process of law, which states that all parties in a case must be handled fairly and impartially.
- If a judge recuses himself or herself, the case is assigned to another judge.
- Judicial recusal is a critical component of ensuring the judicial system is fair and impartial.

Types of judicial recusal
- **Automatic recusal:** This occurs when a judge is forced by law to recuse themselves.A judge, for example, must recuse themselves if they have a financial stake in the result of the case.
- **Discretionary recusal:** This happens when a judge has the authority to recuse oneself.A judge may recuse oneself from a case if they have a close personal contact with one of the parties.

Why do judges recuse themselves?
- Financial or personal stake in the case's outcome
- Prior involvement in the case, such as serving as a lawyer or a judge,
- A personal connection with one of the parties
- A notion that they will be unable to remain impartial in the case

What are the rules governing judicial recusal in India?
- There are no legislated regulations for recusals in India, although various Supreme Court decisions have addressed the matter.
- The Supreme Court has, over time, specified different considerations to be considered when determining a judge's impartiality.
- Ranjit Thakur v. Union of India (1987) - The Supreme Court ruled that it is more necessary for the judge to be honest in the eyes of the concerned party than in his own.
- State of West Bengal v. Shivananda Pathak (1998) - The Court defined it as a state of thought that renders a judge incapable of impartiality in a particular case.

- In Supreme Court Advocates-on-Record Association v. Union of India (2015), the Court stated that where a judge has a financial interest, no additional investigation is required to determine whether there is a 'real danger' or a 'reasonable suspicion' of bias.
- Indore Development Authority v. Manoharlal and Others (2019) - The Court ruled that a judge who gave a verdict in a smaller combination is not barred from serving on a bigger Bench to which a reference is made.

What is the judicial recuse practice in foreign nations?
- The Code of Conduct for United States Judges establishes the standards regulating judicial recusal in the United States.
- According to the Code of Conduct, a judge must recuse oneself if they have a financial interest in the result of the case or a close personal relationship with one of the parties.
- The Code of Conduct further states that a judge shall recuse himself or herself if there is a reasonable suspicion of prejudice.
- The Judicial Conduct and Investigations Office (JCIO) is in charge of examining complaints of judicial misconduct in the United Kingdom.
- The JCIO has issued judicial recusal guidance, which outlines the principles that judges should follow when deciding whether or not to recuse themselves.
- Canada - The Canadian Judicial Council (CJC) is in charge of monitoring judges' behaviour.
- The CJC has issued a code of conduct for judges that outlines the procedures for judicial recusal.

What is the way forward?
- Recusal procedures must be clear and transparent.
- The importance of balancing impartiality with judicial discretion
- Maintaining public trust in the justice system requires fair and transparent recusal practises.

5.   Sedition

Syllabus: Constitution-Significant Provisions

Prelims: Provisions related to Sedition

Mains: Seditions and its effect on the democratic credentials of the country.

Context: The 279th report of the law commission has recommended continuation of the sedition law in the wake of the national security challenges.

What is Sedition:
- **Section 124A defines sedition as:** "Whoever, by words, either spoken or written, or by signs, or by visible representation, or otherwise, brings or attempts to bring into hatred or contempt, or excites or attempts to excite disaffection towards, the Government established by law shall be punished with imprisonment for life, to which fine may be added.

Pre-Independence incidences:
- Several pre-independence cases involving Section 124A of the IPC are against celebrated freedom fighters, including Bal Gangadhar Tilak, Annie Besant, Shaukat and Mohammad Ali, Maulana Azad and Mahatma Gandhi. It is during this time that the most notable trial on sedition — Queen Empress v. Bal Gangadhar Tilak — took place in 1898.

The KedarNath ruling on sedition:
- The court held that unless accompanied by an incitement or call for violence, criticism of the government cannot be labelled sedition.
- The ruling restricted sedition only insofar as seditious speech tended to incite "public disorder"- a phrase Section 124A itself does not contain but was read into it by the court.
- The court also issued seven "guidelines", underlining when critical speech cannot be qualified as sedition.
  - In its guidelines on using the new, restrictive definition of sedition law, the court said not all speech with "disaffection", "hatred," or "contempt" against the state, but only speech that is likely to incite "public disorder" would qualify as sedition.

Sedition laws in other countries:
- In the United Kingdom, the sedition law was officially repealed under Section 73 of the Coroners and Justice Act, 2009, citing a chilling effect on freedom of speech and expression.
- Australia repealed its sedition law in 2010, and last year, Singapore also repealed the law citing that several new legislations can sufficiently address the actual need for sedition law without its chilling effects.

Nut Graf: Sedition can seriously dismantle the constitutional rights of the citizens and impair India's democratic credentials. There is a need to consider the continued existence of this law in the country's law books.

6. New CVC

Syllabus: Statutory, Regulatory & Quasi-Judicial Bodies

Mains: Role and mandate of Central Vigilance Commission

Context: On May 29, 2023, the Hon'ble President of India, Smt. Droupadi Murmu, administered the oath of office to Sh. P. K. Srivastava as Central Vigilance Commissioner at the Rashtrapati Bhavan.

Background
- The CVC is envisioned as the apex vigilance institution, independent of any executive authority, monitoring all vigilance activity under the Central Government and advising various authorities in Central Government organisations on vigilance planning, execution, review, and reform.
- The central government's primary anti-corruption agency.
- CVC is overseen by the Ministry of Personnel.
- The Santhanam Committee on Corruption Prevention (1962-64) advocated its establishment.
- The Central Government established it in 1964 through an executive resolution.
- The CVC was not originally a constitutional or statutory entity.
- The Central Vigilance Commission Act, 2003 (CVC Act) was passed by Parliament in September 2003, giving the CVC legislative status.
- In 2004, the Government of India authorised the CVC as the "Designated Agency" to receive written complaints for disclosure on any allegation of corruption or misuse of office and recommend appropriate action.

Composition:
- A multi-member body consisting of a Central Vigilance Commissioner (chairperson) and not more than two vigilance commissioners.
- Appointed by the President by warrant under his hand and seal on the recommendation of a three-member committee consisting of the Prime Minister as its head, the Union minister of home affairs and the Leader of the Opposition in the Lok Sabha.

Tenure:
- Hold office for four years or until they reach the age of 65, whichever comes first.
- Reappointment is not possible.
- The Chief Vigilance Commissioner's pay, allowances, and other service conditions are comparable to those of the UPSC Chairman.
- They cannot be changed to his detriment during service.

Removals:
- The President has the authority to remove the Central Vigilance Commissioner or any other vigilance commissioner from office under the following circumstances:
- If the member is declared bankrupt
- If the Central Government holds him accountable for a moral turpitude-related offense/if he is convicted of such an offence
- If he joins the profit-making office,
- If the PRESIDENT OF INDIA declares him unfit due to mental or physical incapacity.
- The President may also dismiss the Central Vigilance Commissioner or any other vigilance commissioner for proved misbehaviour or incapacity.
  - In such instances, the President must refer the case to the SUPREME COURT for investigation. Following the investigation, if the Supreme Court upholds the cause of removal and instructs the President to do so, he may be removed.

Function:
- Inquire into, or trigger an inquiry or investigation into, a reference made by the Central Government for an offence under the Prevention of Corruption Act (PoCA) of 1988.
- Initiate an inquiry or investigation into, any complaint lodged against any official for an alleged offence committed under the PoCA, 1988:
  - Members of all-India services serving in the Union and Group 'A' officers of the Central government; and
  - Officers of the Central Government with a specific level of authority.
- Supervise the operations of the Delhi Special Police Establishment (a division of the CBI) and the vigilance administration in the ministries of the Central government or its authority.
- Give instructions to the Delhi Special Police Establishment in order for it to carry out the duties assigned to it under the Delhi Special Police Establishment Act (DSPE) of 1946.
- Examine the status of the DSPE Act's investigations.
- Examine the status of applications pending with the appropriate authorities for prosecution sanction under the PoCA, 1988.
- Provide advice to the Central Government and its authorities on problems referred to it.

- To conduct or cause an investigation into complaints submitted under the Public Interest Disclosure and Informer Protection Resolution and to suggest appropriate action.
- The Central Government is required to engage the CVC when developing rules and regulations regulating vigilance and disciplinary actions involving members of the Central Services and All-India Services.

Before undertaking any inquiry or investigation into an offence committed by personnel of the rank of joint secretary and above in the Central government and its authorities, the Delhi Special Police Establishment must acquire prior authorisation from the Central government.

7. Wrestlers' protest and the shrinking space for dissent

Syllabus: Pressure groups and their role in polity.

Mains: Wrestlers protest and associated concerns.

Introduction:
- Protests allow the public (individuals, classes, and communities) to voice their grievances and demand their rights.
- They have served as catalysts for social and policy change.
- The Medal-winning wrestlers have for almost four months protested and demanded the arrest of the Wrestling Federation of India (WFI) chief. The chief is accused of sexually harassing women wrestlers and a minor.

Details:
- It was only after Supreme Court intervention that two FIRs were filed against the WFI Chief.
- No agreement has been reached despite Wrestlers' negotiations with the Home Minister and Sports Minister.
- The wrestlers have received support from civil society organizations representing women, students, and youth. However, it is very small compared to other protests in the past.

Associated Concerns:
- It is highlighted that protests have failed to garner support from the masses (especially, middle classes and women's groups that were at the forefront of the Nirbhaya protests in 2012).
- The author argues that protests under the current regime are often branded as 'anti-national'.
- Despite being an issue of gender justice, women's groups are largely missing from the protest.
- Wrestling has not received the same level of attention and support as other sports in India. It is also suggested that protesting wrestlers mostly come from modest economic backgrounds.
- The author also highlights the importance of active participation of the middle classes through Anna Hazare Andolan (2011) and Nirbhaya Protest (December 2012) which is majorly missing in the Wrestlers' protest.
- There is inadequate public pressure on the government resulting in no political censure of the WFI Chief and MP despite serious allegations recorded in FIRs.
- It is thus emblematic of society's normalization of patriarchy and sexual harassment.

Nut Graf:
The wrestlers' protest against the Wrestling Federation of India's (WFI) chief has not received the desired support from the masses and has thus failed to create pressure on the government. This is a serious concern as it will have serious repercussions like society's normalization of patriarchy and sexual harassment. The government should take action on a timely basis before it sets an unprecedented example for the future.

8. National Human Rights Commission (NHRC)

Syllabus: Statutory, Regulatory & Quasi-Judicial Bodies

Mains: Roles and responsibilities of NHRC

Context: NHRC notice to Centre, State, SEC over West Bengal panchayat polls.

Introduction:
- The National Human Rights Commission (NHRC) issued notices to the Union government, the West Bengal government, and the State Election Commission (SEC) regarding the implementation of "human rights protection measures" for the upcoming panchayat elections in West Bengal.
- The NHRC also appointed its director general (investigation) as a special human rights observer.
- This observer will conduct an on-site survey in West Bengal, in consultation with the SEC, to identify "sensitive constituencies" that are at risk of experiencing violence during the upcoming polls.

National Human Rights Commission:
- The National Human Rights Commission (NHRC) established in 1993, is an independent statutory body as per the provisions of the Protection of Human Rights Act of 1993 which was amended in 2006.
- Human Rights are an indispensable part of society and Human Rights in India are watched by NHRC.
- NHRC acts as a watchdog of human rights in the country.

- NHRC looks over the rights that are related to life, dignity, liberty and equality of the individual that are defined in Section 2(1) of the PHR Act.
- They are guaranteed by the Constitution of India, embodied in the international covenants and are enforceable by the courts of India as well.
- NHRC was established in compliance with the Paris Principles of Human Rights, 1991 which were adopted for the promotion and protection of Human Rights and were endorsed by the United Nations at its General Assembly of 1993

Preemptive steps to prevent human rights violation:
- The NHRC has taken suo-motu cognizance of a media report highlighting incidents of violence related to various elections in West Bengal, particularly targeting individuals associated with political parties.
- According to the report, in the Purba Medinipur district, a 60-year-old political activist serving as a booth president was allegedly abducted and killed.
- Recognizing the seriousness of this issue and its impact on human rights, the NHRC believes it is crucial to take proactive measures in order to prevent and deter any form of human rights violations, thus safeguarding the citizens' inherent and inviolable right to life and livelihood as guaranteed under Article 21 of the Constitution.
- In the NHRC vs. State of Arunachal Pradesh case (1996 vol. 1 SCC 742), the Supreme Court stated that no state government should tolerate threats by one group of individuals against another, as it is their duty to protect the threatened group from such assaults.
  - Failure to do so would result in the government's failure to fulfill its constitutional and statutory obligations.
- Once the sensitive areas are identified, DG (Investigation) will submit a comprehensive report to the Commission for deployment of Micro Human Rights Observers in all the sensitive constituencies in the state.

Nut Graf: NHRC has issued notices to the Union government, West Bengal government, and SEC, seeking "human rights protection measures" for the panchayat elections. NHRC appointed its director general as a special observer to identify sensitive constituencies at risk of violence.

9. Governors cannot indefinitely hold back Bills

Syllabus: Governor.

Mains: Governor versus State Government.

Prelims: Role, Function, and Responsibilities of Governor.

Introduction:
- There are multiple instances of the tussle between the state governments and Governors with regard to the pendency of bills.

Important Cases and their Rulings:
- **Shamsher Singh v State of Punjab (1974):** It was held by the Supreme Court(SC) that a President or a Governor can exercise their discretion independently of their Ministers only where the Constitution expressly permits them to do so.
- **Purushothaman Nambudiri v State of Kerala:** The case discussed that whether a Bill pending the Governor's assent would lapse upon the dissolution of the House. It was held that as per the provisions of Articles 200 and 201, it would not lapse.
- **Nabam Rebia and Bamang Felix vs Dy. Speaker:** It was held that as far as Article 200 is concerned, the Governor should exercise discretion only with regard to whether a Bill ought to be reserved for the consideration of the President or not.

Conclusion:
- It is highlighted that the Governor does not have the discretion to indefinitely withhold assent to a Bill.
- Moreover, refusing to act on a Bill is in violation of the Constitution, and a Governor's action or inaction in this regard is susceptible to judicial review.

Nut Graf: It is suggested that for parliamentary democracy to sustain, the governor of the state should not withhold assent to the bill as the elected government has the constitutional responsibility to legislate.

10. The Next Finance Commission will have a tough task

Syllabus: Powers, Functions & Responsibilities of various constitutional bodies

Mains: Various issues associated with the distribution of tax revenue by Finance Commission

Context: This article discusses the potential challenges that might arise in front of the next Finance Commission.

Introduction:
- The government will appoint the next Finance Commission in the coming months, tasked with determining the distribution of tax revenue between the central government and the states.
  - This involves deciding the vertical share (how much goes to the states) and the horizontal sharing formula (how it is divided among the states).
- Before economic reforms, the Finance Commission's recommendations were less significant since the Union government had alternative methods to compensate states and exercise favoritism.
- However, with the changes implemented, such as the decline in fresh public sector undertaking investments and the dissolution of the Planning Commission, the Finance Commission now plays a much more pivotal role in India's fiscal federalism as the primary architect of the system.

Issues faced by 15th FC:
- The appointment of the previous Finance Commission sparked controversy due to its mandate to consider the 2011 population figures instead of 1971 figures when determining a State's expenditure.
  - States that had successfully controlled population growth, particularly in the southern region, opposed this change, considering it a "penalty for good performance."
- A similar conflict arises regarding revenue deficit grants awarded by the Finance Commission to States experiencing deficits even after tax devolution.

Potential Challenges for next Finance Commission:
- Finance Commissions have historically struggled to distinguish between a State's deficit resulting from fiscal incapacity versus fiscal irresponsibility.
- The Union government currently allocates 41% of its tax pool to the States. However, due to the Union's expenditure needs and borrowing constraints, there will be less room to further increase the allocation.
- Every horizontal distribution formula has faced criticism for being inefficient or unfair, or both.
  - Historically, Finance Commissions have attempted to adjust the distribution formula to support deficit-ridden States without penalizing responsible ones.
- Divisions among States have deepened in recent years along political, economic, and fiscal lines.
- The fundamental nature of horizontal distribution entails wealthier States compensating poorer States. The challenge lies in ensuring that this process does not further deepen the divide.
  - Various indicators suggest that southern States excel in terms of infrastructure, private investment, social development, and the rule of law, creating a growing gap between the north and the south.
- Finding a balance between richer and poorer States through horizontal distribution will be a significant challenge for the government and the Finance Commission.

Way Forward:
- The Finance Commission's terms of reference mandate considering the expenditure needs and revenue capacity of both the Centre and the States.
- To address specific concerns, the upcoming Finance Commission should utilize this authority in two key areas.
- It should establish guidelines for the appropriate use of cesses and surcharges, as well as propose a formula to limit the amount that can be raised through them.
  - A white paper released by the Tamil Nadu government highlighted that the proportion of cesses and surcharges in the Centre's total tax revenue nearly doubled from 10.4% in 2011-12 to 20.2% in 2019-20.
  - By addressing this issue, the Finance Commission can ensure that cesses and surcharges are utilized judiciously and in line with the original intent of revenue sharing between the Centre and the States.
  - It would also prevent the Centre from excessively benefiting from these levies at the expense of the States, fostering a stronger sense of fiscal balance and cooperation.
- The Finance Commission should prioritize the issue of government spending on what is commonly referred to as "freebies."
- The upcoming Finance Commission should take decisive action in the interest of long-term fiscal sustainability and establish guidelines for freebie spending.

Nut Graf: The upcoming Finance Commission will determine the distribution of tax revenue between the central government and states, facing challenges such as population figures, deficit grants, and wealth disparities. Guidelines for cesses, surcharges, and freebie spending should be established for fiscal balance and cooperation.

11. General Consent to CBI

Syllabus: Statutory, Regulatory & Quasi-Judicial Bodies

Mains: Power of States to withhold consent to the CBI and its implications on the federal character of India.

Context: The Tamil Nadu government has revoked the Central Bureau of Investigation's (CBI) general clearance to probe cases in the state without previous permission from it. This means that the CBI will have to get permission from the state government before taking on any case in Tamil Nadu.

What is a general consent?
- The CBI is governed by the Delhi Special Police Establishment Act, which requires a state government's consensus before starting an inquiry in that state.
- Case-specific consent and general consent are the two types of consent.
- Through notification, the central government can request that the CBI investigate central government personnel for income tax evasion, conspiracy against the nation, spying, and other offences.
- Because law and order are the responsibility of the states, all states typically provided their general assent to the CBI for these inquiries.
- "General consent" is typically granted to assist the CBI in conducting its investigation into cases of corruption involving central government personnel in the relevant state.
- For example, if the CBI sought to probe a bribery claim against a Western Railway clerk in Mumbai, it would have to seek permission from the Maharashtra government before filing charges.
- However, despite notification from the central government, the CBI is unable to examine any complaint filed by the state government against state government officials or entities.
- Thus, the mode of CBI investigation into state government issues is that state governments must get authorization from CBI for a specific case.
- This will be followed by a case-specific notification to the CBI.
- Only if the High Courts or the Supreme Court declare that a CBI inquiry is required, is it assumed that the state government has consented and therefore the central government informs.
- Withdrawal of consent means that the CBI will be unable to register any new case involving a central government employee or a private individual unless the states provide case-specific consent.
- This demonstrates that broad consent is insufficient for investigation, and the CBI must obtain case-specific consent from the states.
- It essentially means that CBI officers will lose all police powers as soon as they enter the state, unless the state government has granted them permission.
- It also requires them to obtain approval from the state government for each case and search done on central government workers.
- Several states have withdrawn general agreement over the years, including Sikkim, Nagaland, Chhattisgarh, and Karnataka, which serves as an example for the present move.

Does the CBI can no longer probe any case in the state?
- The two states have withdrawn their general approval under Section 6 of the Delhi Special Police Establishment Act of 1946.
- Section 6 of the Act prohibits any member of the Delhi Special Police Establishment from exercising powers and jurisdiction in any territory of a State without the agreement of that State's government.
- This is in sharp contrast to Section 5 of the Act, which grants the CBI authority over the entire country.
- However, the CBI will retain the authority to probe previous cases that were registered when there was widespread accord.
- Furthermore, cases recorded elsewhere in the country but involve persons stationed in Tamil Nadu would allow the CBI's jurisdiction to expand to these states.
- There is uncertainty over whether the agency can conduct a search in connection with an old case without the state government's permission.
- However, there are legal remedies available.
- The CBI can always get a search warrant from a state court and conduct searches.
- Section 166 of the CrPC authorises a police officer from one jurisdiction to request that a police officer from another jurisdiction conduct searches on his behalf if the search involves a surprise element.
- And, if the first officer believes that the latter's searches will result in the loss of evidence, the section authorises the first officer to conduct searches himself after notifying the latter.

What happens in fresh cases?
- Withdrawing consent will only prevent the CBI from registering a case in tamilnadu.
- The CBI may still file charges in Delhi and continue to investigate anyone within the state.
- The Delhi High Court recently ruled that the agency can investigate anyone in a state that has withdrawn "general consent" if the complaint is not registered there.
- The order was issued in connection with a corruption case in Chhattisgarh, which also grants consent on a case-by-case basis.

- Because the complaint was registered in Delhi, the court ruled that the CBI could investigate it without seeking permission from the Chhattisgarh government.
- Thus, a state government would be mistaken if it assumes that the ruling party's ministers or members may be targeted by the CBI on orders from the Centre, and that withdrawing general permission would protect them.
- The CBI might still file cases in Delhi if any aspect of the crime was committed there, and arrest and prosecute ministers or MPs.

12. Uniform Civil Code & Tribals from Central and North-East India

Syllabus: Indian Constitution; Panchayati Raj.

Prelims: Tribals of north-east, Panchayati Raj Rights Issues, etc.

Mains: Advantages and disadvantages of implementing the Uniform Civil Code.

Context: The tribal council in Meghalaya, representing the Khasi community, has passed a resolution urging the Union government not to implement the Uniform Civil Code within their jurisdiction.

Introduction:
- A tribal council in Meghalaya unanimously passed a resolution opposing the implementation of the proposed Uniform Civil Code (UCC) within its jurisdiction.
- The UCC aims to establish a uniform set of personal laws on marriage, divorce, inheritance, adoption, and succession for all citizens, regardless of religious affiliation.

Customs and Practices of the Khasi Community:
- The Khasis are a matrilineal community in Meghalaya, where the youngest daughter becomes the custodian of the family property, and a child takes the surname of their mother.
- The Khasi community dominates the areas governed by the Khasi Hills Autonomous District Council (KHADC).
- Two other communities in Meghalaya, the Garo and Jaintia, are also matrilineal, and their dominions are governed by the Garo Hills Autonomous District Council and the Jaintia Hills Autonomous District Council, respectively.

Concerns Raised by the Chief Executive Member:
- Pyniaid Sing Syiem, the chief executive member of the KHADC, stated that the implementation of the UCC would affect the customs, traditions, practices, inheritance, marriage, and religious freedom of the Khasi community.
- He emphasized that the resolution aims to safeguard and protect the interests of the Khasis as provided under the Sixth Schedule of the Constitution.

Opposition from Other Autonomous District Councils:
- Titosstarwell Chyne, the opposition leader and former chief executive member of the KHADC, mentioned that members from the three autonomous district councils had previously gathered to oppose the UCC.

Push for Change to the Matrilineal System:
- An organization named Synkhong Rympei Thymmai, meaning 'Home Hearth Restructured,' has been advocating for a shift from the matrilineal system to a patriarchal one within the Khasi community, in order to align with the broader world.

Nut Graf: The Khasi tribal council in Meghalaya opposes the Uniform Civil Code (UCC) implementation, fearing it would undermine their customs and matrilineal system, as well as religious freedom.

14. Cabinet clears NRF Bill to offer strategic direction to research

Syllabus: GS 2- Government policies and interventions for development of various sectors.

Mains: National Research Foundation (NRF) Bill, 2023

Context: The Union Cabinet has granted its approval for the National Research Foundation (NRF) Bill, 2023, aiming to establish the NRF as the apex body for scientific research in India. This move comes in alignment with the National Education Policy (NEP). With this, it is expected to provide strategic direction to scientific endeavours in the country.

Details:
- Establishment of the National Research Foundation: The NRF Bill has been approved by the Union Cabinet, setting the stage for the establishment of the NRF as the apex body for scientific research in India.
- The NRF will play a crucial role in providing high-level strategic direction and coordinating scientific research efforts across the country.
- The NRF will operate under the administrative oversight of the Department of Science and Technology (DST).
- The bill is intended to ensure equitable funding and participation.

- **Governance Structure:**
  - Board: The NRF will be governed by a board of eminent researchers and professionals from various scientific fields. The Prime Minister is the ex-officio president. Union Ministers of Science and Technology and Education will serve as ex-officio vice presidents.
  - Executive council: The executive council will oversee the operations and decision-making process of the NRF. It will be chaired by the Principal Scientific Adviser to the Government of India.
- **Supercede the Science and Engineering Research Board (SERB):** The NRF Bill will replace the Science and Engineering Research Board (SERB), which was established by Parliament in 2008, and subsume it into the NRF.
- **Consolidation of funding and coordination under a unified framework:** The NRF will rectify existing disparities in research funding distribution, with a particular focus on ensuring equitable support for state universities and institutions beyond the prestigious IITs and IISc.
- The NRF Bill seeks to promote private sector involvement and investment in scientific research.
- The NRF will prioritize funding based on research needs and priorities, as determined by the executive council.
- **Funding**: The government has committed to contribute Rs.10,000 crore over a span of five years.
  - Close to Rs. 36000 crore is expected to be received through private contributions.

15. Tax law in the shadow of the higher judiciary

Syllabus: GS-2, Separation of Power.

Mains: Judiciary and Legislative responsibilities.

Introduction:
- The tax law in India is built on two central precepts:
  - A tax may be imposed only with the authority of law (Article 265 of the Indian Constitution).
  - Any levy ought to be clear, consistent, and predictable. It is based on the principle of sureness.
- These precepts emanate from the rule of law, especially the values of legality and certainty.
- It is argued that in various instances, the Supreme Court (SC) has undermined these commitments.

Details:
- It is suggested that the SC has reversed well-reasoned judgments of High Courts and virtually enacted into existence taxes that lack legislative support.
- For instance, in ITO vs Vikram Sujitkumar Bhatia case, it was discussed whether the provision (Section 153C) of the Income Tax Act, 1961, could have a retrospective effect in the absence of a legislative mandate.
  - Section 153C is concerned with the conditions under which a search made on a person's premises could result in the opening of proceedings against other persons and entities.
  - It allowed the Revenue Department to proceed against third parties to a search if material seized (such as money, bullion, jewellery, or books of accounts) "belongs or belong to" a person other than the one who was subject to the search.
  - At least three different High Courts held that "belongs or belong to" should be narrowly construed. This implies that a mere reference to a person's name would not by itself satisfy the law.
  - Consequently, the law was amended in 2015. It meant that assessments could be made against third parties to a search, even if the material seized (particularly documents and books of accounts) "pertains or pertain to" the person or if the information contained in those items "relates" to the person.
  - The question was whether it would apply to searches conducted prior to its enactment.
  - The Gujarat HC ruled that it could not be retrospective as the amendment was bringing into the fold of Section 153C a new class of assessees, who were previously excluded.
  - The SC reversed this verdict on 6th April 2023 and gave the justification that:
    - It should be presumed that the unamended provision never existed in law.
    - Moreover, the new law is declaratory and seeks to explain an earlier provision, and is hence retrospective.

Associated Concerns:
- It is argued that the Court in holding that the provision will apply to past searches, has acted not as an interpreter of the law but as a maker of the law.
- In a similar case in Union of India vs Ashish Agarwal, the Court resuscitated notices of reassessment that had been issued by the Revenue without any sanction of law.
- It should be remembered that if any law has to be mended, it is the sole domain of the legislature. The court should not encroach on the legislative functions.
- Moreover, in resolving these cases, SC invoked Article 142 of the Constitution. It has been argued multiple times that this power should not be applied in breach of statutory law.

Nut Graf: Article 265 of the Indian Constitution forbids taxation without legislation. Any attempt by the Judiciary to bypass it is seen as a serious cause of concern. The judiciary should avoid encroaching on matters that are the sole responsibility of legislatures and abide by the Separation of Power doctrine.

ECONOMY

1.   Antardrishti Initiative

Syllabus: Mobilization of resources and Growth

Prelims: Initiatives of RBI

Context: Recently, the Reserve Bank of India Governor Shaktikanta Das has launched 'Antardrishti', a financial inclusion dashboard aimed at monitoring and evaluating the progress of financial inclusion in India.

About The Initiative:
- The primary objective of the dashboard is to assess the current state of financial inclusion by analyzing key metrics and indicators, enabling policymakers and stakeholders to identify areas that require attention and implement targeted interventions.
- The dashboard presently is intended for internal use in the RBI, it will further facilitate greater financial inclusion through a multi-stakeholder approach.
- By involving various entities, such as financial institutions, regulators, and policymakers, in the decision-making process, the dashboard promotes collective efforts to enhance financial inclusion. This collaborative approach ensures that diverse perspectives and expertise contribute to the development of inclusive policies and initiatives.

Financial Inclusion Index:
- In 2021, the Reserve Bank of India (RBI) devised the Financial Inclusion (FI) Index as a reliable means to accurately gauge the level of financial inclusion. The FI Index considers three crucial dimensions: 'Access', 'Usage', and 'Quality'.
- It encompasses multiple sectors, including banking, investments, insurance, postal services, and pensions. The index condenses various aspects of financial inclusion into a single numerical value that ranges from 0 to 100.
- The score of zero signifies total exclusion from financial services, whereas a score of 100 signifies comprehensive inclusion in the financial system.

2.   Disinflation in India

Syllabus: Mobilization of resources and Growth

Mains: Disinflation in India

Context: In June 2023, Reserve Bank of India Governor Shaktikanta Das said that the disinflation process will be slow and happen over a long period of time and the inflation target of 4% will be achieved only over the medium-term.

What is Disinflation?
Disinflation is the process of slowing down the rate of inflation and is used when there is a marginal reduction in the rate of inflation in the short term.
- Deflation is different from disinflation where in deflation the inflation rate turns negative and is considered the opposite of inflation.
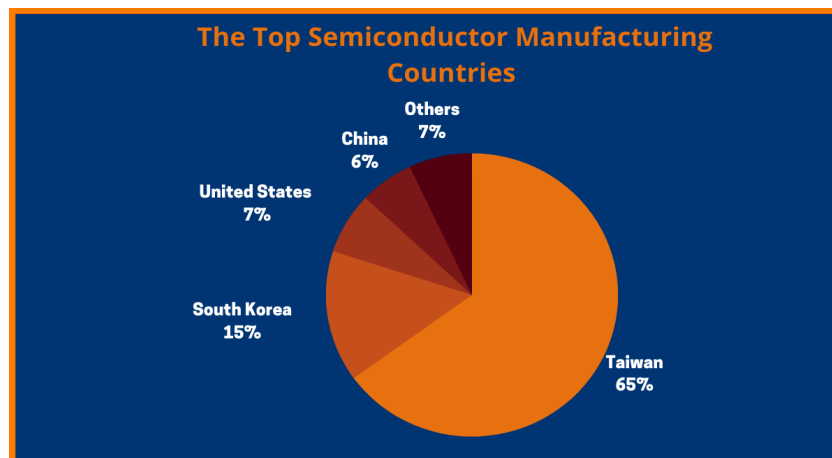
Softening of Inflation:
- The RBI has been mandated by the government to keep consumer price index-based inflation (CPI) at 4 percent with a range of +/- 2 per cent.
- There are signs of softening of inflation as inflation reduced from a peak of 7.8 per cent in April 2022 to 4.7 per cent in April 2023.
- The inflation projection by the Reserve Bank of India for the financial year 2023-24 is 5.1 per cent.
- In view of the low inflation rate and to assess the impact of previous rate hike decisions the Reserve Bank of India decided on a pause in the April and June 2023 monetary policies.
- However, the Reserve Bank of India Governor Shaktikanta Das said that a pause in the rate hike decision is neither a pivot nor a change in policy direction.
- In a recent monetary policy decision in June '23, the RBI left the repo unchanged at 6.5 per cent.
- The central bank has raised the repo rate by 250 basis points (bps) between May 2022 and February 2023 to check inflation.
- The Reserve Bank of India maintains the stability of the Indian financial system through the conduct of monetary policies as financial instabilities can undermine economic growth and impede monetary policy transmission.
- Monetary policy and financial stability play a complementary role in maintaining price stability.

3. Challenges for semiconductor fabrication in India

Syllabus: Growth and Development

Mains: Challenges for semiconductor fabrication in India

Context: The global semiconductor industry is currently valued at $500-$600 billion and caters to the global electronics industry currently valued at about $3 trillion.

The Top Semiconductor Manufacturing Countries
- Others 7%
- China 6%
- United States 7%
- South Korea 15%
- Taiwan 65%

- The "Chip 4" or "Fab 4" alliance includes four of the world's top producers of semiconductors: USA, Japan, Taiwan & South Korea.
  It represents more than 70% of the value of the global semiconductor industry.
- Chip 4 countries are looking to strengthen the semiconductor supply chain and shift dependency away from China.
- The semiconductor shortage during COVID-19, which forced some carmakers to halt production, thrust chip powerhouse Taiwan into the spotlight and has made supply chain management a bigger priority for governments around the world.
- The US is increasingly worried about China's growing geopolitical power, which rests in part on its manufacturing capabilities.
- China, as the world's second-largest economy, is a huge market for global semiconductor enterprises.

Semiconductor policy: Earlier attempt
- First, the establishment of the semiconductor tab was made in 2007 in the form of a Special Incentive Package (SIP).
- The second attempt in this direction was mode in 2012 by introducing some amendments to the previous scheme.
- Semiconductors work on the principle of Moore's Law, which says that the number of transistors in the unit doubles after every 18 months. But, miniaturisation of tabs requires technical know-how and investment.

Semiconductor policy:
- The scheme for setting up of Semiconductor Fobs in India provides fiscal support to eligible applicants for setting up Semiconductor Fabs. This is aimed at attracting large investments for setting up semiconductor wafer fabrication facilities in the country.
- The scheme for setting up Display Fabs in India provides fiscal support to eligible applicants for setting up Display Ribs which is aimed at attracting large investments for setting up TFT LCD/AMOLED-based display fabrication facilities in the country. The Scheme provides fiscal support of up to 50% of Project Cost subject to a ceiling of INR 12,000 crore per fab.
- The India Semiconductor Mission was launched in 2021 with a total financial outlay of Rs.76,000 crore under the aegis of the Ministry of Electronics and IT (MeitY).
- It is part of the comprehensive program for the development of sustainable semiconductor and display ecosystem in the country.
- The programme aims to provide financial support to companies investing in semiconductors, display manufacturing and design ecosystem.
- Envisioned to be led by global experts in the Semiconductor and Display industry, ISM will serve as the nodal agency for efficient, coherent and smooth implementation of the schemes.

4.   De-dollarisation – Can the dollar be replaced?

Syllabus: Mobilization of resources

Mains: De-dollarisation and India Focus on De-dollarisation

Context: There's a growing trend of countries sidestepping the US dollar (de-dollarisation) and choosing to use their own local currencies for bilateral trade.
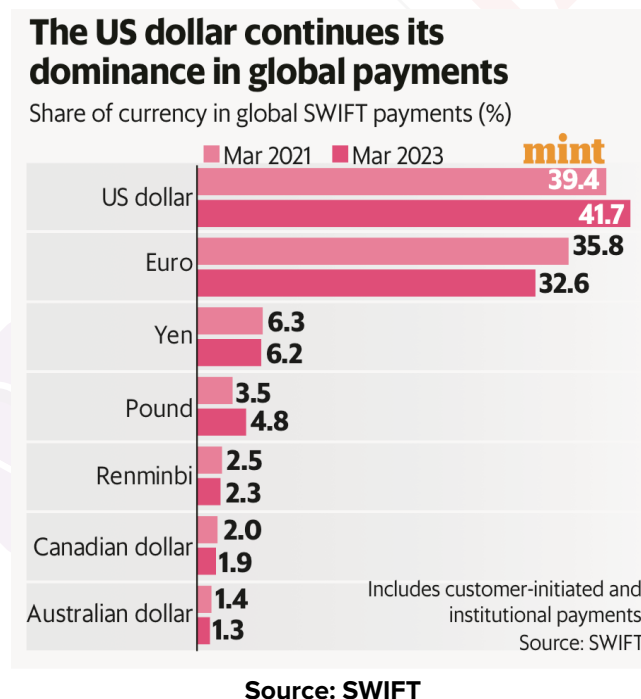
What is de-dollarisation?
De-dollarisation is a term that refers to the process whereby countries tend to reduce their reliance on the US dollar as a reserve currency, medium of exchange, and also a unit of account.
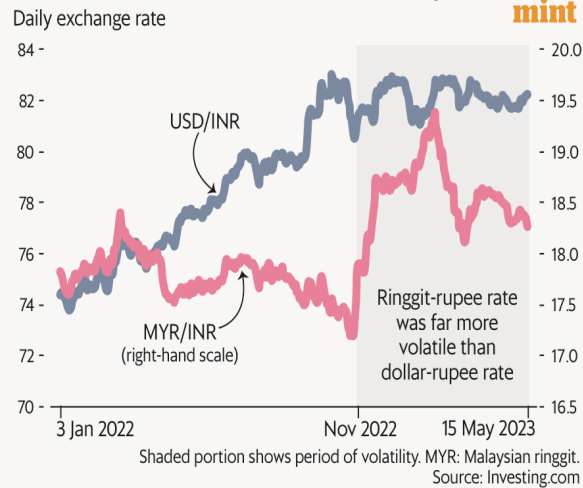
Why are de-dollarisation attempts being made?
● Sanctions by U.S.: The U.S. imposed several sanctions that restricted the use of the U.S. dollar to purchase oil and other goods from Russia, and this has been seen by many countries as an attempt to weaponise the dollar.
● Power to control transactions by U.S.: Since international transactions carried out in the U.S. dollar are cleared by American banks, this gives the U.S. government significant power to oversee and control these transactions.
● To end U.S Hegemony: Some countries, like China and Russia, have sought to diminish the influence of the US dollar as a means of countering perceived American hegemony and mitigating the impact of US sanctions.
● To Promote their own currency: Other countries, particularly those in the Eurozone, have pursued dedollarisation to promote the international use of their currency, the euro, in a bid to enhance their global economic standing and secure greater financial autonomy.

Why are dollars needed?
● Around 40% of international trade is invoiced in US dollars
● As per IMF, 60% of the reserves are in dollars, 20% are in euros, Followed by yen, British pound.
● When countries deal with each other they would want a common standard for currency conversion
● The country that runs the anchor/standard must be large

The US dollar continues its dominance in global payments
Share of currency in global SWIFT payments (%)

Currency	Mar 2021	Mar 2023
US dollar	39.4	41.7
Euro	35.8	32.6
Yen	6.3	6.2
Pound	3.5	4.8
Renminbi	2.5	2.3
Canadian dollar	2.0	1.9
Australian dollar	1.4	1.3

Includes customer-initiated and institutional payments
Source: SWIFT

Source: SWIFT

Source: Mint

Issues with trading of   globally
- India has a trade deficit with many trading partners
- Having an independent monetary policy would be very difficult
- It would also mean that the government must provide for full capital account convertibility
- Indian rupee trade is just a fraction of the total trade - accounts for just 2% of the total trade

Should India Focus on De-dollarisation?
- Benefits: It could reduce the vulnerability to fluctuations in US monetary policy and enhance monetary autonomy, enabling them to better tailor policy actions to the domestic economic conditions.
- Moreover, the diversification of reserve currencies could provide a buffer against currency fluctuations and capital flow reversals, reducing the likelihood of financial crises and improving overall financial stability.
- Challenges: As developing countries transition away from the US dollar, they may face heightened exchange rate volatility, which could impact trade, investment, and capital flows.
- Additionally, the development of deep and liquid domestic financial markets – a prerequisite for currency internationalisation – could prove to be a formidable challenge for countries with less developed financial systems.
- Furthermore, the potential costs associated with the transition, such as adjustments to existing trade and financial arrangements, may be significant and could strain limited resources.

Way forward:
- In light of these considerations, developing countries like India should adopt a prudent and measured approach towards dedollarisation. Policymakers must strike a delicate balance between the potential benefits of reducing reliance on the US dollar and the risks and costs associated with such a transition.
- While dedollarisation presents opportunities for a more diversified and resilient global financial system, it also poses significant challenges that must be carefully managed to ensure the preservation of global financial stability and sustained economic growth.
- Developing countries such as India must carefully weigh the potential benefits and risks associated with this transition.

5.   Will a hike in MSP help farmers?

Syllabus: GS-03 Issues related to Minimum Support Prices

Mains: Minimum Support Price and associated concerns.

Prelims: Minimum Support Price.

Context: The central government has increased the MSP Kharif crops increasing prices between 5-10%.

Introduction:
- The Centre announced the increase in the Minimum Support Prices(MSP) of Kharif crops, increasing the prices by 5-10% from the last season.
- **The aim of the move is to:**
  - Ensure remunerative prices to growers for their produce
  - Encourage crop diversification
- The announcement has received mixed reactions. For instance,
  - Some agriculture experts believe that an increase in MSP will give a slight respite to the growers.

- ○ However, they also argue that the absence of any dependable or assured market mechanism of procurement-purchase for crops at MSP in most parts of the country defeats the purpose of encouraging crop diversification.
- ○ A section of farmers' representatives are unhappy and term the hike as 'meagre' increase.

Details:
- The government announced the MSP for 17 'kharif crops' for the marketing season of 2023-24 on 7th June 2023.
- The government states that the increase in MSP is in line with the Union Budget 2018-19 announcement of fixing the MSP at a level of at least 1.5 times the all-India weighted average cost of production.
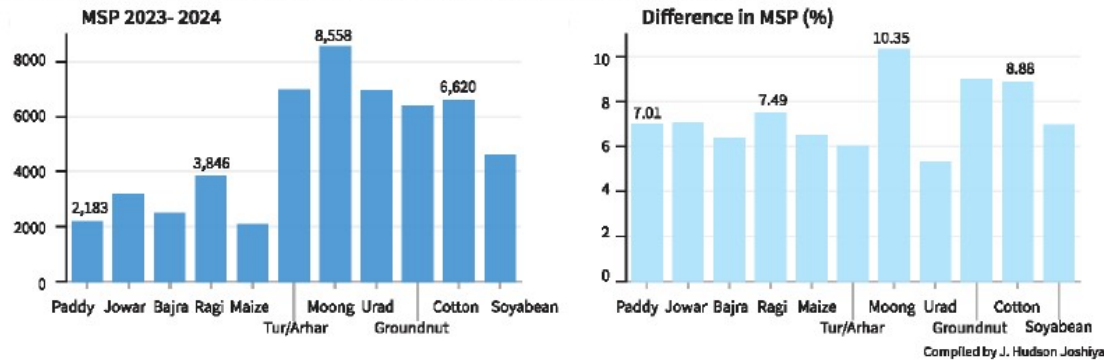
Source: The Hindu

Concerns of Farmers:
- Several farmers' outfits have called the increase insufficient because the increased input costs coupled with unfair MSP will push large sections of farmers (particularly small and marginal) into indebtedness.
- Moreover, the government's promise that MSP will be calculated as per the recommendation of the Swaminathan Commission still remains unfulfilled.
  - ○ It was recommended that MSP should be C2+50% (C2 or comprehensive cost of production).
- The Bharatiya Kisan Union (Ekta-Ugrahan) and the Samyukta Kisan Morcha (SKM) have dismissed the hike saying that it does not provide a remunerative price.
- Agriculture experts highlight that as per the past track records, only a few crops (wheat, paddy, and cotton) are being procured at MSP, while others are being procured at much below MSP.
- The major hurdles in crop diversification are the non-implementation of MSP and below-MSP-procurement of a large number of crops.

Foodgrain stock in India:
- According to the third advance estimate for 2022-23, total foodgrain production in India is estimated to be 330.5 million tonnes. It is higher by 14.9 million tonnes compared to 2021-22.
- The Government sources claim that it is the highest increase in the last five years.
- The total stocks of rice and wheat held by the Food Corporation of India (FCI) and State agencies is 555.34 lakh tonnes(on 1 May 2023). It comprises 265.06 lakh tonnes of rice and 290.28 lakh tonnes of wheat.

Way Ahead:
- A rise in the income of the farmers should be a long-term solution to farmers' distress.
- The government should establish an effective system to provide assured purchase and returns to farmers for all major crops at the MSP.
- An alternate option of extending subsidies on input costs should be explored.

Nut Graf: The government has announced an increase in the Minimum Support Price(MSP) of Kharif crops. It has received mixed reactions with many farmer outfits dismissing the hike stating that it does not ensure remunerative prices. The government should effectively implement MSP for other crops to achieve crop diversification in the country.

6.   Withdrawal of 2000 rupee note

Syllabus: Mobilization of resources

Mains: Impact of the Withdrawal of the 2000 Rupees Notes

Context: On May 19, 2023, the Reserve Bank of India (RBI) announced that it will withdraw the Rs 2000 denomination banknotes from circulation.

Introduction:
- The RBI announced the withdrawal of its highest-value currency note, Rs 2000 from circulation, however, the notes will continue to be legal tender, which implies that consumers can purchase goods using the currency.
- The central bank has asked everyone to deposit the Rs 2000 bank notes into their accounts or exchange them for banknotes of other denominations at any bank branch by September 30, 2023, and has set a limit of Rs 20,000 at a time to avoid disruptions of regular activities of bank branches.

Reasons for the withdrawal:
- Rs 2000 banknote was introduced in November 2016 (demonetisation) under Section 24 (1) of the RBI Act, primarily to meet the currency requirement of the economy in an expeditious manner after the withdrawal of the legal tender status of all Rs 500 and Rs 1000 banknotes in circulation at that time.
- Rs 2000 banknote is a large amount of currency note and was introduced as an ad-hoc measure when demonetisation took place in November 2016. The country was short of currency notes and there was a need for the remonetization process. Even if the printing presses would have run for 24 hours a day, it wouldn't have been possible to meet the requirements of the economy. So, a solution in the form of a 2000 currency note was introduced to fill up the huge currency gap.
- Every currency note, especially paper note, has a lifespan of 4-5 years, so it is very normal for RBI under Section 26(2) of the RBI Act, 1934 to ask the government to pass an ordinance by which these notes are withdrawn and taken out of circulation. The Clean Note Policy of the RBI ensures the availability of good quality banknotes to the public.
- About 89% of the Rs 2000 denomination notes were issued prior to March 2017 and are at the end of their estimated life span of 4-5 years.
- The total value of these banknotes in circulation has declined from Rs 6.73 lakh crore at its peak in March 2018 (37.3% of notes in circulation) to Rs 3.62 lakh crore constituting only 10.8% of notes in circulation on March 31, 2023, so the impact of withdrawal will be very marginal for the economy. When demonetisation was done in 2016, Rs 500 and Rs 1000 banknotes comprised 80% of the total currency in circulation.
- It has also been observed that this denomination is not commonly used for transactions and the stock of banknotes in other denominations continues to be adequate to meet the currency requirement of the public.
- The withdrawal of Rs 2000 currency notes also aims to restrict its hoarding and proliferation of black money.

Nut Graf: The RBI's recent withdrawal of ₹2,000 banknotes aligns with its Clean Note Policy and aims to provide improved currency with enhanced security. The discontinuation may lead to increased supply of ₹500 notes or introduction of a new high-value currency, affecting printing costs.

7.   Who should own the world's lithium?

Syllabus: Indian Economy and issues relating to planning, mobilisation of resources, growth and development

Prelims: Lithium reserves in India

Mains: Trends in the Indian lithium industry and issues associated with managing lithium mining and ownership rights.

Context:
This article analyses the status of India's lithium industry and also talks about ownership rights.

Trends in Indian lithium industry
- Lithium is one of the most important components for manufacturing Lithium-ion batteries which are extensively used in wind turbines, solar panels, and electric vehicles, all of which are critical for the green economy.
- In 2021, the electric-vehicle (EV) market in the country was valued at $383.5 million. Further, the market is estimated to increase to about $152.21 billion in 2030.
- In 2019-2020, India imported close to 450 million units of lithium batteries which were valued at $929.26 million.
- India imports around 70% of its Li-ion battery requirements from China and Hong Kong.
  - India is said to be one of the largest importers of Lithium batteries in the world.
- Experts believe that the ongoing global transition towards low-carbon economies, advent of artificial intelligence (AI), and 5G networks will bring about significant changes in global and regional geopolitics.
  - These changes might also impact access to and control over rare minerals, such as lithium and cobalt, which are expected to play a key role in these epochal changes.
- Thus the development of the domestic lithium reserves in the country is a matter of high stakes.

Ownership of crucial minerals
- A three-judge Bench of the Supreme Court in its ruling in July 2013 held that "the owner of the land has rights to everything beneath, down to the centre of the earth".
- The court made this observation while hearing pleas from jenmis, hereditary landholders of Malabar who have always held absolute proprietorship over lands, defending their right to minerals beneath their lands.
- However, a large portion of land, which includes forests, hills, mountains, and revenue wasteland, accounting for over 22% of India's landmass is publicly owned.
- The apex court further added that the Union government could take over the mining activities and ban private actors from mining rare and sensitive minerals such as uranium under the Atomic Energy Act 1962.
- Scholars and experts argue that lithium is as important as, if not more than, uranium in today's context.

Case study of how few countries manage lithium?
- Chile and Bolivia are known to have the largest known reserves of lithium.
- In these South American countries, lithium extraction is either done by the State itself or it is mandatory for the mining companies to enter into a contract with state-owned companies.
- In the case of Chile, the government has designated lithium as a strategic resource and its development has been made the exclusive prerogative of the state.
  - The government has provided license to only two companies (SQM and Albemarle) to produce lithium.
  - Chile's President in April 2023, announced a new "National Lithium Strategy" which opens up opportunities for public-private partnerships for future lithium projects.
  - This new strategy facilitates the government to regulate the environmental impacts of mining, distribute the revenue from lithium production more fairly among local communities, and promote R&D on lithium-based technologies.
- In Bolivia, a new constitution which was approved by a popular vote in 2009, accorded the government "control and direction over the exploration, exploitation, industrialisation, transport, and commercialisation of natural resources."
  - The government in Bolivia had nationalised lithium and put in place stringent regulations against private and foreign participation.
  - This is said to be one of the key reasons for the failure of the country to produce lithium at a commercial scale for close to two decades.
  - Bolivia's current administration, however, seeks to bring about a change by collaborating with other Latin American nations and formulating a new "lithium policy" that would be beneficial to all of their economies.
- Furthermore, the Mexican administration also nationalised lithium in February 2023, by declaring that "Oil and lithium belong to the nation and they belong to the people of Mexico."
- On the whole, various Latin and South American countries have adopted various measures to pursue a multi-pronged strategy and the governments of these countries have enjoyed a significant degree of control over lithium mining and production.
  - These measures by the governments have also been influenced by the mobilisation of indigenous communities in these regions who demand accountability.

Way forward for India
- As India looks to explore and develop its own lithium reserves, it is important to acknowledge the fact that the development of this sector would require a significant level of effectiveness from the measures undertaken by the Indian state.
- Further, most of India's mineral wealth lies in regions with very high levels of poverty, environmental degradation, and lax regulations.
  - Thus prudent management of the mining sector is required in order to meet goals such as social well-being, environmental safety, and national energy security.

Nut graf: The domestic exploration and extraction of lithium are of extreme geostrategic significance. However, it is equally important to ensure that such extractions are done in the public interest and there are no adverse environmental and social impacts on the communities residing in such regions.

8. India's manufacturing challenge

Syllabus: Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Various challenges and issues associated with the manufacturing sector in India

Context: This article discusses root causes of challenges faced by the manufacturing sector in India.

Introduction:
- The issue of whether manufacturing or services should be the desirable path for India's economy has been a topic of discussion in public forums.
- Despite the economic reforms of 1991 that focused on manufacturing, the share of manufacturing in India's economy did not increase significantly.
- Even with the qualitative change in the manufacturing sector since then, with improved product quality and variety, the lack of proportional growth suggests a rising income inequality.

Poor growth records:
- Manufacturing growth in India has been relatively stagnant since the economic reforms of 1991, with notable government initiatives such as 'Make in India' and the Production-Linked Incentive scheme failing to yield impressive results.
- The government has also implemented various policy initiatives aimed at supporting the corporate sector and promoting ease of doing business. These include a substantial reduction in tax rates in 2019 and efforts to improve the overall business environment.
- Additionally, public investment has been prioritised, with an 18.5% increase in capital expenditure in the last Union Budget.
- Despite these measures, the manufacturing sector in India continues to face challenges. The sluggish growth can be partly attributed to the impact of demonetization in 2016, which had a detrimental effect on the manufacturing industry.
- The first estimates for 2022-23 show that manufacturing growth was only 1.3%, lower than agriculture and other service sectors, indicating a structural issue hindering the manufacturing sector.
- However, the persistently low growth rates suggest that there are underlying structural issues that need to be addressed.

Systemic Issues:
- Despite government efforts, industry leaders alone cannot achieve a manufacturing push without considering demand from households.
- Household demand for manufactured goods is closely tied to the satisfaction of basic needs like food, housing, health, and education.
  - The share of food in household expenditure is highest in India compared to other major economies, while its GDP per capita is the lowest.
- Exporting can help overcome limited domestic markets, as seen in the success of smaller countries in East Asia, but competitiveness is crucial.
- Infrastructure and workforce skill level are vital for successful exporting, with factors like transportation, power supply, space, and waste disposal services also playing a significant role.
- Most manufacturing exports are transported by sea. However, companies in north India face significant challenges in reaching seaports due to poor infrastructure and practices, resulting in longer turnaround times compared to ports in Singapore.
  - The importance of ports for exports is highlighted by Kerala traders who have resorted to using ports outside the state due to lower costs.

Issues with education:
- India's education system lags significantly behind other manufacturing countries, particularly in East Asia, as evident from international assessments like the Programme for International Student Assessment (PISA) and findings from organisations like Pratham.
- Indian children show low proficiency in reading and numeracy during their early years, as highlighted by Pratham's assessments. Similarly, employers in India express concerns about the lack of employability among university graduates, even extending to institutions like the Indian Institute of Technology (IIT).
- The focus on expanding universities to cater to middle-class aspirations has neglected the needs of those seeking vocational training and skilled labour jobs like carpenters, plumbers, and mechanics.
- The state of vocational training institutes in India is limited, with only a small percentage of Indian youth receiving technical training compared to countries like South Korea.

Way Forward:
- The economic reforms of 1991 aimed to boost manufacturing but overlooked the necessary ecosystem, including education, training, and infrastructure. Building this ecosystem is crucial and cannot be achieved solely through legislation.
- Liberalising reforms in India have reached their limits and are insufficient to address the broader challenges hindering manufacturing growth.
- Additional measures are needed to strengthen education, vocational training, and infrastructure to foster a conducive environment for manufacturing to thrive.

Nut Graf: India's manufacturing growth has been poor despite government initiatives, while education and infrastructure deficiencies pose significant challenges. Strengthening these areas is crucial for sustainable manufacturing growth and requires more than liberalising reforms.

9. Hydroelectric power deals in Arunachal Pradesh

Syllabus: GS03-Infrastructure-Energy

Prelims: National Hydroelectric Power Corporation; Tehri Hydro Development Corporation Ltd.

Context: Arunachal scraps 44 hydel deals with private companies.

Introduction:
- The government of Arunachal Pradesh has cancelled 44 hydroelectric power contracts with private developers due to the lack of commitment from them despite multiple notices.
- The withdrawn projects, with a total capacity of 32,415 megawatts, will now be transferred to Central Public Sector Undertakings (PSUs) through new agreements.
- The Central PSUs, including National Hydroelectric Power Corporation and Tehri Hydro Development Corporation Ltd., have analysed and evaluated an indicative list of 29 projects provided by the union government.

National Hydroelectric Power Corporation(NHPC):
- NHPC was established in 1975 with the objective of harnessing the country's hydroelectric potential to meet the increasing demand for electricity and promote sustainable development.
  - As a public sector undertaking, NHPC operates under the administrative control of the Ministry of Power, Government of India.
- It has developed and commissioned several major hydroelectric projects across different states, including the prestigious 2,000 MW Subansiri Lower Hydroelectric Project in Arunachal Pradesh.
- NHPC's projects not only generate clean and renewable energy but also contribute to the economic growth and development of the regions where they are located.
- The company emphasises the sustainable utilisation of water resources and environmental conservation in its project planning and execution.
- The company has a strong focus on corporate social responsibility (CSR) initiatives, including community development, healthcare, education, and environmental conservation in the areas surrounding its projects.
- NHPC also collaborates with various stakeholders, including state governments, local communities, and technical institutions, to ensure the successful implementation of its projects.

Tehri Hydro Development Corporation Ltd (THDC):
- THDC is a public sector undertaking under the administrative control of the Ministry of Power, Government of India.
- It was incorporated in 1988 with the primary objective of developing and operating the Tehri Hydro Power Complex in Uttarakhand, India.
- The Tehri Hydro Power Complex, located on the Bhagirathi River near Tehri town, is one of the largest hydroelectric projects in India.
- It comprises the Tehri Dam and the Tehri Pumped Storage Plant. The Tehri Dam, with a height of 260.5 metres, is one of the highest dams in the world.
- Apart from the Tehri Hydro Power Complex, THDC has also undertaken several other hydroelectric projects across the country, including the Koteshwar Dam and the Vishnugad Pipalkoti Hydro Electric Project.

10. Odisha Train Accident: Railway Safety in India

Syllabus: Infrastructure-Railways

Mains: Various parameters of Railway safety in India

Context: 70 killed in Odisha train accident

Introduction:
- A major railway accident occurred in Odisha on June 02,2023, resulting in the presumed death of at least 70 passengers and over 350 injuries.
- As rescue and recovery operations continue, the death toll is expected to rise.
- The Coromandel Express, which connects West Bengal with Tamil Nadu, primarily carries passengers from West Bengal travelling for work or better healthcare facilities.
- This accident is considered one of the most severe in recent times, with similarities to a previous incident in 2013 in Jajpur district, Odisha.

Railway Safety in India:
- India's railway network is one of the largest in the world, catering to millions of passengers daily. While railways serve as a lifeline for transportation, ensuring the safety of passengers is of paramount importance.
- However, the Indian railway system faces various challenges, such as outdated infrastructure, lack of advanced technology, inadequate regulations, and limited safety awareness.

- Factors contributing to railway accidents are, infrastructure deficiencies,human factors, such as train operator errors, signal misinterpretation, fatigue, and negligence, overcrowding and passenger behavior like unauthorized crossing of tracks,lack of proper barricades, inadequate warning signals, and insufficient awareness among road users at level crossing, sabotage attempts, vandalism, and terrorist activities can pose safety risks.
- Majority of the accidents were caused due to derailments (60%), followed by accidents at level crossings (33%).
- In the last decade, accidents caused due to both these causes have reduced by about half.
- The Standing Committee on Railways, when examining the safety in railways, had noted that one of the reasons for derailments is defect in the track or coaches.
  - The Committee had recommended that Indian Railways should switch completely to the Linke Hofmann Busch (LHB) coaches as they do not pile upon each other during derailments and hence cause lesser casualties.

Number of railway accidents due to various factors
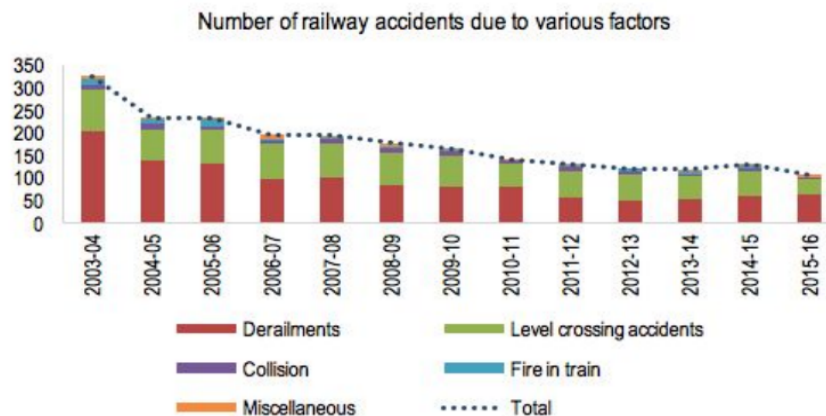
Coupling Failure in Railways:
- Indian Railways is also facing a major problem of the detachment of locomotives from rakes due to coupling failure.
- Despite instructions to address the issue, the Railways has neglected this major safety concern for over three years, according to sources.
- The detachment of the coupler connecting the coaches to the locomotive poses a dangerous situation, as the rake becomes disconnected and continues moving on the track.
  - Coupling failure in Indian Railways refers to the malfunction or failure of the coupling system that connects the railway cars or coaches.
  - The coupling system is crucial for maintaining the integrity and stability of the train, as it enables the transfer of traction forces and ensures that the cars remain securely attached to one another during the journey.
- Coupling failures can occur due to various reasons, including wear and tear, lack of maintenance, mechanical defects, or human error.
- The Railway authorities have approached the Research Designs and Standards Organisation (RDSO), the research arm of the Railways, to rectify this defect.
- However, the modification suggested by the RDSO for the Dellner coupler, which should have been completed in 2020, has not progressed sufficiently, leading to incidents of train parting.
- In response to this concern, the General Managers of all Zonal Railways have been instructed to identify unmodified Dellner couplers and prioritise their rectification.
  - The modification involves adding an additional pin to the coupler of each coach to prevent uncoupling during sudden braking and jerks.
  - Furthermore, zonal authorities have been directed to erect fences in areas where derailments occur due to cattle run-over issues.

Government initiatives towards railway safety:
- The Indian government launched the Integrated Railways Safety Management System (IRSMS) to enhance the safety and security of the railway network. It integrates various safety-related functions, including train operation, maintenance, and infrastructure management, to ensure a comprehensive approach to safety.
- Train Protection and Warning System (TPWS) is a train safety system implemented by the Indian Railways to prevent accidents caused by human error or overspeeding. It automatically applies brakes if a train exceeds a pre-set speed limit or violates signal norms, thereby enhancing safety.
- Rashtriya Rail Sanraksha Kosh (RRSK) is a dedicated fund created by the Indian government to finance critical safety-related infrastructure projects. It aims to eliminate unmanned level crossings, strengthen track and bridge safety, and improve signaling systems.
- The Indian government has taken significant initiatives to eliminate unmanned level crossings, which are prone to accidents. It has set targets to replace them with either road overbridges or underpasses, ensuring the safety of both road and rail users.
- Linke Hofmann Busch (LHB) Coaches are safer and more technologically advanced than conventional coaches. The Indian government has been gradually replacing older coaches with LHB coaches to improve passenger safety during accidents or derailments.

- Automatic Train Protection (ATP) System is being implemented in select sections of the Indian Railways to enhance safety. It includes features like continuous speed monitoring, overspeed protection, and emergency braking, ensuring safer train operations.
- The Indian Railways regularly conducts safety audits and inspections to identify potential safety hazards and take corrective measures. These audits help in identifying and addressing issues related to track maintenance, signalling systems, rolling stock, and other safety-related aspects.
- The government has initiated the deployment of advanced signalling systems like the European Train Control System (ETCS) to improve train control and reduce the chances of accidents. These systems enable real-time monitoring and communication between trains and control centres, enhancing safety and efficiency.

Nut Graf: A major railway accident in Odisha recently caused significant loss of life and injuries. The incident highlights the challenges faced by India's railway system, including outdated infrastructure and limited safety measures. To address these issues, the government has implemented various initiatives.

11. Understanding the Kavach system

Syllabus: Infrastructure- Railways.

Mains: Kavach system of Railways.

Prelims: Kavach system.

Context: Railway accident in Odisha.

Details:
- A ghastly train accident took place on 2nd June 2023 and killed approximately 288 passengers.

Kavach System:
- The Research Design and Standards Organisation (RDSO) along with the Indian industry indigenously developed Automatic Train Protection (ATP) system called Kavach.
- It is a state-of-the-art electronic system with Safety Integrity Level-4 (SIL-4) standards.
- It provides protection by preventing trains from passing Red (danger) signals and avoiding collisions.
- Kavach automatically activates the train's braking system, if the driver fails to control the speed.
- It also averts collisions between two locomotives equipped with functional Kavach systems. It further relays SoS messages during emergency situations.
- Additionally, it has the centralised live monitoring of train movements through the Network Monitor System.
- It is a cheaper SIL-4-certified technology with the probability of an error being 1 in 10,000 years.
- The Traffic Collision Avoidance System (TCAS) helps in two-way communication between the station master and loco-pilot.
  - The equipment on the locomotive and transmission towers at stations connected with Radio Frequency Identification (RFID) tags helps in conveying messages.
  - It helps the loco-pilot in knowing the signal in advance(without visual sighting) and maintains the permissible speeds.
- Notably, both the trains in the Odisha accident (Shalimar-Chennai Coromandel Express and the Yeshwanthpur-Howrah Express) were not fitted with Kavach-TACS.
- Implementation of Kavach:
  - One of the pioneers of the implementation of Kavach-TACS is South Central Railway (SCR) Zone.
  - The Secunderabad-based Indian Railways Institute of Signal Engineering & Telecommunications (IRISET) hosts the 'Centre of Excellence' for Kavach.
    - It trains the in-service railway staff on Kavach.

Kavach Deployment Strategy:
- The railway board is implementing Kavach in a focused and phased manner beginning with high-density routes like New Delhi-Mumbai and New Delhi-Howrah Sections.
- The next priority is Highly Used Networks followed by Passenger High-Density Routes and all other routes.

Nut Graf:
The indigenously developed Automatic Train Protection (ATP) system called Kavach is equipped with state-of-the-art technology. It has the potential to control train accidents and reduce its frequency to a great extent safeguarding the lives of passengers.

12. Biofertilizer scheme gets Central govt.'s green light

Syllabus: GS-3, Agriculture, Issues related to direct and indirect farm subsidies, Conservation and environmental pollution

Prelims: PM-PRANAM Programme

Context: The Cabinet Committee on Economic Affairs (CCEA) approved the PM-PRANAM or PM Programme for Restoration, Awareness, Generation, Nourishment and Amelioration of Mother Earth scheme.

Details:
- The PM-PRANAM scheme was proposed in the 2023-24 union budget.
- The scheme aims to promote the use of nutrient-based biofertilizers for sustainable agriculture.
- It seeks to save soil fertility, reduce reliance on chemical fertilizers, and encourage balanced fertilizer usage.
- This is an incentive-based scheme which involves active participation from state governments.
- States that adopt alternative fertilizers will be incentivized through subsidies saved from the reduction of chemical fertilizer usage.
- For example, suppose a state reduces its consumption of conventional fertilizers by three lakh tonnes using green fertilizers, resulting in a subsidy saving of Rs. 3,000 crores; so, for the efforts, the central government will incentivise the state by providing 50% of that subsidy savings.
- **Continuation of existing Urea Subsidy Scheme:** The urea subsidy scheme will continue, ensuring a consistent supply of urea to farmers at an affordable price, ensuring that farmers have access to essential nutrients for their crops without financial burden.
- **Market Development Assistance (MDA) for Organic Fertilizers:** The PM-PRANAM scheme includes an allocation of Rs. 1,451.84 crores for Market Development Assistance (MDA).
  - MDA aims to promote organic fertilizers derived from Gobardhan plants, which produce fermented organic manures (FOM), liquid FOM, and phosphate-rich organic manures (PROM) as by-products from biogas plants and compressed biogas (CBG) plants.
- **Use of Eco-Friendly Option of Urea i.e. Nano Urea Production:** The use of nano urea, a more efficient and eco-friendly form of urea, has increased in the country. By 2025-26, eight nano urea plants with a production capacity of 44 crore bottles will be commissioned. Nano urea technology enhances nutrient absorption by crops and reduces nitrogen losses, resulting in increased productivity and cost savings.
  - This initiative supports natural/organic farming practices and contributes to rejuvenating soil productivity.

13. Bullet Train Project

Syllabus: GS03-Economy-Infrastructure

Prelims: National High-Speed Rail Corporation Limited; Shinkansen Technology

Context: Second bridge in the bullet train project completed.

Key Details:
- Recently, the second bridge in the bullet train project was completed spanning the Purna River in Gujarat.
- The construction of a 360-metre-long bridge posed significant challenges for the National High-Speed Rail Corporation Ltd. (NHSRCL), the implementing agency for the Mumbai-Ahmedabad bullet train project.
- Out of the 24 river bridges planned for the high-speed rail corridor, 20 are being built in Gujarat and four in Maharashtra.
- The foundation work for the bridge presented difficulties due to rising water levels in the river, which increased by approximately five to six metres every fortnight during high tides.
  - NHSRCL officials monitored the tides from the Arabian Sea throughout the construction process.
- The first river bridge, constructed between Vapi and Bilimora stations in Gujarat, was completed in January 2023.
- Additionally, work is ongoing for the construction of the longest bridge in Gujarat, a 1.2-km bridge on the Narmada Bharuch.
- NHSRCL officials expect the bullet train to be operational by 2026, with progress being made on the foundation, pier, and other infrastructure works across various rivers in Gujarat, such as the Sabarmati, Mahi, Narmada, and Tapi.

Mumbai-Ahmedabad Bullet Train:
- The Mumbai-Ahmedabad high-speed corridor will have a high-speed train, with financial assistance from the Japanese Government.
- The Shinkansen high-speed technology will be used in this train. "National High-Speed Rail Corporation Limited", a Special Purpose Vehicle (SPV) has been formed for the implementation of this project.

14. Seeing India's energy transition through its States

Syllabus: GS-3, Energy.

Mains: India's energy transitions.

Introduction:
- India is planning to propose a multiple energy pathways approach in the upcoming energy forum.
    - This approach will accommodate diverse contexts and development trajectories of different countries.
- It should be noted that states are crucial players in India's energy transition due to multi-tier governance of energy production and usage.

Significance of States in Energy Transition:
- In a federal system, states are important for four functions crucial to energy transition:
    - States are spheres of implementation and are important for the realisation of national targets.
    - Several legacy issues like high losses, unreliable supply, and service quality are associated with state political economy and thus should be addressed at the state level.
    - States act as laboratories of policy innovations. For instance, initial initiatives of solar energy in Gujarat and Rajasthan and wind energy in Maharashtra and Tamil Nadu.
    - If the goals are misaligned with state priorities, they can become major roadblocks to national achievements.
- Though India has set laudable goals for energy transition, it is important to engage with diverse State contexts, capabilities, and priorities.
- Central mandates like the updation of State Action Plans on Climate Change, the establishment of State-level steering committees for energy transitions, and regular meetings of energy ministers highlight the importance of states.

Associated Concerns:
- India has achieved a significant portion of its 2022 target of 175 GW of renewable energy. However, only a few states like Gujarat, Karnataka, and Rajasthan met their individual targets.
- Furthermore, nearly 80% of the current renewable energy capacity is confined to only 6 states in West and South India.

Way Ahead:
- There is a need for multi-scalar planning and execution strategy along with the consideration of inter-linkages, their implications, and cross-learnings.
- The analysis of state-level preparedness for energy transition should be conducted.
- State-level frameworks should understand plans, actions, and governance processes towards energy transition.
    - This will enable an expedited transition.
    - It will broaden the transition discourse of a narrow set of outcomes.
    - It will further lead to greater transparency and public legitimacy.
    - Moreover, it would create a greater sensitivity to State-level diversities in priorities, capacities, and opportunities.
    - It would also ensure evidence-based policy decisions.

Global Energy Transition Index:
- The Global Energy Transition Index measures 115 countries' readiness to shift to stable, efficient, accessible, and inclusive energy systems through three dimensions: economic development and growth, sustainability, and energy protection and access indicators.
- It considers recent developments in the global energy environment as well as the growing urgency of addressing climate change.
- The report was released by the World Economic Forum (WEF), prepared in collaboration with Accenture.
- In the recently published report, India ranked 87th out of 115 countries in the Energy Transition Index(ETI) 2021.
- Further, India has made significant progress over the past decade, owing to the increasingly diverse energy sources, the share of renewables.

Nut Graf: States are critical actors in India's energy transition. However, an effective transition strategy requires multi-scalar planning and implementation strategies that accommodate the diverse context, needs, and resources of different states.

15. Requirement for limits on UPI transactions

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Various consequences of UPI implementation

Context: Daily limits by banks on UPI transactions.

Introduction:
- In order to cope with the growing popularity of the Unified Payments Interface (UPI) , banks have implemented daily transaction limits that exceed the limits mandated by the National Payments Corporation of India (NPCI) in 2021.
- This measure aims to ensure the efficient operation of the popular payments interface amidst the escalating number of transactions.
- NPCI has also raised the value limits for specific categories with higher average transaction values, such as Capital Markets and Credit Card Bill payments.
- All participants in the ecosystem, including NPCI and regulators, regularly assess and modify transaction and value limits on the UPI as needed.
  - This includes the recent increase in limits for IPOs, broking, mutual funds, loan repayment, and other transactions, with a focus on supporting future growth.

Unified Payment Interface (UPI):
- UPI is a real-time payment system that helps in instant and quick transfer of funds between two bank accounts.
- The transfer of funds is done through a single mobile application. Some of the important features of UPI are listed below.
  1. Immediate fund transfer which is faster than NUT.
  2. UPI is available for 24 hours
  3. It is also available on public holidays
  4. Every Bank provides its own UPI for different mobile platforms like Android, 10S.
  5. It can be utilised for making payments to merchants, and utility bill payments.
  6. Any complaint can be raised from Mobile App directly.
- The idea of UPI was developed by the National Payments Corporation of India (NPCI) and is controlled by the Reserve Bank of India (RBI) and IBA (Indian Bank Association).

Key Details:
- **Current Limits:** Currently, users of the UPI can make up to 20 transactions or 1 lakh in a single day.
  - Specific categories such as capital markets, collections, insurance, and inward remittances have a higher limit of 2 lakh.
  - In December 2021, the limit for UPI-based (Application Supported by Blocked Amount) ASBA IPO and retail direct schemes was increased to 5 lakh per transaction.
- **Banks and App Guidelines:** Several banks and apps have set their own transaction guidelines.
  - For instance, Punjab National Bank (PNB) and Bank of Baroda, state-run lenders, have set lower transaction limits at 25,000 and 50,000 respectively. Additionally, some apps, including Google Pay, have a limit of ten transactions per day across all UPI apps.
- **Security and Seamless Functioning:** As UPI expands its reach, including non-resident accounts with international numbers and its increasing utility in daily life, limits play a significant role in sustaining its growth.
- **Use-case Expansion:** Daily limits also become important as the UPI interface explores new use-cases.
  - For example, there is a proposed pilot project for coin-vending machines with UPI as the facilitator. Setting limits aids in managing the expanding scope of UPI and supporting its adoption in various domains.

Recent trends observed with respect to UPI:
- In May 2023, the total number of transactions facilitated through UPI reached 9,415.19 million, with a combined value of approximately 14.89 lakh crore. This indicates a substantial increase in both transaction volume and value.
- P2P (peer-to-peer) transactions accounted for around 43% of the volume compared to P2M (peer-to-merchant) , but in terms of value, their share amounted to 11.45 lakh crore.
- In the P2P category, a significant majority of transactions (54.2%) were conducted in the below 500 range, while in the P2M category, a considerable portion (84.3%) fell within the same amount bracket. This indicates a lower-value utility for P2M transactions.
- Until February of the financial year 2022-23, the total number of reported UPI fraud cases had increased by approximately 13% compared to the previous financial year, totaling 95,402 cases.
  - However, there was a decline in the fraud-to-sales ratio, which stood at 0.0015%.
- Consequently, there is an urgent need to establish a robust safeguard infrastructure within the growing UPI ecosystem in order to address the rising incidence of fraud.

Nut Graf: The conversation about daily limits revolves around striking a balance between maintaining security measures and accommodating the increasing popularity and utility of the UPI interface in everyday transactions.

16. Replicating UPI success abroad will be tough

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Various consequences of UPI implementation

Context: India is holding talks with 30 countries to deploy a payments framework similar to UPI

Advantages of Internationalization of UPI:
- Dependence on the SWIFT system will come down
- India's soft power in the global system will increase
- Will allow the Indians to use the platform for forex transactions or for making payments while traveling in foreign countries
- NRIs can use the UPI payments even if they do not have the Indian mobile number
- Government is considering to allow foreign remittances through UPI
- This is in addition to Aadhaar being adopted in many other countries to prepare a digital national identification platform

What has favoured this growth in India?
- Technology companies such as PhonePe, Google Pay, Paytm etc promoted usage of digital payments
- Covid-19 and demonetisation
- Introduction of 4G
- Cheaper smartphones
- Merchant acceptance - zero merchant discount rate

Concerns:
- Government support was one of the driving factors in India
- In Poorer countries the banks may not be willing to invest and develop such infrastructure (another factor to consider here is whether these banks are stable as banks in India)
- The card service providers may lobby against UPI
- Card penetration in many countries is higher and using the NFC (Near Field Communications) the payments can be done easily
- In some countries the mobile wallets are very popular and in some countries the ageing population does not prefer such methods as it has access to debit/credit cards

17. Will ONDC experience success like UPI

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Various consequences of UPI implementation and ONDC

Context: A project on Open Network for Digital Commerce (ONDC) has been initiated by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India.

About ONDC:
- It is a Section 8 company
- Sponsored by DPIIT (Department of Industry and Internal Trade)
- The network will include retailing, food delivery, tourism, hospitality, travel, mobility and wholesale trade
- ONDC acts as direct bridge between consumers and sellers

Why is ONDC needed?
- The e-commerce market has been broken down into silos and is dominated by a very few of companies
- There have been accusations of the companies promoting their own products
- The current market players charge higher commissions of around 20 to 25% and commissions on ONDC are around 3 to 5%

Implementation of ONDC:
- The task of Open Network for Digital Commerce has been assigned to the Quality Council of India (QCI).
- ONDC is to integrate e-commerce platforms through a network based on open-source technology.
- The Open-sourcing project is likely to be on the lines of Unified Payment Interface – UPI, therefore several operational aspects such as onboarding of sellers, vendor discovery, price discovery, and product cataloging could be made open-source by e-commerce platforms.

Will ONDC achieve success like UPI?
- Bigger players such as Amazon, Flipkart have stayed away from ONDC
- Will the govt backed entity achieve efficiency like a private owned entity
- Penetration of e-commerce is only around 6%
- Ambiguous government messaging – is it a competition or a facilitator?

Challenges:
- ONDC is yet to show any significant traction for e-commerce orders
- It has scaled 20000 orders per day from around 1000 in March but 97-99% of these are hyperlocal orders - food and groceries
- Sellers not updating inventory listings and payment reconciliation issues to delivery frauds
- Logistical glitches

18. UPI lite needs more push from banks

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Various consequences of UPI implementation and UPI lite

Context: UPI Lite – the platform launched by the Reserve Bank of India (RBI) in 2022 to enable real-time, low-value transactions up to Rs 200. While most transactions that happen in India come under its purview and it is beneficial to both banks and customers, the expansion of its user base has been gradual.

Details:
- A circular released by the National Payments Corporation of India (NPCI) showed that around 75% of the total volume of retail transactions in India are below Rs 100 in terms of value while around 40-50% of overall UPI transactions are below Rs 200.
- Currently, UPI Lite comprises a mere 2-3% of total UPI transactions. UPI transactions rose 43% year-on-year (y-o-y) to a record Rs 14.1 trillion in value terms during April 2023.

About UPI lite:
- The National Payment Corporation of India (NPCI) has launched UPI Lite, an on-device wallet option for UPI to enable small-value transactions in an offline mode.
- UPI Lite will be an on-device wallet functionality that will enable offline transactions of smaller values.
- UPI Lite will work via the wallet system.
- Transaction limit- Funds have to be added in the UPI Lite wallet and which can be used to make small payments under Rs 200.
- Wallet limit- There is a Rs 2,000 limit on the amount of money you can have in this UPI Lite wallet.
- The users will not be required to enter their UPI PIN while confirming UPI Lite payments.
- Phases- In phase 1, UPI lite will process transactions in partially offline mode (debit offline and credit online).
- This means that if you are paying someone using a UPI Lite wallet, the money will be debited from your account without being connected to the internet, but it will get credit to the receiver's account when they are online.
- At a later point, UPI Lite will process transactions in complete offline mode i e debit and credit both offline.
- Adding funds- Any user of UPI app will have the option to enable UPI Lite called "On-Device wallet" on their UPI app itself.
- Once enabled, users can allocate funds from their bank account to UPI lite.
- Adding funds in UPI Lite shall only be allowed in online mode with additional factor authentication or using UPI AutoPay feature.

How is UPI Lite different from the existing features?
- Digital wallets- The key differentiating factor between a regular digital wallet and UPI Lite is that an existing UPI customer need not repeat the KYC process to use UPI Lite.
- UPI 123Pay- Unlike UPI 123Pay, UPI Lite enables QR code-based payment even offline.

19. Production linked subsidy

Syllabus: Effects of liberalisation on the economy, changes in industrial policy and their effects on industrial growth.

Prelims: Basic data regarding production-linked subsidy scheme

Mains: Role of the PLI Schemes in providing thrust to the manufacturing sector in the country.

What is the Production Linked Subsidy (PLI) Scheme?
- It is a scheme that aims to give companies incentives for incremental sales from products manufactured in domestic units.
- The scheme invites foreign companies to set up units in India, however, it also aims to encourage local companies to set up or expand existing manufacturing units and also to generate more employment and cut down the country's reliance on imports from other countries.
- It was launched in April 2020, for the Large Scale Electronics Manufacturing sector, but later towards the end of 2020 was introduced for 10 other sectors.
- This scheme was introduced in line with India's Atmanirbhar Bharat campaign.

Why is the production-linked scheme needed?
- PLI is important as the government cannot continue making investments in these capital-intensive sectors as they need longer times to start giving returns.
  - Instead, what it can do is invite global companies with adequate capital to set up capacities in India.
- This scheme also plays an important role in providing a thrust to the manufacturing sector in the economy of the countries.

Benefits of the PLI scheme:
- The PLI scheme makes investments in the core sectors like electronics, and batteries. Investment in the core sectors leads to the generation of externalities which would eventually benefit our economy.
- This scheme will play an important role in reducing the impact of human activities on the environment. With this scheme, investments are made in the field of green sectors like green hydrogen, e-vehicles, etc.
- Global electronics giants such as Samsung, Pegatron, Flex, and Foxconn among others are looking to either set up shop or expand their presence in India.
- This scheme will, on the one hand, attract big foreign investment in the sector, while also encouraging domestic mobile phone makers to expand their units and presence in India.

Concerns with respect to the PLI scheme:
- The PLI schemes have led to the transformation of the Indian economy to organised sectors. As a result of this, there has been a falling employment generation. Resultantly, there is slow employment growth and economic slowdown.
- PLI just acts like a subsidy scheme so it is important that incentives are distributed among the corporations in a manner that does not give a disproportionate advantage to one over the other.

Nut graf: PLI schemes offer many advantages to the manufacturing sectors but there is a need for the schemes to be distributed rationally in order to reduce their negative impact and enable equitable growth of sectors and the economy as a whole.

20. Transgenic Cotton

Syllabus: E-Technology in the Aid of Farmers, Technology Missions

Mains: Concerns and challenges associated with GM crops.

Context: Proposal to test transgenic cotton rejected by three States.

Introduction:
- The proposal endorsed by the Genetic Engineering Appraisal Committee (GEAC), which aimed to conduct field tests for a new type of transgenic cotton seed, has been rejected by Gujarat, Maharashtra, and Telangana.
- Bioseed Research India, based in Hyderabad, has developed a transgenic cotton seed containing the cry2Ai gene, which is believed to confer resistance to the pink bollworm, a significant pest.
  - However, Gujarat, Maharashtra, and Telangana have declined the GEAC's recommendation to test this seed in farmer's fields.
- According to the existing regulations, transgenic seeds must undergo field testing before obtaining clearance from the GEAC for commercial development.
- Bioseed sought permission from four states for conducting these tests, but only Haryana granted approval.

Educating the States:
- The GEAC has requested the Department of Biotechnology and the Indian Council of Agricultural Research to collaborate in organising capacity-building activities.
- These activities aim to inform State/UT Governments about the technology and regulatory framework associated with evaluating genetically modified (GM) crops.
- In India, transgenic cotton is the sole GM crop that has received approval and is currently being cultivated in fields.

Transgenic Cotton:
- Transgenic cotton, also known as genetically modified (GM) cotton, refers to a type of cotton that has been genetically engineered to possess certain desired traits.
- Bt cotton, the most widely cultivated transgenic cotton variety in India, is engineered to produce a toxin called Bacillus thuringiensis (Bt), which is toxic to certain insect pests, particularly the bollworm.
- This trait provides inherent insect resistance to the cotton plant, reducing the need for chemical insecticides and minimising crop damage caused by pests.
- The introduction of Bt cotton has led to substantial increases in cotton yields and has significantly reduced the economic losses incurred by farmers due to insect infestation.
- However, the adoption of transgenic cotton has not been without challenges. One major concern is the development of resistance in insect pests to the Bt toxin over time.
- The continuous exposure of pests to Bt cotton can lead to the emergence of resistant populations, undermining the effectiveness of the technology.
- Additionally, there have been debates and concerns surrounding the impact of transgenic cotton on seed sovereignty and the traditional seed sector.

Process of approval of GM Crops in India:
- RCGM (Review Committee on Genetic Manipulation) assesses and decides on the applications regarding the testing of GM crops. (conducts Biosafety Research Level 1 trial)
- GEAC (Genetic Engineering Appraisal Committee) then assesses the applications for field trials. (Biosafety Research Level 2 Trial)
- If approved, field trial assessment is done to decide if the crop can be commercialised.
- The developers of GM crops conduct field trials to assess their performance, agronomic traits, and potential environmental impacts.
    - These trials are carried out under strict containment and biosafety guidelines, ensuring that the GM crops do not escape into the environment.
- MEC (Monitoring and Evaluation Committee) monitors small-scale trials on behalf of GEAC and reports them.
- The GEAC forms a sub-committee of scientific experts, known as the Institutional Biosafety Committee (IBC), to review the data submitted by the developers. The IBC examines the safety, efficacy, and environmental impact of the GM crop and prepares a report.
- Following the IBC review, the GEAC invites public comments and suggestions on the GM crop. This step allows stakeholders, including farmers, NGOs, scientists, and concerned citizens, to voice their opinions and concerns regarding the potential release of the GM crop.
- After considering the IBC report and public comments, the GEAC makes a decision on the approval or rejection of the GM crop. If approved, specific conditions, restrictions, or monitoring requirements may be imposed to ensure the safe use and cultivation of the GM crop.
- The Union Ministry of Agriculture, after checking the seed act, allows for the seed to be released in the market.
- Once a GM crop is approved, post-approval monitoring and surveillance are conducted to monitor its performance, potential impacts, and compliance with the prescribed conditions.

Nut Graf: Three states, Gujarat, Maharashtra, and Telangana, have rejected the proposal endorsed by the GEAC for field tests of a transgenic cotton seed developed by Bioseed Research. Only Haryana granted approval, highlighting the need for educating states about GM crop evaluation and regulations.

21. The necessity of electricity distribution companies

Syllabus: Energy.

Mains: Electricity Act and proposed reforms.

Background Details:
- The Electricity Act 2003 laid the framework for the dismantling of the State Electricity Boards. It further separated generation, transmission, and distribution into separate companies.
- Though electricity generation was delicensed, transmission and distribution remained licensed and regulated activities.
- Its aim was to encourage competition, protect consumer interests, and supply electricity to all.
- Consequently, a competitive industry structure in a generation has evolved in recent years and the share of private industry increased rapidly.
- Similarly, the impressive growth in renewable power can be attributed to private investment. For instance, tariff-based bids for the electricity supply to Discoms have been the key to the success of the National Solar Mission.

Energy Conservation (Amendment) Bill 2022:
- The Energy Conservation (Amendment) Bill 2022, passed by Rajya Sabha in December 2022, aims to create a domestic carbon market in the country.
- The bill would promote the domestic carbon market in India. The carbon market would incentivize emission-reduction actions, leading to increased investment in clean energy and energy efficiency by the private sector in residences, commercial buildings, and industrial spaces.
- The bill creates agencies for issuing carbon credit certificates domestically while banning firms from exporting their carbon credits outside the country.
- The Act aims to strengthen India's carbon reduction promises under the Paris Agreement, COP 26, and COP 27.
- There are two types of institutional mechanisms that regulate carbon emissions developed by the EU in 2005, namely "cap-and-trade" and "command-and-control."
- Cap-and-trade is a market-based mechanism operating on the principle of issuing permits or allowances for emissions or pollution that add up to a maximum or capped amount, which is progressively decreased year by year.
- Polluters exceeding their permitted limits can buy permits from others who have permits available for sale.
- As per ICAP (International Carbon Action Partnership) there are 25 well-functioning emissions trading schemes or ETSs, currently in force in countries like Japan, the UK, the US, Canada, Mexico, etc.
- Surat, in 2019, implemented a pilot emissions trading scheme (ETS) for particulate matter pollution. It had led to a reduction of 24% in particulate matter pollution for participating industries. Ludhiana and Ahmedabad plan to follow the same model.
- Command-and-control mechanisms thrust a cap from the top on all industries uniformly, which has been unsuccessful in most geographies due to the inability of legacy industries to quickly generate climate finance for the green transition.

U.K. Model:
- The U.K. has a power pool where all generators must submit bids for the next day indicating the quantity and price of the supply.
- The bids are then stacked in ascending order of the price. Then the price with the quantity that would be required to meet the total demand becomes the pool price for electricity.
- This mimics the intersection of supply and demand curves to get the market price.
- Moreover, the introduction of full retail competition allows consumers to choose from several suppliers.

Scenario in India:
- India now has one of the cheapest solar rates in the world.
- Currently, power in India is supplied from individual power plants through long-term contracts at determined prices.
  - Notably, as the plant depreciates, the fixed (capital) cost component in the tariff declines; the older the plant, the cheaper its electricity.
- As India is discussing the contours of the new Electricity Amendment Bill 2022. Several experts favour deregulation and competition like the U.K. model.
- However, other experts highlight that adopting a power pool model is unsuitable for India.
  - The free market (or power pool) mechanism implies all electricity will be sold at the price of the electricity from the most expensive plant at which demand would be fully met.
  - As a result, the steep price shock cannot be absorbed.
- Discoms have the universal service obligation of supplying electricity to meet the entire demands of all consumers in their licence area.
  - This is done by entering long-term power purchase contracts.
- **Achievements:**
  - In India, Power-generating capacities have risen sharply and the power supply position has become comfortable in the past few years.
  - Discoms have become pivotal in the completion of rural and household electrification.
- The Electricity Act enables consumers with a load of 1 MW and above the right to open access. It allows them to buy electricity from whoever they want and pay the Discom only for the use of their distribution network and a cross-subsidy surcharge.
  - The cross-subsidy surcharge became obligatory because higher-end industrial and commercial users pay more and cross-subsidize the lower-end households (with fewer tariffs).
  - However, the mandate to progressively reduce cross-subsidies has not yet been implemented.
- There are also power exchanges that enable trading and optimal utilisation of the total generating capacity in the country.
- As the demand for electricity is inelastic, there is a necessity for price caps.

Associated Concerns:
- Discoms are often seen as the weak link in the supply chain of electricity with rising cumulative losses and an inability to pay generators on time.
- The issue with Discoms primarily lies in the domain of political economy as:
  - There is the inability of regulators in the States to determine cost-reflective tariffs
  - State governments fail to give timely subsidies
  - There is also an issue of misgovernance

- It is suggested that without any new investments, India might again suffer from power shortages.
- The Russia-Ukraine conflict has also led to consequences emanating from a dogmatic faith in the deregulated market.

Conclusion:
- The idea of doing away with the centrality of the Discom should be carefully analyzed. The lessons from the experience of the U.K. in 2022 should also be thoroughly studied.
- The inelasticity of electricity demand has compelled the government to give cash support or impose taxes.

Nut Graf:
The electricity status has considerably improved in recent years in India. However, there are several concerns associated with the new bill. It is suggested that the centrality of discoms should not be ignored.

22. Purchasing manager index (PMI)

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Significance of PMI for Indian economy

Context: The seasonally adjusted S&P Global India Manufacturing Purchasing Managers' Index (PMI) rose from 57.2 in April to 58.7 in May, indicating the strongest improvement in the health of the sector since October 2020.

Details:
- The S&P Global India Manufacturing Purchasing Managers' Index (PMI) surged to a 31-month high of 58.7 in May, with factory orders rising at the fastest clip on higher demand for Indian products, both locally as well as internationally, and an improvement in the operating conditions during the month.
- The seasonally adjusted PMI rose from 57.2 in April to 58.7 in May, indicating the strongest improvement in the health of the sector since October 2020.
- The index is compiled by S&P Global from responses to questionnaires sent to purchasing managers in a panel of around 400 manufacturers.

About Purchasing Manager Index:
- It is a survey-based measure that asks the respondents about changes in their perception about key business variables as compared with the previous month.
- The purpose of the PMI is to provide information about current and future business conditions to company decision makers, analysts, and investors.
- The PMI is a number from 0 to 100.
- A print above 50 means expansion, while a score below that denotes contraction, A reading at 50 indicates no change.
- If the PMI of the previous month is higher than the PMI of the current month, it represents that the economy is contracting.
- It is usually released at the start of every month. It is, therefore, considered a good leading indicator of economic activity.

Who compiles PMI?
- PMI is compiled by IHS Markit for more than 40 economies worldwide.
- IHS Markit is a global leader in information, analytics and solutions for the major industries and markets that drive economies worldwide.
- IHS Markit is part of S&P Global.

Significance of PMI:
- The PMI is widely followed as an indicator of economic health because the manufacturing and services sector is a key driver of economic growth.
- In general, a high PMI reading is seen as a positive sign for the economy, as it indicates that the manufacturing and services sectors are performing well and contributing to economic growth.
- A low PMI reading is seen as a negative sign, as it indicates that the manufacturing and services sectors are struggling and may be dragging down overall economic performance.

23. Ceiling on wheat stocks

Syllabus: Issues of Buffer Stocks & Food Security

Mains: Objectives and Significance of Buffer Stock in India

Context: The Union Government imposed limits on stock of wheat.

Introduction:
- In an effort to ensure food security and prevent hoarding, the Union government has imposed restrictions on the stock of wheat that traders, retailers, and processors can hold.
- The aim is to stabilize wheat prices and maintain a steady supply of this essential commodity.
- The order stood effective with immediate effect until the end of March 2024.
- The government has also planned to sell 15 lakh tonnes of wheat from the central pool through e-auction via the Open Market Sale Scheme (OMSS) to various buyers such as flour mills, private traders, bulk buyers, and wheat product manufacturers.
  - The objective is to regulate the retail prices of wheat, and the wheat will be sold in lot sizes ranging from 10 to 100 metric tonnes.

Stock Limit:
- The permissible stock that traders/ wholesalers can hold is 3,000 metric tonnes.
- Retailers and big chain retailers can hold up to 10 metric tonnes at each of their outlets, while the latter can hold up to 3,000 metric tonnes at all their depots combined. Processors would be able to stock 75% of the annual installed capacity.
- The mentioned entities are expected to declare their stock positions and update them regularly on the Department of Food and Public Distribution's portal.
- If the stock held by them is higher than the limit, they will have 30 days from the day of issue of notification to bring the same under the prescribed limits.

Concerns over wheat output:
- The recent actions are a response to concerns over decreased wheat production due to unseasonal rains, hailstorms, and high temperatures, which could lead to higher prices of the crop.
- The government aims to prevent local prices from surpassing its purchase prices and maintain an adequate supply of wheat by offloading stock and controlling prices through the Open Market Sale Scheme.
- On June 14, the retail price of wheat was ₹29/kg compared to ₹27.54/kg in 2022 while the wholesale price stood at 2,593.5/quintal.
- The Food Corporation of India plays a crucial role in ensuring affordable food grains for vulnerable sections through the Public Distribution System.
  - The target for wheat procurement in the current Rabi Marketing Season was 341.5 lakh metric tonnes, with 261.99 lakh metric tonnes already procured as of June 12,2023.
- However, concerns have been raised that wheat procurement may decrease by 20% from the initial estimate, as government purchases have slowed due to a spike in local prices.
- As of June, the government's central stock of wheat amounted to 313.9 lakh metric tonnes compared to 311.42 lakh metric tonnes in 2022.
- Despite the warnings from experts about the potential effects of El Nino, the Agricultural Ministry estimates the production of wheat at a record 1,127.43 lakh metric tonnes for the agriculture year 2022-23, higher by 50.01 lakh metric tonnes from previous year's production.

Nut Graf: The Union government has imposed stock limits on wheat for the first time in 15 years to ensure food security, while planning to sell a significant amount of wheat through e-auction to regulate the retail prices of wheat. Decreased wheat production raises concerns over higher prices.

24. Green GDP : Concept and Prospects

Syllabus: Indian Economy & Issues Relating to Planning, Mobilization of Resources, Growth, Development & Employment

Mains: Significance of Incorporating green accounts in conventional GDP

Context: Growing environmental concerns have resulted in the demand for green national accounts that highlight the stock of environmental wealth, and its use and depletion by a society in its conventional national accounts.
- Incorporation of green accounts in conventional GDP requires expansion of the definition of production, consumption, and wealth.
- Both environmentally beneficial and harmful products must be accounted for in the national accounts. The social value of such products must be integrated with related economic activities.

What is green GDP?

● Green GDP, is an indicator of economic growth with environmental factors taken into consideration along with the standard GDP of a country. Green GDP factors biodiversity losses and costs attributed to climate change.

Green national accounts highlight the stock of environmental wealth | Photo Credit: RGBAlpha

How is it used?

● In production: It would amount to including environmentally beneficial/harmful goods and services.
● In consumption: To be segregated based on zero carbon generating, less environmentally degrading, and major environment depleting products.
● Investment: Zero carbon and conventional carbon generating technologies as categories
● Human capital: Bifurcation of jobs in conservation and conventional sectors
● Income of the government: Taxes levied on and subsidies advanced to polluting sectors, environment-conserving technologies and efficient technologies.

The significance of green GDP:

● Sustainability
● Tangible valuation of the environmental costs
● Resource Management
● Policy direction
● Nudge to the private sector

Challenges:

● Lack of available and reliable data
● What value to be assigned
● Policy implementation
● Developmental urgencies
● No comparative study

Way Forward:

● Development of a common framework
● Increasing awareness - Masses and the policymakers
● Pilot projects on a smaller scale
● Role of academia and civil society
● Promotion as a good practice

Related Factoid - Global Green Economy Index:

● The Global Green Economy Index (GGEI) is a measure of the green economy performance of 160 countries published by Dual Citizen, a consultancy firm.
● India's rank in 2022 - 144th
● The GGEI covers four dimensions and 18 indicators:
● Climate Change & Social Equity
● Sector Decarbonization
● Markets & Investment
● Environmental Health

25. Fortification of Rice

Syllabus: Public Distribution System Objectives, Functioning, Limitations, Revamping

Mains: Potential advantages of food fortification in India

Context: The Narendra Modi government rolled out fortified rice under the public distribution system (PDS) without ascertaining the ill effects of such rice on the health of 80 crore beneficiaries, the Congress alleged.

What is Fortification of Rice?
- Fortification is the process of adding nutrients to food products that are not naturally present or are present in insufficient amounts.
- The fortification process adds essential elements such as Vitamin A, Vitamin B12, Vitamin B1, Iron, Zinc, and Folic Acid.

Food Safety and Standards (Fortification of Foods) Regulation 2016

- According to Food Safety and Standards Authority of India (FSSAI) norms, 1 kg fortified rice shall contain iron (28 mg-42.5 mg), folic acid (75-125 microgram) and Vitamin B-12 (0.75-1.25 microgram).
- Need for fortification:
- Malnutrition
- Iron deficiency - Anaemia
- Most common staple food
- Loss during milling and polishing

Benefits:
- Iron helps in attaining an improved cognitive development
- Enhanced maternal health
- Improved child health

Challenges:
- Time dependent - can become ineffective after some time
- Can trigger adverse reactions in people with genetic disorders
- Technological and social barriers

Way Forward:
- Biofortification
- Increased research and development
- Raising awareness levels

26. Decarbonizing the steel sector

Syllabus: Changes In Industrial Policy & their Effects on Industrial Growth

Mains: Various parameters to facilitate the decarbonization of the steel industry in India.

Context: The development requirements of India, is going to increase the appetite for steel in the coming years. India's steel industry accounts for about 11 per cent of the country's emissions currently

Present Situation:
- India is the world's 2nd largest producer of crude steel and 2nd largest consumer of finished steel.
- The National Steel Policy 2017 has set a target to reach 300 million tonnes (MT) of annual production by 2030 from the existing level of 120 MT.
- India's crude steel production is expected to increase to about 435 million tonnes (mt) by 2050.

Importance of decarbonization:
- Will save crucial foreign exchange - import of coking coal
- Setting up of a global supply base - early mover advantage
- Meeting of the international commitments on climate change
- Helps adapt to changing regulatory regimes like Carbon Border Adjustment Mechanism by the European Union.

Issues and challenges:
- Hydrogen based production is uncompetitive - price disadvantage
- Green hydrogen is much costlier than other types
- Technological efficiency is lacking in non carbon based production
- Carbon capture and storage is a costly process

Way Forward:
- Rapid advancement in Hydrogen technology
- Introducing CO2 pricing
- Policies for scrap metal usage
- Policy measures to provide support for green steel
- Exploring international markets
- Creation of production hubs

27. Indian economy resilient despite global risks: RBI

Syllabus: GS 3: Indian economy and issues relating to planning

Mains: Indian economy status

Context:
The Reserve Bank of India (RBI) has released its biannual Financial Stability Report (FSR). The report highlights the strength and resilience of the Indian economy and domestic financial system in rising uncertainty in the global economic landscape.
The report has brought to light positive indicators such as declining non-performing assets (NPAs) and the ability of scheduled commercial banks (SCBs) to meet capital requirements under stress scenarios.

Details:
- **Declining NPA:** The FSR reveals that scheduled commercial banks' gross non-performing assets ratio reached a 10-year low of 3.9% in March 2023. This decline indicates an improvement in asset quality, reflecting the resilience of the banking sector.
- **Robust Capital Reserves:** The RBI's macro stress tests demonstrate that SCBs are well-equipped to comply with minimum capital requirements even in severe stress scenarios. This reflects the prudent financial management and strong capital reserves of Indian banks.
- **Resilient Domestic Financial System:** While the global financial system is going through a stressful period, particularly due to banking turmoil in the United States and Europe, the Indian financial sector has remained stable and resilient.

- **Twin Balance Sheet Advantage:** Both the banking and corporate sectors have taken steps to strengthen their balance sheets. The RBI Governor describes it as a 'twin balance sheet advantage', which contributes to overall economic growth by fostering a more stable and resilient financial system.
- **Positive Economic Outlook:** The resilience of the Indian economy, supported by strong macroeconomic fundamentals, provides a positive outlook for future growth.
- Strengthened balance sheets, declining NPAs, and the ability of SCBs to withstand stress scenarios contribute to the overall stability of the Indian economy.

28. The Open Market Sale Scheme for wheat and rice

Syllabus: Public Distribution System – Objectives, Functioning, Limitations, Revamping; Issues of Buffer Stocks and Food Security

Prelims: About Open Market Sale Scheme

Mains: Food Inflation and Open Market Sale Scheme

Context: Revision in the Open Market Sale Scheme (OMSS) for wheat and rice and state reactions to recent changes.

What is the Open Market Sale Scheme (OMSS)?
- The Open Market Sale Scheme (OMSS) is a program implemented by the Food Corporation of India (FCI) to sell surplus food grains, such as wheat and rice, from the central pool to various stakeholders in the open market.
- OMSS allows the FCI to sell surplus food grains through e-auctions to traders, bulk consumers, and retail chains at predetermined prices.
- States can also procure additional food grains through OMSS to distribute to NFSA beneficiaries, beyond their central pool allocation.

Revision of OMSS by the Centre:
- **Quantity Restrictions:** The maximum quantity a single bidder can purchase in a single bid has been limited, ranging from 10-100 metric tonnes instead of the previous limit of 3,000 metric tonnes.

Centre's Argument:
- **Inflation and Supply Regulation:** The Centre implemented these changes to control inflation and regulate the supply of essential commodities.
- **Obligations to Beneficiaries:** The Centre asserts that it is fulfilling its obligations to distribute grains to 80 crore marginalized NFSA beneficiaries and needs to consider the impact of retail prices on the 60 crore common consumers.
- The revisions also aim to facilitate increased participation of small and marginal buyers, promote competition, and curb retail prices.

State Reactions:
- **Karnataka:** The discontinuation of OMSS sales to states has drawn criticism. The Congress-led government claims that the Centre's decision aims to hinder the implementation of their Anna Bhagya scheme, which provides rice to marginalized families.
- **Tamil Nadu:** The state is actively seeking alternative sources for purchasing rice since the supply under OMSS has been stopped. Government functionaries are concerned about managing supplies and providing subsidized rice to ration card holders.

Nut Graf: The recent revisions to the OMSS made by the Centre, including quantity restrictions, aim to foster greater participation, competition, and price control. However, this move has sparked reactions from certain states that highlight concerns over the implementation of welfare schemes and the need to explore alternative procurement sources.

29. Spiralling food prices

Syllabus: GS-3, Transport and Marketing of Agricultural Produce and Issues and Related Constraints

Mains: Seasonal food Inflation and government measures to control it

Context: Indian households struggle with surging prices of essential kitchen staples, posing inflation risks and highlighting the need for policy intervention.

Introduction:
- Indian households are facing difficulties due to a sharp increase in prices of essential kitchen staples.
- Prices of tomatoes, onions, potatoes, tur dal, and rice have seen significant surges.
  - **Tomato Prices:**
    - Tomato prices have more than doubled month-on-month.

■ Tomato prices are almost triple the prices compared to the same time last year.
- ○ **Onion and Potato Prices:**
    - ■ Prices of onions and potatoes increased by 7.5% and 4.5% respectively over a month.
    - ■ Although seemingly less severe, they contribute to the overall inflationary trend.
- ○ **Tur Dal Prices:**
    - ■ Tur dal, a key protein source for vegetarian households, continues to rise and its prices climbed 7.8% month-on-month, reaching　130.75 per kilogram on June 29.
    - ■ Pulses, including tur dal, experienced a 128 basis points increase in retail inflation.
- ● Rising prices indicate underlying inflation pressures in the economy.

Impact of Government Measures:
- ● The imposition of stock limits on urad and tur dal had a limited impact on price gains.
- ● Seasonality and market dynamics play a role in the price fluctuations of farm produce.
- ● Tomato growers in rural Maharashtra faced unremunerative prices, leading to the dumping of produce.

Year-on-Year Comparison:
- ● Prices of several food items remain significantly higher than the same period last year.
- ● Tomato prices almost tripled, tur dal increased by 35%, and common paddy (rice) rose by 19%.

Potential Risks:
- ● Monsoon rains are 13% below average, increasing the risk of food price inflation.
- ● Uncertainty in spatial and temporal distribution due to El Niño could further impact prices.
- ● Policymakers need to prioritize taming inflation for sustainable inclusive growth.

Conclusion:
- ● Monsoon deficits and climate uncertainties pose risks to food prices.
- ● Policymakers must prioritize price stability to ensure sustainable and inclusive growth.

Nut Graf: As food prices surge in India due to factors like supply constraints and seasonal fluctuations, policymakers must address inflation to safeguard sustainable growth and protect households from financial burden.

INTERNATIONAL RELATIONS

1. How has Dhaka reacted to the U.S. threat on visas?

Syllabus: Effect of policies and politics of developed and developing countries

Mains: Analysing the trends in U.S.-Bangladesh relations and the "new visa policy" of the U.S.

Context: The Secretary of State of the U.S. notified a "new visa policy" on 24th of May 2023, which threatens to limit visas to Bangladeshis who undermine the democratic election process at home.

Details about the notification
- The new policy specifies that the restriction on visas would apply to existing as well as former officials from Bangladesh, members of pro-government and opposition political parties, members of law enforcement agencies, the judiciary and security services who have undermined the democratic election process in Bangladesh.
- According to the notification "actions that undermine the democratic election process" include actions such as rigging, the use of violence to prevent people from exercising voting and their right to freedom of association and peaceful assembly, the use of force to restrict political parties, civil society, or the media from disseminating their views.

Response from Bangladesh
- Various reports have accused the government of Prime Minister Sheikh Hasina of rigging elections held in 2014 and 2018. However, the government has denied all such claims.
- The U.S. has been one of the largest foreign direct investors (FDI) in Bangladesh and the Bangladesh government has immediately responded to the new policy of the U.S. by saying that the country would take appropriate steps to prevent foreign interference in domestic elections.

About the trends in U.S. and Bangladesh bilateral ties
- The U.S. and Bangladesh have enjoyed a strong economic bond despite various tensions in their political relations due to legacy reasons.
- The U.S. is said to be the third largest trading partner of Bangladesh and is also the largest importer of the garments produced in Bangladesh.
- In recent times, the U.S. has acknowledged the fact that there is a need to strengthen bilateral ties beyond trade as China has shown keen interest in Bangladesh.
    - The importance of the Indo-Pacific strategy also makes Bangladesh politically significant for the U.S.

Key hurdles
- Washington under then President Nixon was not in favour of the liberation of Bangladesh (earlier known as East Pakistan) from Pakistan.
    - This has been one of the key hurdles for furthering the U.S.-Bangladesh ties as the current government in Bangladesh has modelled itself as the defender of the spirit of 1971 and treats those who opposed the creation of Bangladesh as opponents.
    - The current Bangladeshi government has thus maintained a distinction between economic and political relations between the two countries.
- Prime Minister Sheikh Hasina after being sworn into power in 2009 has followed a "zero tolerance" policy against terrorism and extremism.
    - The government under her leadership has undertaken some stringent actions against insurgents and radical groups.
    - However, such actions have attracted criticism from the U.S. and concerns have been raised about human rights violations.
- Furthermore, Bangladesh has maintained a neutral policy on the Russia-Ukraine war with Prime Minister Sheikh Hasina repeatedly raising concerns over the interference in the affairs of sovereign countries.
    - This stance of the Bangladeshi government has also acted as a key hurdle in dithering its relations with the U.S.

Path ahead
- Prime Minister Sheikh Hasina has now emerged as a key regional leader on account of her strong connection with India.
- Despite Bangladesh being the largest trade and security partner of India in South Asia, the Indian government has still not responded to the new policy of the U.S.
- In April 2023, Bangladesh had shown interest to soften its attitude to the U.S. through its declaration of the Indo-Pacific Outlook (IPO).
    - However, the latest move by the U.S. would mean that the Bangladesh government would not consider a stronger strategic alignment with the U.S.

Nut graf: The announcement of the "new visa policy" by the U.S. which restricts visas to individuals who undermine the democratic process in Bangladesh is expected to further aggravate the already existing tension in the bilateral ties between the U.S. and Bangladesh.

2.　Multi-Vectored Foreign Policy of Central Asia

Syllabus: Effect of Policies & Politics of Developed & Developing Countries on India's Interests

Mains: Chinese diplomacy in Central Asia and its implications on other countries

Context: Recent C+C5 summit hosted by China.

Introduction:
- Between May 18 and 19, China hosted the inaugural C+C5 summit in Xi'an, bringing together the leaders of five Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan)
- The summit resulted in the signing of the Xi'an Declaration and marked the establishment of the China-Central Asia Summit mechanism.
- Summit focused on the 10th anniversary of the Belt and Road cooperation to be a 'new starting point'.
- The discussions also centred on fostering people-to-people interactions, launching a program called the 'Cultural Silk Road' to promote cultural exchanges, and addressing concerns related to regional terrorism and extremism.

C+C5 grouping:
- The C+C5 grouping, which includes China and central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan), focuses on fostering economic cooperation and regional integration.
- These countries are strategically located along the ancient Silk Road, and their partnership with China aims to enhance trade, investment, and infrastructure development in the region.
- This collaboration promotes economic growth and facilitates the flow of goods, services, and capital.
- The C+C5 grouping is closely tied to China's ambitious Belt and Road Initiative. Central Asian countries serve as important nodes within the BRI, as they offer connectivity between China, Europe, and the Middle East.
- Energy cooperation is a significant aspect of the C+C5 grouping. Central Asian countries possess substantial energy reserves, particularly in the form of oil, natural gas, and uranium. China, as a rapidly growing economy, requires a stable energy supply, and these countries offer a potential source.
- The C+C5 grouping also emphasises security cooperation, particularly in the areas of counterterrorism and border control. Central Asian countries share borders with Afghanistan, a region prone to instability and terrorist activities.
- The C+C5 grouping promotes cultural exchanges and people-to-people interactions between China and the central Asian countries.

Maintaining Balanced Regional Engagements:
- While the growing Chinese influence in Central Asia raises concerns about Russia's role in the region, it is essential to acknowledge the efforts of Central Asian countries to maintain balanced regional and international engagements.
- In 2022, Russian President Vladimir Putin held numerous meetings with Central Asian leaders, highlighting the continued importance of Russia in the region.
- The participation of all five Central Asian Presidents in Moscow's Victory Day parade demonstrates their commitment to maintaining diversified relationships.

Central Asia's Multi-Vectored Foreign Policy:
- Central Asian countries have successfully implemented a multi-vectored foreign policy, extending beyond the Russia-China axis.
- This approach allows them to assert their sovereignty while strengthening economic and political ties with various centres of power.
- Notably, the European Council President's visit to Kazakhstan and Uzbekistan emphasised the EU's commitment to the region and the desire to enhance interregional cooperation.
- Each Central Asian country has unique priorities in their foreign policy strategies, such as regional security, economic concerns, and neutrality.

Lessons for the Broader Post-Soviet Space:
- The success of Central Asian countries in maintaining a multi-vectored foreign policy presents valuable lessons for other post-Soviet nations, particularly Georgia and Moldova.
- While these countries aspire to EU and NATO membership, it is crucial not to compromise workable relations with Russia.
- Absolute security cannot be guaranteed solely through prospective membership in Western alliances, given the complexities of unconventional warfare.
- Moldova's recent pro-Western government policy and aspirations for EU membership should be balanced with a pragmatic approach that acknowledges Russia's geographic presence and the necessity of peaceful coexistence.

Implications for India:

- Chinese diplomacy in Central Asia has significant implications for India, particularly in terms of geopolitics, regional influence, and economic cooperation.
- China's engagement in Central Asia is driven by its ambitious Belt and Road Initiative (BRI) and its desire to secure energy resources, expand trade routes, and increase its strategic presence in the region.
- China's close ties with countries like Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan enable it to expand its political and military presence, potentially encircling India from the north and that challenges India's historical influence in the region.
- As China secures energy resources through pipelines and infrastructure projects in Central Asia, it strengthens its energy security and reduces its dependence on maritime routes. This increased energy cooperation could impact India's energy interests and access to Central Asian resources.
- China's BRI creates new trade routes and economic corridors, enabling China to expand its economic influence. The development of these routes could bypass India and limit its connectivity with Central Asia, affecting India's trade and economic interests in the region.
- China's deepening ties with Pakistan, including the China-Pakistan Economic Corridor (CPEC), further strengthens its influence in Central Asia. This nexus allows China to leverage its economic and military cooperation with Pakistan to expand its footprint in the region, potentially posing a security threat to India.

Nut Graf: The China-Central Asia Summit held in Xi'an showcased the region's commitment to strengthening ties with China while maintaining balanced regional engagements. Central Asian countries' successful implementation of a multi-vectored foreign policy demonstrates their pragmatic approach to international relations and the benefits of diversified relationships.

3. US debt ceiling deal

Syllabus: Effect of Policies & Politics of Developed & Developing Countries on India's Interests

Mains: Global implications of possible US default

Context: U.S. averts first-ever default by suspending federal debt limit.

Introduction:

- U.S. senators have voted to temporarily suspend the federal debt limit, averting the risk of a credit default just days before the Treasury deadline.
- Economists had warned that the country could face a shortage of funds to pay its bills by June 05,2023 highlighting the urgency to pass the Fiscal Responsibility Act.
- This legislation extends the government's borrowing authority until 2024 while reducing federal spending.
- The bipartisan agreement, reached between President Joe Biden and Republicans, secured a majority of 63 votes to 36 in the Senate, following a smooth passage in the House of Representatives.

What is the US debt ceiling?

- The debt ceiling is the amount of money the US government is allowed to borrow to pay the nation's bills.
- In the United States, the Congress comprising the House and Senate approves the budget and funds for the Executive branch to run the country.
- The issue of debt ceiling arises from the fact that the United States has been running a fiscal deficit since 2001.
  - There is a limit to that borrowing which is periodically increased to allow the government to borrow more and continue working.
- If the debt ceiling is not increased or suspended, the government would not be able to borrow and pay its outstanding dues.
- So far, such a situation has happened only once in 1979 from an accounting error and not a political crisis.

Impact of possible US default:

- A default by the US on its debt would have devastating consequences for the economy. According to Moody's Analytics, even a breach of the debt limit for just one week would lead to a rapid and severe weakening of the US economy, resulting in the loss of approximately 1.5 million jobs.
- The United States would experience an economic downturn, accompanied by significant volatility in the stock markets.
- A prolonged default could have severe repercussions, potentially destabilizing the $24 trillion Treasury debt market, leading to a freeze in financial markets, and triggering an international crisis.
  - Of all the foreign exchange reserves held by the world's central banks, US dollars account for 58 per cent.
- Researchers at the Federal Reserve have calculated that from 1999 to 2019, 96 per cent of trade in the Americas was invoiced in US dollars. So was 74 per cent of trade in Asia. Elsewhere outside of Europe, where the euro dominates, dollars accounted for 79 per cent of trade.
- A rising dollar can trigger crises abroad by drawing investment out of other countries and raising their cost of repaying dollar-denominated loans.

Nut Graf: U.S. senators voted to suspend the debt limit, preventing a credit default. Failure to increase or suspend the debt limit could lead to an economic downturn, volatility in stock markets, and a potential international crisis.

4.   International trade has a carbon problem

Syllabus: Effect of policies and politics of the developed world.

Mains: EU's Carbon Border Adjustment Mechanism (CBAM).

Prelims: CBAM.

Context: European Union's Carbon Border Adjustment Mechanism.

Details:
- India is apprehensive about the European Union's Carbon Border Adjustment Mechanism (CBAM) which has the potential to cripple India's export of carbon-intensive products.
- New Delhi has called CBAM protectionist and discriminatory. It is also looking forward to challenging the law at the World Trade Organization (WTO)'s dispute settlement body.
- However, India's export to the European Union is only 1.8% and is limited only to aluminium, iron, and steel.
- Though the international trade regime allows countries to adopt unilateral measures for safeguarding the environment, it should not be used for trade protectionism.

Carbon Border Adjustment Mechanism (CBAM):
- The EU adopted the Emissions Trading System (ETS) in 2005.
  - It is a market-based mechanism that intends to reduce greenhouse gas (GHG) emissions by allowing bodies emitting GHG to buy and sell these emissions amongst themselves.
  - The ETS is now at its fourth stage.
  - The EU is worried that the ETS mechanism might put domestic industries at a disadvantage.
  - It is also concerned that European firms operating in carbon-intensive sectors might possibly shift to countries having less stringent GHG emission norms. This phenomenon is called 'carbon leakage'.

Carbon Border Adjustment Mechanism:
- It is a mechanism to be introduced by the European Union (EU) to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries.
  - The EU plans a gradual introduction of CBAM from 1st October 2023 and this will translate into a 20-35% tax on selected imports to the EU nations by 1st January 2026.
  - From 1st January 2026, the EU will start levying the carbon tax on multiple products exported to the EU.
  - The products included in the CBAM list will be expanded over a period of time and by 2034, it will cover all products entering the EU.
- CBAM will hurt the global trade of developing countries, especially India.
- In 2022, India's 27% of the total export in iron, steel, and aluminium products (valuing USD 8.2 billion) went to the EU.
- Under this mechanism, from 1st October 2023, India's export of Iron and aluminium to EU nations, will attract extra scrutiny.

WTO's Stand:
- WTO law is based on the fundamental principle of non-discrimination. It accords equal treatment to 'like' products irrespective of their origin country (Most-Favoured Nation Clause).
- The countries are also required to treat foreign-made 'like' products as they treat domestic ones (National Treatment Principle).

Associated Concerns:
- Despite being origin-neutral, CBAM might discriminate between goods from different countries on account of an inadequate carbon pricing policy.
- Moreover, there is a concern about whether the carbon-intensive products to which the CBAM applies are 'like' or not. For example,
  - Steel production by electric arc furnaces is less carbon-intensive than the steel produced in blast furnaces.
- It has re-ignited debates on the comparison of products based on processes and production methods.
- It is argued that the CBAM violates WTO law by discriminating between EU and foreign products based on embedded emissions.
- However, there might be a claim for justifying CBAM under the General Exceptions clause given in Article XX of the General Agreement on Tariffs and Trade (GATT).
  - According to Article XX, measures taken by countries that otherwise violate GATT obligations are permitted if:
    - They fall under one of the listed policy grounds.
    - They fulfil the requirements of the introductory clause of Article XX, called the chapeau.

- The commentators argue that the CBAM considers only 'explicit' carbon prices and excludes the 'implicit' costs (non-price-based costs) borne by the products originating in some countries.
- It also arbitrarily discriminates between countries having the same environmental conditions.

Conclusion:
India should deliberate with the EU to secure gains on CBAM and help in maximizing the benefits of Indian exporters through bilateral trade.

Nut Graf: The Carbon Border Adjustment Mechanism might be used for trade protectionism in the pretext of environmental protection. There are several concerns associated with its discriminatory approach. It is suggested that India should deliberate on a bilateral trade deal with the EU or use WTO to address its challenges.

5. Shangri La Dialogue

Syllabus: Bilateral, Regional & Global Groupings & Agreements Involving India and/or Affecting India's Interests

Mains: Significance of Shangri La dialogue for global peace

Context: 20th Shangri-La Dialogue in Singapore

Introduction:
- The International Institute for Strategic Studies (IISS) Shangri-La Dialogue is Asia's premier defence summit.
- It's a unique meeting where ministers debate the region's most pressing security challenges, engage in important bilateral talks and come up with fresh approaches together.
- The 2023 event is taking place in Singapore on 2–4 June.

Shangri La Dialogue:
- The Shangri-La Dialogue (SID) is an inter-governmental security forum held annually by an independent think tank, the International Institute for Strategic Studies (IISS).
- It is attended by defence ministers, permanent heads of ministries, and military chiefs of 28 Asia-Pacific states.
- The forum gets its name from the Shangri-La Hotel in Singapore where it has been held since 2002.
- The Shangri-La Dialogue was conceived by the current IISS Director-General and Chief Executive Sir John Chipman in 2001 in response to the clear need for a forum where the Asia Pacific defence ministers could engage in dialogue aimed at building confidence and fostering practical security cooperation.
- The SID was based on the Munich Conference on Security Policy with the divergent point being for the creation of a Track One organisation.

Peace plan by Indonesia:
- Indonesia proposed a plan to end the war between Russia and Ukraine.
- Indonesia called for an immediate cessation of hostilities and suggested a ceasefire at present positions, demilitarised zones guaranteed by observers and UN peacekeeping forces, and a unorganised referendum in disputed areas.
- However, the initiative faced swift criticism from attendees.
- Indonesia, known for non-aligned diplomacy, previously attempted peace mediation.
  - Indonesian President Joko Widodo travelled to Kyiv and Moscow and met the nations' leaders in 2022 while chairing G20.

Australia on US-China relations:
- Australian Prime Minister Anthony Albanese delivered a keynote speech urging the United States and China to resume high-level communication channels and establish safeguards to prevent the deteriorating relations from escalating into conflict.
- He emphasised that the potential repercussions of a breakdown in the Taiwan Strait or any other conflict would extend beyond the major powers and have devastating global consequences.
- Therefore, leaders in the Indo-Pacific region must exert all efforts to promote dialogue and prevent conflict, as the possibility of conflict in the region is not inevitable.

Nut Graf: The IISS Shangri-La Dialogue, convenes ministers to address regional security issues and explore new strategies. In the 2023 event, Indonesia proposed a peace plan for the Russia-Ukraine war, receiving mixed feedback. Australia stressed the importance of communication between the US and China to avert conflict in Taiwan strait and its global consequences.

6.   What are the friction points on the LAC?

Syllabus: India and its neighbourhood.

Mains: India-China relations.

Context: The standoff between India and China in Eastern Ladakh marks three years.

Details:
● Even after three years of the standoff between India and China at Eastern Ladakh, both countries are far from achieving disengagement, de-escalation, and restoration of status quo ante.
● Both countries engaged in diplomatic, military, and political level talks for resolving the standoff.

Status of the Disengagement Process:
● Since the Corps commander-level talks (in 2020), disengagement has been undertaken from five friction points:
    ○ Galwan in 2020
    ○ North and South banks of Pangong Tso in February 2021
    ○ Patrolling Point (PP) 17 in the Gogra-Hot Springs area in August 2021
    ○ PP15 in September 2022

Source: The Print

● India maintains that there are two additional friction points at Depsang Plains and Demchok. However, China rejects it terming them as legacy issues predating the 2020 standoff.
● India is consistent in its stand of restoring the status quo ante as of April 2020 and restoring patrolling rights till the traditional patrolling points.
● Beijing is consistent that it would not restore its status quo ante prior to the standoff as it believes that "the status quo of April 2020... was created by India's illegal crossing of the LAC."
● Moreover, China is developing infrastructure and inducting new weapons along the 3488 km-long LAC.
● India is also undertaking infrastructure and capability enhancement projects to match the levels of the Chinese.
● Thus, this scenario highlights that any de-escalation process to restore status quo looks remote.

Buffer zones and their status:
● Buffer zones were created at the friction points during the disengagement process.
    ○ Buffer zones imply that both sides would pull back at an equal distance to prevent any new skirmishes.
    ○ Moreover, no patrolling would be undertaken to maintain peace and tranquility.
● The buffer zones at all five points continue to exist.
● In order to ensure the honouring of the understanding reached, India conducts regular monitoring by Unmanned Aerial Vehicles (UAV) and satellites.

Depsang Plains and Demchok:
● **Demchok**
    ○ It is a disputed area and China has set up tents in the Charding La area.
● **Daulat Beg Oldie (DBO)**
    ○ It is a part of the crucial Sub-Sector North (SSN).
    ○ Currently, the airfield is accessible by the 255 km-long Darbuk-Shyok-DBO (DSDBO) road.
    ○ It was an ancient trade route.
    ○ There is a plan to build an alternate axis across Saser La.
● **Depsang Plain**

- ○ It is another part of the Sub-Sector North (SSN).
- ○ It is also close to the Karakoram Pass overlooking the strategic Saltoro ridge and Siachen glacier.
- ○ Notably, the Chinese build-up in Depsang threatens Indian positions at DBO. It further brings Chinese troops closer to the DSDBO road.
  - ■ China is blocking Indian Army patrols from going up to the PPs 10, 11, 11A, 12, and 13.
  - ■ According to reports, Indian Army last accessed the patrolling points in Depsang in January/February 2020.
- ○ It is highlighted that the distance from the Limit of Patrol (LoP), on which the PPs are marked, to the LAC is the maximum in the Depsang area.
- ○ Depsang has seen several faceoffs in the past.
- ○ Moreover, the number of troops and frequency of patrols had gone up since 2013.

Nut Graf:
The situation in Eastern Ladakh along the Line of Actual Control has not yet been resolved since the 2020 standoff. The present scenario highlights that de-escalation and disengagement and restoration of status quo in the region appear to be a distant dream.

7.   Why does North Korea want spy satellites?

Syllabus: Effect of policies and politics of developed and developing countries.

Mains: North Korea's spy satellite launch and its implication.

Context: North Korean satellite Malligyong-1 was launched on 31st May 2023.

Introduction:
- North Korea launched a military reconnaissance satellite Malligyong-1 through a new type of rocket called Chollima-1.
- The satellite crashed into the Yellow Sea after 10 minutes due to instability in the engine and fuel system of the rocket.
- The launch raised alarms in South Korea and Japan. Both the countries along with the U.S. has strongly condemned the action.

North Korea's Space Programme:
- North Korea had an active space programme in the previous decade.
- It should be noted that satellite launch vehicles use core technology similar to long-range missiles that deliver warheads capable of destroying intercontinental targets
- Beginning in 1998, North Korea successfully orbited its first satellite in 2012 after three failed attempts.
- North Korea in April 2023 announced that it had completed the construction of its first spy satellite.
  - ○ It will play a crucial role in advanced surveillance technology. This would further help in improving the ability to strike targets during conflicts.
- It is highlighted that North Korea's space programme is a response to other strategic developments in the region. For instance:
  - ○ The U.S. announced that it would activate the U.S. Space Forces in Korea. This would aid South Korea with advanced capabilities of missile warning and satellite communications.
  - ○ On 25th May 2023, South Korea successfully launched the Nuri rocket that aims to develop a space-based surveillance system.

Impact on East Asia:
- The launch of the North Korean satellite has caused security anxiety in East Asia.
- North Korea has become unafraid of its technological intentions. It aims to strengthen its security apparatus in the region.
- Despite being a breach of the UN Security Council resolutions, it will not attract additional economic sanctions. Moreover, it displays the weak effectiveness of sanctions on North Korea.
- A successful set of four to five military satellites in orbit would improve the surveillance capacity of North Korea.

Nut Graf: Despite the unsuccessful launch of the North Korean satellite Malligyong-1, there are increased concerns in the region. Moreover, North Korea has now become vocal about its missile programme and aims at advanced surveillance of the region.

8. In the short term, stabilise the Line of Actual Control

Syllabus: India and its neighbourhood.

Mains: India-China relations.

Introduction:
- India and China are incurring huge expenditures in inducting men, materials, and equipment close to the LAC to ensure better defence preparedness.
- It is observed that there is an increase in rhetoric and jingoism in both countries calling for more aggression.

Current Status of India-China Relations:
- India's External Affairs Minister S. Jaishankar stated at a media group meeting that the situation along the LAC is "fragile and quite dangerous".
- The state of affairs between both countries is not sustainable and can trigger a major conflict that can adversely impact the world - both politically and economically.
- China considers Ladakh and Arunachal Pradesh as two of the five fingers that are attached to the Tibetan Palm and thus raises territorial claims on these two regions.
- Similarly, India is not willing to make any concessions in favour of China.
- LAC has the potential to escalate into a full-fledged war. Moreover, it will not yield any positive results for India.
- It should be noted that an increase in the visibility of the movement of opposing forces (through surveillance technology) raises aggression.
- It is further complemented by troop density, better roads, improved logistics, and availability of aviation assets. This further increases the face-offs and clashes.

Agreements and Associated Inadequacies:
- The agreements between both countries are based on the premise that LAC is defined and understood by both neighbours. However, there is a lack of clarity in large segments.
- According to Article I of the 1993 Agreement, joint mechanisms to verify and settle LAC-related disputes should be established.
    - The Working Mechanism for Consultation and Coordination on India-China Border Affairs (WMCC) was created after 19 years in 2012.
    - Moreover, it meets biannually but has little to show in terms of real results.
- The LAC has only four Border Personnel Meeting (BPM) points.
    - Lack of BPM hinders constructive engagement and escalates conflicts.
    - Additionally, the Lipulekh BPM Point proposed in the Article V of the 2005 Protocol has yet to be established.
- Article II of the 1993 Agreement and Articles II and III of the 1996 Agreement have proposed a mutually agreed reduction and redeployment of forces along the LAC.
    - This has not seen any progress.

Way Ahead:
- Both countries should take short-term but effective and pragmatic measures to resolve the dispute.
- There is a need to identify reasons for rising clashes on the LAC and work on solutions.
- The author suggests that the LAC should be converted into a Line of Control (LC) by delineating it on the map and on the ground without prejudice to border claims. This can be implemented if both sides display maturity.
- The disputed areas along LAC can be declared 'No Entry Zone' allowing both the countries to patrol other mutually agreed areas.
- The option of joint patrolling in disputed areas can be explored. This would help in building confidence and maintaining the status quo.
- Existing agreements, confidence-building measures, and engagement mechanisms should be strengthened.

Nut Graf:
The relations between India and China remain fragile since the Doklam and Galwan crisis. There are inadequacies in various agreements between the two countries, which need to be resolved in a timely manner. Both countries should act maturely and maintain peace and stability in the region.

9. G7 summit

Syllabus: Bilateral, Regional & Global Groupings & Agreements Involving India and/or Affecting India's Interests

Mains: Relevance of G7 in present international order

Context: The Group of Seven (G7) leaders met in Hiroshima for their 49th annual summit. Japan is hosting this year's conference in its position as the grouping's President.

The selection of Hiroshima as the host city for the G7 Summit underscores Prime Minister Kishida's determination to putting nuclear disarmament and non-proliferation at the forefront of the meeting's agenda.

● PM Modi attended the Summit at the invitation of Japanese Prime Minister Shinzo Abe.
● The attending leaders published a leaders' communiqué on the second day of the summit, which will be adopted at the summit's conclusion on the 21st.

Origin of G-7:
● The G7 was formed in response to the 1973 oil shocks and ensuing financial crisis.
● To address the situation following the oil shock, the heads of the world's six main industrial nations resolved to meet in 1975.
● These six countries were the United States, the United Kingdom, France, Germany (West), Japan, and Italy.
● **In 1976, Canada joined these countries, and the G7 was born.**

Current Members:
● United States, United Kingdom, Canada, France, Germany, Italy, and Japan
● Members of this category are regarded to have the most developed and sophisticated economies in the world.
● The G7 includes a representative from the European Union.

Purpose of G7:
● Determining the direction of multilateral discourse
● To influence policy responses to global concerns.
● Essentially, the G7 serves as a forum for discussing and coordinating solutions to significant global concerns, particularly those relating to trade, security, economy, and climate change.

Significance:
● The G7 is not a treaty-based organisation with a permanent administration or headquarters. The presiding nation sets the agenda for the G7.
● It is unable to adopt laws since it is made up of several nations, each with its own democratic systems.
● G7 decisions, however, have worldwide implications because the member countries are political and economic giants.

G7 Hiroshima Leaders' Communiqué:
● **Concerning Ukraine**
  ○ Russia's action against Ukraine has been condemned in the strongest terms possible.
  ○ Separately, the G7 Leaders released a statement on Ukraine.
  ○ Decided to take real steps to support Ukraine in the face of Russia's illegitimate campaign of aggression for as long as it takes.
● **Concerning Disarmament and Nonproliferation**
  ○ Decided to step up disarmament and non-proliferation measures, with the ultimate objective of achieving a world free of nuclear weapons.
  ○ The G7 Leaders' Hiroshima Vision on Nuclear Disarmament was also released at the event.
● **Indo-Pacific**
  ○ The necessity of a free and open Indo-Pacific that is inclusive, prosperous, secure, and founded on the rule of law was reiterated.
  ○ The commitment to increase coordination with regional partners, notably the Association of Southeast Asian Nations (ASEAN) and its member states, was emphasised.

10. Why is there trouble in Kosovo again?

Syllabus: Policies and politics of developed and developing countries.

Mains: Kosovo-Serbia conflict.

Prelims: Kosovo and Serbia relations.

Details
- Clashes broke out between Kosovo and Serbia on 29th May 2023. It is one of the worst escalation of tensions in the last 10 years.
- The conflict rose between the Serbs protesting in North Kosovo and the NATO-led Kosovo Force (KFor).

North Atlantic-Treaty Organisation (NATO):
- The North Atlantic Treaty Organization (NATO) is an intergovernmental military alliance formed in 1949 with the primary objective of promoting collective defence and security among its member states.
- It was created as a response to the rising tensions during the Cold War and the perceived threat from the Soviet Union. Understanding the purpose and historical context of NATO is essential to grasp its significance in global politics.
- NATO started with 12 founding members and has expanded over the years to include 31 member countries.
- It has evolved from its initial focus on North America and Western Europe to include countries from Central and Eastern Europe, with the goal of promoting stability and cooperation across the Euro-Atlantic region.
- The principle of collective defence is at the core of NATO's existence. Article 5 of the North Atlantic Treaty states that an armed attack against one member is considered an attack against all members, and they are obligated to respond collectively to ensure the security of the alliance.
- NATO has been involved in various military operations and missions, both within and beyond its member states, with the aim of promoting international security.
  - It has conducted operations such as the NATO-led mission in Afghanistan, counter-piracy operations off the coast of Somalia, and air policing missions in the Baltic states.
- NATO maintains partnerships with countries and organisations outside its membership to foster cooperation and contribute to regional and international security. These partnerships include the Partnership for Peace program, the Mediterranean Dialogue, and the Istanbul Cooperation Initiative.

Background Details:
- Kosovo and Serbia lie in the Balkan region of Europe.
- The Serbian Empire gained control of Kosovo in the 12th Century.
- In the 1389 Battle of Kosovo, Serbia lost control of Kosovo for almost 500 years.
  - It became a majority-ethnic Albanian region with Muslims.
- In the early 20th century it again became a part of Serbia after five centuries of Ottoman rule.
- After the Second World War, Kosovo was made a province of Serbia. However, ethnic Albanians (comprising 90% of Kosovo's population) considered it to be unfair.
- Albanians sought Kosovo's separation from Serbia.
- There was an insurgency in the late 1990s. In 1999, NATO intervened and through the UN Security Council (UNSC) Resolution 1244, a transitional UN-led administration began to head Kosovo.
- Kosovo unilaterally declared Independence in 2008 and was recognized as a country by almost 100 countries including the U.S. and a number of EU-member countries.
- However, Serbia does not recognize Kosovo as a separate country and considers it as a part of itself.

Source: The Economist

Scenario since 2008:
- Approximately 50000 Serb minorities reside in the northern part of Kosovo bordering Serbia. It makes up 5.3% of the country's population.
- Multiple clashes have occurred in the northern region since 2008.
- Notably, Kosovo cannot become a UN member country without Serbia's approval as it has diplomatic allies in Russia and China. Both of them can veto such a decision in the UN.
- In 2013, Brussels Agreement was brokered by the EU. However, the agreement was not fully implemented on the ground.
- In 2022, violent clashes broke out in the northern region as Kosovo asked Serbian drivers to use temporary number plates for their vehicles while passing through the country (similar to provisions in Serbia).
  - As a result, ethnic Serbians staged protests and blocked the two border entry points between Serbia and Kosovo.

Causes of recent clashes:
- The ethnic Serbs boycotted the mayoral elections in Kosovo(April 2023) leading to ethnic Albanian mayors being elected in the Northern region.
- The July 2023 move asked for a change in number plates.
- Despite 30 (approximately) technical and political agreements little progress has been achieved in implementing them and formulating new ones.
  - The talks were suspended on account of Kosovo's imposition of 100% tariffs on Serbian goods.
- Kosovo and the West are concerned about strong military ties between Russia and Serbia. These concerns have intensified since the Russia-Ukraine conflict

Conclusion:
- The Jun 1, 2023 talks between the two countries show some scope for de-escalation if Kosovo is allowed to hold fresh elections(free and fair) in Serb-dominant municipalities.

Nut Graf: Violent clashes have broke out in Kosovo, which have once again highlighted the decades-old tensions between Kosovo and Serbia. The situation needs to be controlled both internally and with the support of other countries and mitigate the potential of any further conflicts in the region.

11. A pragmatic approach, for better India-Nepal ties

Syllabus: India and its neighbourhood relations.

Mains: India-Nepal ties.

Context: Nepal's Prime Minister Visit to India.

Introduction:
- The Prime Minister of Nepal Pushpa Kamal Dahal Prachanda visited India. This was his first bilateral visit to India, after assuming office.
- Despite several challenges to Nepal's democracy and the challenges posed by COVID-19, India and Nepal reviewed the entire spectrum of bilateral relations including political, economic, trade, energy, security, and developmental cooperation.

Details:
- Nepal is facing political instability and the opposition is challenging the leadership of the current Prime Minister.
  - However, Prime Minister Prachanda acted moderately and reasonably, focusing on the opportunities for a better future.
  - Unlike his earlier stint as a Prime Minister, Prachanda is focusing on maintaining good relations with India.
  - The Indian government has also reassured Nepal that the border issue will be resolved with mutual satisfaction.
- The recent visit of the Prime Minister has helped in underlining the real priorities like the economic landscape of the region. For example, infrastructure, hydropower projects, tourism circuits, etc.

India-Nepal Relations:
- Despite political challenges in both countries, there was a consensus on Mahakali Treaty that identified the Pancheshwar Multipurpose Project (PMP).
- There is also a new dimension of cooperation in the power sector with the transmission passage (trilateral power transaction) from Nepal to Bangladesh through India.
- The Memorandum of Understanding was signed for facilitating cross-border digital payments.
- India has offered to create a ground station and supply 300 user terminals to offer the services of the South Asia Satellite to Nepal.
- There is also cooperation in areas like space technology, telemedicine, tele-education, e-governance, banking and ATM services, meteorological data transmission, disaster response, and the networking of academic and research institutions.

Way Ahead:
- Nepal needs to depoliticize cooperation with India, particularly in water resources cooperation.
- It should improve its governance and democracy and check unbridled corruption.
- India should address the concerns of Nepal that it is no longer a foreign policy priority. It should give a sense of ownership, equality, and credit for major forward movements in sectors like hydropower.

Nut Graf:
Nepal's Prime Minister's visit to India and his steady focus on development will boost bilateral ties between both countries. India should also go the extra mile in meeting the needs and expectations of Nepal and stabilise relations for a better future.

12. HAP to take AI governance global

Syllabus: Regional and Global Groupings (G-7).

Mains: Details about Hiroshima AI Process.

Prelims: Hiroshima AI process.

Context: Annual G-7 summit took place in Hiroshima from 19 to 21 May 2023. The Hiroshima AI Process was initiated during the summit.

Introduction:
- The annual G-7 summit was hosted by Japan in Hiroshima from 19 to 21 May 2023.
- During the summit, the **Hiroshima AI Process (HAP)** was initiated.
  - HAP is an effort to determine a way forward to regulate Artificial Intelligence (AI).
- The ministerial declaration of the G-7 Digital and Tech Ministers' Meeting (April 2023) discussed "responsible AI" and committed to promoting human-centric and trustworthy AI.
- Despite deliberations and accords to regulate AI, each country is promoting human-centric and trustworthy AI.

Hiroshima AI Process:
- Despite several other issues, the communiqué accorded more importance to AI. It discussed inclusive AI governance and trustworthy AI, in line with shared democratic values.
- It also took stock of the opportunities and challenges of generative AI.
- The G-7 communiqué aimed to establish the Hiroshima AI process, through a G7 working group, in an inclusive manner and in cooperation with the OECD and GPAI, for discussions on generative AI by the end of 2023.
- **Ways in which HAP can move forward are:**
  - It can enable the G-7 countries to move towards a divergent regulation based on shared norms, principles, and guiding values.
  - It is suggested that it can become overwhelmed by the divergent views among the G-7 countries and fail to deliver any meaningful solution.
  - It can also end up delivering mixed results with some convergence on certain issues and divergence on others.

Significance of HAP for AI:
- It will indicate the values and norms and from where AI will derive its guiding principles.
- It will align the development and implementation of values of freedom, democracy, and human rights.
- It also emphasizes fairness, accountability, transparency, and safety.
- The HAP will not address AI regulation from a state-centric perspective but will be a multiple-stakeholder approach through a fair and transparent mechanism.
- Regulating AI is a challenge due to divergence among G-7 member countries.
- It is said that HAP will be similar to intellectual property rights (IPR).
- The HAP will bring greater clarity to the role and scope of the 'fair use' doctrine in the use of AI for various purposes.

Associated Concerns:
- The communique's emphasis on working with others like OECD countries and on developing an interoperable AI governance framework implies that HAP will be impacted by the concerns of other country groups.
- Moreover, countries that aren't part of the G-7 would want to influence the global governance of AI. They can also launch a process of their own.

Nut Graf: The initiation of the Hiroshima AI Process (HAP) in the G-7 summit intends to regulate Artificial Intelligence. This reflects that AI governance has become a global issue that could become more contested in the future.

13. Musings on the frictions in India-Canada ties

Syllabus: Bilateral relations.

Mains: India-Canada Relations.

Context: A pro-Khalistani parade on June 4 in Brampton, Canada.

Introduction:
- A pro-Khalistani parade on June 4 in Brampton, Canada showcased a tableau that depicted the message of not forgetting the riots of 1984 in India.

Details:
- As a response to media questions on the above incident, India's External Affairs Minister S. Jaishankar objected to Canada's support for "separatists, extremists, and those who advocate violence".
- He spoke out against Canada's hypocritical approaches to human rights issues and its decades-long disdain for the territorial integrity of India.

Diaspora and Foreign Policy:
- The ethnic Indian community, including the Sikhs, plays a crucial role in Canada's demography and politics.
- The Indian diaspora has gained political, financial, and professional success in many countries including Canada. Thus the government's attitude towards them has become a part of foreign policy.
- Diaspora in the current dispensation has become important not only for the destination country but also for the source country. This has resulted in diaspora politics.

Other Details:
- Another significant issue was Canada's National Security and Intelligence Adviser's remark on India as foreign interference and its categorization with Iran and Russia.
- In response to the remarks, Mr. Jaishankar stated that "India cannot be accused of seeking to influence Canadian domestic affairs." Diplomatic activities and engagement with the diaspora should not be considered interference in Canada's internal affairs.
- It should be noted that the Canadian Prime Minister is dependent on the New Democratic Party (NDP) for his government's survival, and the party is a committed Khalistan sympathizer.
  - This is a major cause of concern for India in maintaining good India-Canada relations.
- Moreover, bilateral ties between both countries are facing challenges in many areas of cooperation. For example, the Cannabis medicine project.

Nut Graf: The India-Canada relations are facing tough times. It is the responsibility of the Indian diplomats to highlight the damage caused to bilateral ties when Canadian politicians support separatism in India.

14. PM Modi's visit to U.S.

Syllabus: Bilateral groupings and agreements involving India and/or affecting India's interests.

Prelims: About various key agreements signed between India and the U.S.

Mains: Trends in India-U.S. bilateral relations

Context: Prime Minister Narendra Modi is undertaking his first designated state visit to the U.S. from June 20-24, 2023.

Key details
- The ongoing visit of the Prime Minister is only the third "official state visit" by an Indian leader to the U.S.
  - The first two visits came in June 1963 (President S Radhakrishnan) and November 2009 (PM Manmohan Singh).
- During the official state visit of Prime Minister Modi to the U.S., the leaders of the two countries hailed the strengthening of the strategic partnership between the two countries.
- The two leaders, while addressing a gathering of officials and thousands of members of the Indian diaspora after meeting each other at the White House, noted that both countries share democratic values and described the current bilateral relations as a new stage in the India-U.S. relationship.
- The two leaders also discussed various aspects of the war in Ukraine and rising tensions in the East and South China Sea during their bilateral meeting.
- PM Modi further added that both countries take pride in their diversity and believe in the fundamental principle of the welfare of all.
- The PM of India during the state visit also met key business leaders including the likes of Tesla CEO Elon Musk, co-founder of the hedge fund and Bridgewater Associates Ray Dalio and famous American economist Prof Paul Romer among others.

Important agreements signed during the visit
- The two leaders announced several agreements on various sectors such as defence cooperation, semiconductors, critical and emerging technologies, health, environment, visas, energy and mobility, and space.
  - **Jet engine tech transfer:** General Electric and Hindustan Aeronautical Limited (HAL) signed an MoU for the co-production of GE 414 Jet Engines for the LCA Tejas Mk2 in India.
- **INDUS-X:** The Defence Ministries of the two countries launched the inaugural session of the "INDUS-X" innovation platform which was hosted by the U.S. India Business Council (USIBC) with an aim to foster defence industrial collaboration.
- **Critical and emerging technology:** U.S. chipmaker Micron Technology, Inc has announced plans to invest up to $825 million in a new semiconductor testing and packaging unit in Gujarat.
  - Other U.S.-based companies such as Applied Materials and Lam Research also are expected to announce investments in India.
- **Space cooperation:** India has agreed to join the U.S.-led Artemis Accords on space exploration and collaborate with NASA for a framework for human spaceflight and a joint mission to the International Space Station (ISS) in 2024.
  - Artemis Accords is a framework for space exploration and cooperation that has been signed by 25 countries at present.
- **Drone technology**: India has also agreed to procure 31 U.S.-made armed MQ9-Reaper drones.
- **Maritime cooperation**: India and the U.S. also look to deepen their maritime relations as the U.S. looks to join the Indo-Pacific Oceans Initiative (IPOI) launched by the Indian government in 2015.
- **Visas:** The U.S. Department of State announced the launch of a pilot project to adjudicate domestic renewals of certain petition-based temporary work visas.
  - This programme could expand to cover H1B and L-1 skilled visas by 2024 and to other categories eventually.
  - Acknowledging the rapid development in strategic partnership and demand for travel, both countries intend to initiate the process to open two new consulates in India in the cities of Bengaluru and Ahmedabad.
- **Advanced telecommunications**: The two countries are said to be closely working together on 5G and 6G technologies and Open Radio Access Network (RAN) systems.
- **Other key agreements:** Agreements in the fields of AI, cancer diagnosis and therapeutics, off-shore and onshore wind power and ' green hydrogen' are also expected to be announced.

Nut graf: Prime Minister Modi's first-ever official state visit to the U.S. has gained extreme significance as the visit yields several vital agreements in crucial sectors such as defence cooperation, critical and emerging technologies, health, visas, and space.

15. Jumpstarting the next phase of U.S.-India defence ties

Syllabus: Bilateral Agreements Involving India

Mains: Cooperation and challenges of Indo-US relations.

Context: This article discusses the increasing momentum in the U.S.-India defence ties.

Introduction:
- The U.S.-India relationship has made remarkable strides, especially in defence cooperation, strategic alignment, and economic collaboration.
- These areas of progress indicate a deepening partnership between the two countries, driven by shared interests and a desire to enhance regional stability and prosperity.

Recent Developments:
- During the visit by United States Secretary of Defense Lloyd Austin in June 2023 efforts were made to strengthen the defence partnership and promote collaboration in critical areas.
- During this visit, a roadmap for defence industrial cooperation was established.
  - This forms part of the U.S.-India initiative on Critical and Emerging Technology (iCET) agreement.
- This roadmap aims to enhance defence manufacturing in India through increased technological cooperation, aligning with India's goal of reducing import dependency and achieving self-reliance.
- The visit also focused on fostering technological innovation and expanding military cooperation.
- The launch of the Indus-X initiative provides a fresh impetus for defence innovation engagement between the U.S. and India.
  - This initiative builds upon the U.S.-India bilateral Space Situational Awareness arrangement, signed in 2022, which aims to enhance information sharing and cooperation in the space sector.
- Additionally, new areas of cooperation in defence space exchanges have been identified, based on the collaboration between the U.S. Space Command and India's Defense Space Agency.
- With India's "Major Defense Partner" status and the signing of four foundational agreements with the U.S., there are now avenues for technology sharing and more frequent cooperation.
  - These agreements enable the exchange of sensitive technologies without India needing to become an ally and also serve as effective mechanisms to overcome procedural challenges or structural differences and prevent setbacks in the relationship.

The Indo Pacific Cooperation:
- U.S.-India defence partnership in the Indo-Pacific region is a fundamental aspect of their engagement.
- The combined threat assessments of India and the U.S. in the region identify China as a common and prominent challenge, as highlighted in the China's Military Power Report 2022 published by the U.S.
  - The report reveals that the People's Liberation Army Navy is currently the world's largest navy in terms of the number of ships, indicating that China's subsurface presence in the Indian and Pacific Oceans is expected to increase as the region becomes more contested.
- Other significant issues in the Indo-Pacific includes Russia's aggressive actions towards Ukraine, and transnational concerns like terrorism and climate change.
- Apart from the Indo-Pacific, the existing scale of American investments in India serves as a strong rationale for promoting broader industrial cooperation between Indian and U.S. companies in the defence sector.
  - The U.S. government actively encourages its companies to support India's defence modernization efforts, which could lead to the growth of joint ventures, increased American share in Indian defence manufacturing, and the resolution of existing obstacles in co-development and co-production.
  - Major American companies such as Boeing, Lockheed Martin, Raytheon, and Textron already collaborate with Indian companies like Hindustan Aeronautics Limited and the Tata group in various defence-related manufacturing activities.
- Recent steps have also shown promise in revitalising the Defense Technology and Trade Initiative (DTTI), particularly in terms of co-production and co-development in the defence sector.
- Prime Minister Narendra Modi's upcoming official state visit to the U.S. on June 22 is further expected to witness several major announcements, particularly in the realm of defence cooperation, showcasing the limitless potential of the emerging defence partnership between both countries.

Nut Graf: The U.S.-India relationship has achieved significant progress in defence cooperation driven by shared interests and a focus on regional stability. Recent developments include efforts to strengthen defence partnership is crucial in the Indo-Pacific region. The upcoming state visit of PM Modi to the U.S. is expected to bring further announcements, solidifying the growing defence partnership.

16. India, U.S. initiative on future tech

Syllabus: Bilateral, Regional & Global Groupings & Agreements Involving India and/or Affecting India's Interests

Mains: Initiative on Critical and Emerging Technologies (iCET) and its significance for India.

Context: India and the United States unveiled a roadmap for enhanced collaboration in high-technology areas.

Introduction:
- India and the United States recently unveiled a roadmap to strengthen collaboration in high-technology fields.
- The focus is on tackling regulatory challenges and harmonising export controls to facilitate smoother trade and foster "deeper cooperation" in critical areas.
- The Initiative on Critical and Emerging Technology (iCET), introduced by President Joe Biden and Prime Minister Narendra Modi in 2022, was reviewed during the second track 1.5 dialogue held recently.
- The U.S. emphasised the significance of aligning technology with shared democratic values and universal human rights, and expressed their commitment to building an open, accessible, and secure technology ecosystem that reinforces democratic principles and institutions.

What is iCET?
- India and the U.S. have established the Initiative on Critical and Emerging Technologies as a framework for collaboration in vital and advancing technology fields such as artificial intelligence, quantum computing, semiconductors, and wireless telecommunication.
- Introduced in January 2023, the initiative aims to strengthen the strategic partnership between the two countries and drive cooperation in technology and defense.
- During the Quad meeting in Japan in May 2022, Mr. Modi and Mr. Biden initially announced this framework.
- The iCET's primary objective is to establish India and the U.S. as trusted technology partners, focusing on building supply chains and promoting co-production and co-development.

Progress so far:
- India and the U.S. have made notable advancements in various key areas identified for collaboration through iCET as a result of high-profile visits and talks between officials and stakeholders over the past year.
- During the second round of iCET talks, the Quantum Coordination Mechanism was established, a public-private dialogue on telecommunication (PDD) was initiated to drive collaboration in OpenRAN, 5G, and 6G, and substantial exchanges on AI and space took place.
- An MoU was signed in March 2023 to establish a semiconductor supply chain, leading to the formation of a semiconductor sub-committee to review recommendations from an industry-led task force associated with iCET.
- Both countries are expected to finalise a significant jet engine deal.
- Furthermore, a new initiative called the India-U.S. Defence Acceleration Ecosystem (INDUS-X) is set to be launched, aiming to advance cutting-edge technology cooperation.

- To facilitate strategic technology and trade collaborations envisioned under iCET, a Strategic Trade Dialogue has been established. Its purpose is to address regulatory barriers and review existing export control norms.

INDUS-X:
- It is a major initiative launched under iCET between India and the U.S.
- It aims to foster partnerships and collaboration in the defense innovation ecosystems of both countries.
- INDUS-X is scheduled to be launched in Washington, D.C., ahead of the Prime Minister's visit in June 2023.
- The initiative aims to promote defence innovation partnerships and cooperation between Indian and U.S. defence sectors.
- The primary emphasis is on promoting advancements in high-tech cooperation and identifying prospects for collaborative research, development, and production.
- The collaboration focuses on technology partnership, long-term research and development, and improving supply chain security.
- The goal is to promote co-development and co-production projects, enabling Indian and U.S. defence companies to work together.

Nut Graf: India and the United States have made significant progress in strengthening collaboration through the Initiative on Critical and Emerging Technologies (iCET). The two countries are also set to launch INDUS-X and have established a Strategic Trade Dialogue to address regulatory barriers and export control norms.

17. The concerns about India-U.S. digital trade

Syllabus: Bilateral groupings and agreements involving India and/or affecting India's interests.

Prelims: About various hurdles hindering digital trade between India and the U.S.

Mains: India-U.S. bilateral relations

Context:
Current status of India-U.S. technology trade and the concerns raised by U.S. tech firms regarding policy barriers in different sectors.

Key Details:
- During Prime Minister Narendra Modi's state visit to the U.S., technology cooperation was a significant topic of discussion.
- However, according to the Computer & Communications Industry Association (CCIA), digital trade between the two nations faces policy hurdles.
  - Computer & Communications Industry Association (CCIA) represents major U.S. tech companies.
- This article summarizes the current status of India-U.S. technology trade and highlights the concerns raised by U.S. tech firms.

Bilateral Trade Overview:
- In FY2023, the U.S. became India's largest trading partner, with a bilateral trade increase of 7.65% to $128.55 billion in 2022-23.
- However, digital or technology services have not played a prominent role in bilateral trade.
- The U.S. ran a $27 billion deficit in trade in digital services with India in 2020.

Initiative on Critical and Emerging Technology (iCET):
- The iCET, announced by President Joe Biden and Prime Minister Narendra Modi, aims to strengthen the tech partnership.
- It established a Strategic Trade Dialogue to address regulatory barriers, align export controls, and promote deeper cooperation in critical areas.

Concerns Raised by U.S. Tech Firms:
- **Discriminatory Regulations and Policies:**
  - The CCIA highlights the "significant imbalance" and "misalignment" in the U.S.-India economic relationship.
  - U.S. digital service providers face policy barriers and a protectionist posture from India.
  - India's guidelines on sharing geospatial data favour Indian companies, providing preferential treatment.
  - India's shift towards greater government censorship and control over political speech hinders U.S. companies' operations.
- **Taxation Measures:**
  - U.S. tech firms object to India's expanded version of the "equalization levy" on digital services.
  - The equalization levy imposes taxes on non-resident suppliers of digital services in India.
  - The levy has led to double taxation, constitutional validity concerns, and compliance issues.

- **India's IT Rules 2021:**
  - The IT Rules burden social media intermediaries (SMIs) with compliance requirements.
  - The rules include impractical compliance deadlines and content takedown protocols.
  - SMIs must appoint local compliance officers and comply with Grievance Appellate Committees' decisions.
- **Draft Data Protection Law:**
  - Ambiguities exist in the new draft of the Digital Personal Data Protection Bill, impacting cross-border data flows and compliance timelines.
  - India's policy on data flows will have global implications, similar to the EU's GDPR.
  - Data localization requirements increase operating costs and may be seen as discriminatory.
- **Telecom Bill:**
  - The draft Telecommunications Bill, 2022, expands the regulatory scope to cover internet-enabled services.
  - Over-the-top (OTT) communication services, such as messaging platforms, would face onerous obligations.
  - The law would impose licensing requirements, government access to data, encryption rules, and more.
- **Other Policy Barriers:**
  - A proposed "Digital Competition Act" aims to address anti-competitive practices by big tech companies.
  - The proposal includes estimated taxes for significant digital intermediaries, perceived as targeting U.S. tech firms.

Conclusion:
- Cooperation on technology is a key aspect of India-U.S. relations, but policy barriers hinder digital trade.
- Addressing these concerns will be crucial for fostering a balanced and mutually beneficial technology trade relationship between India and the U.S.

Nut Graf: During Prime Minister Narendra Modi's U.S. visit, technology cooperation was emphasized, but U.S. tech firms flagged policy hurdles hindering digital trade and fair competition with India.

18.   The path to a new and imminent U.S.- Iran nuclear deal

Syllabus: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests.

Mains: Iran - US relations, Iran Nuclear Deal

Context: This article discusses the prospective U.S.- Iran nuclear deal.

Introduction:
- On 14th June 2023, the Foreign Minister of the Sultanate of Oman said that Iran and the United States are in talks to finalise a nuclear deal. The deal is also concerned with the release of American prisoners in Iran.
- Iran's Supreme Leader Ayatollah Ali Khamenei seeks a new agreement which would ensure that Iran's nuclear infrastructure remains in place instead of reviving the earlier agreement.
- According to media reports, this deal will be informal and unwritten.

Iran Nuclear Deal:
- The Iran Nuclear Deal, formally known as Joint Comprehensive Plan of Action (JCPOA) is an agreement on the Iranian nuclear program reached in Vienna on 14 July 2015, between Iran and the P5+1 (the five permanent members of the United Nations Security Council—China, France, Russia, United Kingdom, United States—plus Germany).
- The main objective of the Joint Comprehensive Plan of Action was to slow down Iran's nuclear program. If Iran decided to make a nuclear weapon, it would take a year for it to be complete, giving enough time for world powers to respond.
- Although the Iran Nuclear Deal was stalled under US President Trump in 2018, the new President Joe Biden has expressed interest in reviving the JCPOA following an announcement in May 2021.

Key provisions of the prospective deal:
- According to the arrangement, Iran will have to freeze its nuclear enrichment at 60% which is currently 84%.
- The proposed agreement focuses on addressing concerns about Iran's uranium enrichment program and the stockpile of centrifuges. It aims to prevent Iran from obtaining a nuclear weapon and reduce the risk of regional conflict.
- Iran will not attack U.S. military contractors in Syria and Iraq.
  - It will cooperate with the IAEA (International Atomic Energy Agency) and will not provide ballistic missiles to Russia.
  - Iran will release 3 U.S. citizens who are in its custody.
- On the other hand, the U.S. will not impose any new sanctions on Iran, (remarkably, it doesn't force the U.S. to remove existing sanctions).
  - It will not seize oil tankers in the Gulf waters.
  - It will not pursue anti-Iran resolutions in the United Nations.
  - The U.S. will also de-freeze Iran's bank accounts in various banks outside the country.

Impact on geopolitics:
- From the Iranian view, the agreement is expected to improve Iran's ties with Saudi Arabia.
- The potential deal also could discourage Saudi Arabia's nuclear ambitions.
- Iran can continue with its political and economic ties with Russia and China.
- This agreement also allows Iran to sell its oil in world markets.
- However, Israeli Prime Minister B. Netanyahu called the agreement a "mini-agreement" and a "historic mistake" and that Israel is not bound by the agreement.

Nut graf: Iran and the United States are reportedly negotiating an informal and unwritten nuclear deal, which addresses concerns about Iran's uranium enrichment program and the release of American prisoners. The agreement aims to prevent Iran from obtaining nuclear weapons and reduce regional conflicts.

19. Atlantic Declaration

Syllabus: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests.

Mains: UK - US relations

Context: The United States and the United Kingdom have announced the Atlantic Declaration for a Twenty-First Century U.S.-UK Economic Partnership.
- The Atlantic Declaration is focused on building a resilient, diversified, and secure supply chain, reducing strategic dependencies.
- The partnership aims to leverage the energy transition and technological breakthroughs to drive shared growth, create employment opportunities, and uplift communities.

Atlantic Declaration Action Plan (ADAPT):
- The ADAPT sets forth a comprehensive strategy to enhance economic growth, competitiveness, and resilience while prioritising workers, businesses, climate, and national security.
- The plan encompasses five key pillars and involves regular high-level meetings to drive progress and increase ambition over time.

5 Pillars:
- Leadership in Critical and Emerging Technologies: artificial intelligence, quantum computing, biotechnology, and advanced manufacturing.
- Cooperation on Economic Security and Technology Protection: cybersecurity, supply chain resilience, and technology governance.
- Partnering on an Inclusive and Responsible Digital Transformation
- Building the Clean Energy Economy of the Future.
- Strengthening Alliance across Defense, Health Security, and Space.

20. India proposes G20 membership for African Union

Syllabus: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests.

**Mains:** Relevance of G7 in present international order and for India

Context: Prime Minister Narendra Modi has written to the leaders of the G20 nations, proposing that the African Union be given full membership of the grouping at its upcoming G20 summit in India.
- The Prime Minister has taken a "bold step" to enhance Africa's voice on the international stage and in shaping the future of India – Africa relations.

Details:
- This proposal is being regarded as a significant and courageous move to amplify Africa's influence on the global stage and to actively shape the future of our interconnected world.
- Granting full membership to the African Union in the G-20 would be a substantial stride towards establishing a more equitable, inclusive, and representative global governance framework.
- By taking this step, Prime Minister Modi aims to ensure that the G-20 agenda incorporates the priorities and concerns of African countries, recognizing their significance and unique perspectives.
- This demonstrates India's commitment to fostering stronger ties with Africa and highlights the urgent need for a more inclusive and representative global order.

INDIA - AFRICA IN NUMBERS
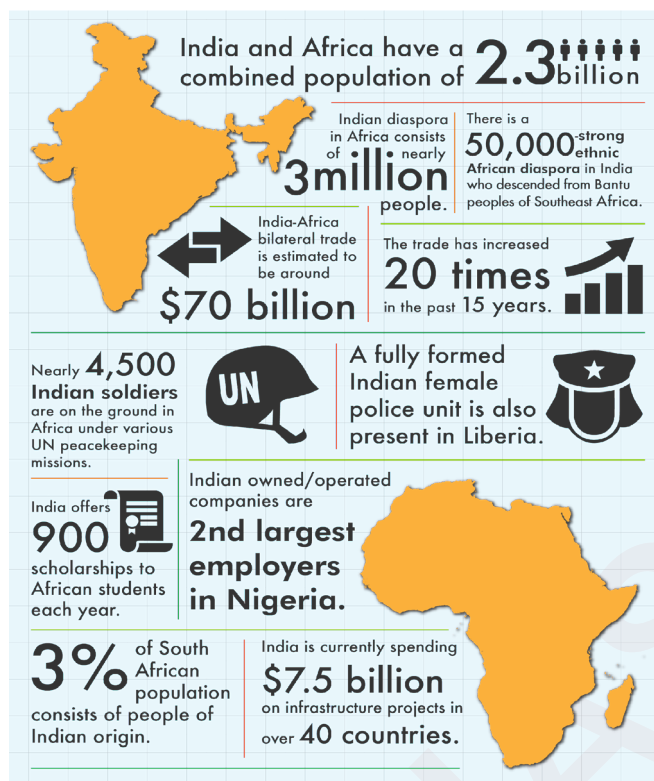
- The idea to propose AU's inclusion in G20 germinated after the 'Voice of the Global South Summit' in January, 2023.
- Currently, South Africa is the only African country that enjoys member status in the G20.
- India's move is consistent with its ambitions to project itself as a leader of the Global South.
- This is also in sync with India's aspiration for permanent membership of the UNSC, for which Delhi is keen to garner support from Africa that has 55 votes.
- However, any expansion of membership of the G20 grouping is based on consensus, and all G20 leaders have to come to an agreement on the issue.

Significance:
- This proposal is being regarded as a significant and courageous move to amplify Africa's influence on the global stage and to actively shape the future of our interconnected world.
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- This demonstrates India's commitment to fostering stronger ties with Africa and highlights the urgent need for a more inclusive and representative global order.

African Union:
- The African Union, which comprises 55 member states, serves as a vital continental body representing the collective interests and aspirations of African nations.
- As the primary organisation representing Africa's voice, the African Union has been actively engaged in promoting the progress and economic development of its member nations.
- Its establishment in 2002 marked the official transition from the Organization of African Unity (OAU), emphasising a collective approach to address regional challenges and pursue common goals.
  - OAU was established on 25th May 1963, when 32 heads of independent African States signed the OUA Charter in Addis Ababa Ethiopia in May 1963 for the establishment of Organisation of African Unity (OAU).
  - This initiative was taken as a pan-Asian vision for a united and free Africa with a major focus on the freedom, justice, equality and dignity of the African people. The main objective of the Organisation of African Unity (OAU) was to eradicate the African states from colonisation and to promote unity and solidarity.
- On 9th September 1999, the Heads of State and Government of the Organisation of African Unity (OAU) called for the establishment of an African Union through the Sirte Declaration to enable the role of Africa in the global economy. Therefore, the African Union (AU) was officially launched in July 2002 in Durban, South Africa.

Nut Graf: Indian Prime Minister Narendra Modi has proposed granting the African Union full membership in the G-20 summit, aiming to amplify Africa's influence and address its priorities. The African Union represents 55 member states and promotes regional progress and development.

21. India - US Cooperation in Critical & Emerging Technologies

Syllabus: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests.

Mains: India- US relations

Context: Prime Minister Narendra Modi's visit to US. Last week, India and the United States unveiled a roadmap for enhanced collaboration in high-technology areas, with a focus on addressing regulatory barriers and aligning export controls for smoother trade and "deeper cooperation" in critical areas.
- This was part of the Initiative on Critical and Emerging Technology (iCET) announced by President Joe Biden and Prime Minister Narendra Modi last year.

What is iCET?
- The Initiative on Critical and Emerging Technologies is a framework agreed upon by India and the U.S. for cooperation on critical and emerging technologies in areas including artificial intelligence, quantum computing, semiconductors and wireless telecommunication.
- It was launched in January, 2023 to strengthen their strategic partnership and drive technology and defence cooperation.
- Mr. Modi and Mr. Biden first announced the framework on the sidelines of the QUAD meeting in Tokyo in May 2022.

What are the focus areas of the initiative?
- Trusted technology partners
- Build supply chains
- Support co-production and co-development
- Expand tech partnership and cooperation between their governments, businesses, and academic institutions.
- Setting up a research agency partnership to drive collaboration in areas like AI.
- Developing a new defence industrial cooperation roadmap to accelerate technological cooperation for joint development and production.
- Developing common standards in AI.
- Developing a roadmap to accelerate defence technological cooperation and 'innovation bridge' to connect defence startups.
- Supporting the development of a semiconductor ecosystem.
- Strengthening cooperation on human spaceflight.
- Advancing cooperation on development in 5G and 6G.
- Adopting OpenRAN network technology in India.

What has been the progress so far?
- India and the U.S. have made "significant progress" in several key areas identified for collaboration since the launch of iCET.
- The two countries have already put in place the Quantum Coordination Mechanism, launched a public-private dialogue (PDD) on telecommunication to drive collaboration in OpenRAN, 5G and 6G, and held "important exchanges" on AI and space.
- In March, India and the U.S. signed an MoU on establishing a semiconductor supply chain that paved the way for creating a semiconductor sub-committee.
- On the defence front, the two countries concluded a mega deal for GE F414 jet engines to power LCA Tejas Mk2.
- In addition, a new initiative to advance cutting-edge technology cooperation, known as the India-U.S. Defence Acceleration Ecosystem (INDUS-X) has been launched.
- India and the U.S. have also concluded a roadmap for 'Defence Industrial Cooperation' to guide the policy direction for the next few years.
- The two countries have also established a Strategic Trade Dialogue to remove regulatory "barriers" and review existing export control norms to take forward strategic technology and trade collaborations envisaged under iCET.

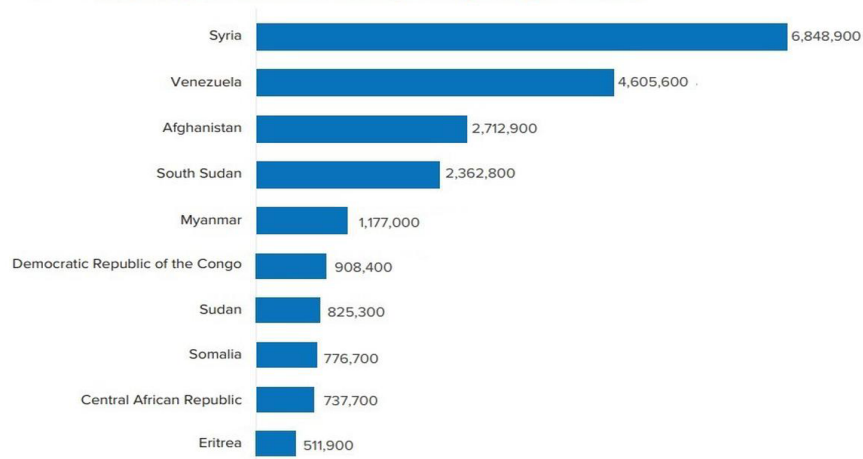## 22. Challenges in dealing with refugee crisis

Syllabus: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests.

Mains: Refugee crisis in world

Context: The United Nations has designated June 20 as World Refugee Day to honour forcibly displaced people all around the world and celebrate their strength and courage.
- The ongoing crises in countries like Myanmar, Sudan and war-ridden Ukraine have led to a rise in the number of refugees across the world.
- According to the UNHCR, 69% of refugees displaced across borders are from just five conflict-ridden countries: Syria, Venezuela, Afghanistan, South Sudan, and Myanmar.

People displaced across borders by country of origin | end-2021

Country	Number
Syria	6,848,900
Venezuela	4,605,600
Afghanistan	2,712,900
South Sudan	2,362,800
Myanmar	1,177,000
Democratic Republic of the Congo	908,400
Sudan	825,300
Somalia	776,700
Central African Republic	737,700
Eritrea	511,900

People displaced across borders by host country | end-2021

Country	Number
Türkiye	3,759,800
Colombia	1,843,900
Uganda	1,529,900
Pakistan	1,491,100
Germany	1,255,700
Sudan	1,103,900
Bangladesh	918,900
Lebanon	845,900
Ethiopia	821,300
Iran (Islamic Republic of)	798,300
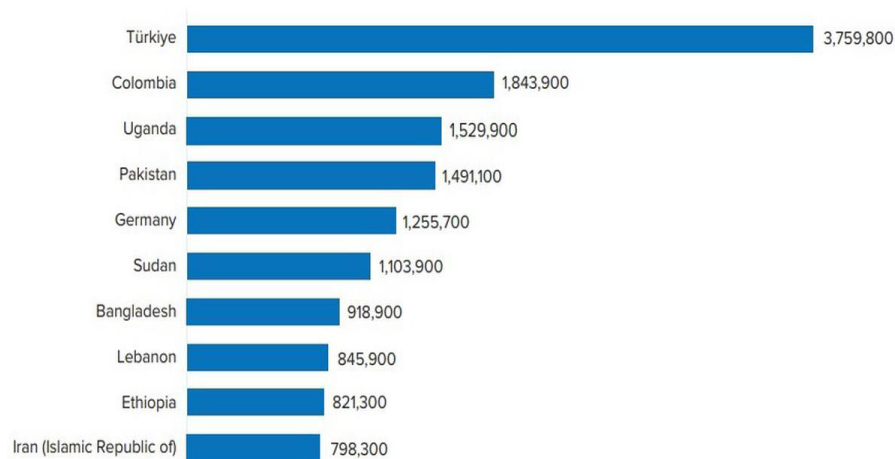
Refugees around the world
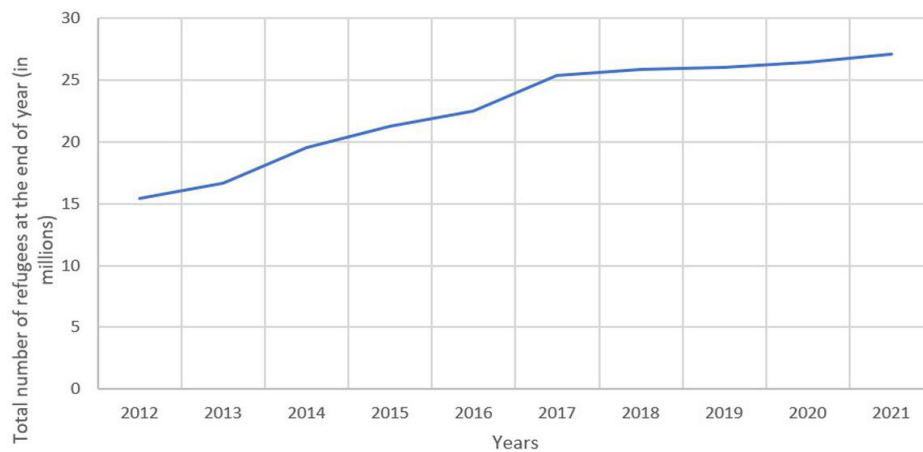
To highlight the refugees' right to seek safety, the UNHCR is focusing on three key areas:

→ **Whoever** they are, people forced to flee should be treated with dignity.

Anyone can seek protection, regardless of who they are or what they believe. It is non-negotiable: seeking safety is a human right.

→ **Wherever** they come from, people forced to flee should be welcomed.

Refugees come from all over the globe. To get out of harm's way, they might take a plane, a boat, or travel on foot. What remains universal is the right to seek safety.

→ **Whenever** people are forced to flee, they have a right to be protected.

Whatever the threat – war, violence, persecution – everyone deserves protection. Everyone has a right to be safe.

What is the 1951 UN Refugee Convention?

The United Nations Convention Relating to the Status of Refugees was adopted in 1951 and forms the crux of International refugee protection today. The convention is grounded in Article l of the Universal Declaration of Human Rights 1948 which states that everyone has the right to seek and to enjoy asylum from persecution in other countries. The convention also highlights non-refoulement - not returning refugees or asylum seekers to a country where their freedom or lives are threatened.

The 1951 convention originally only applied to people who fled due to events that occurred before January 1. 1951, and within Europe. An amendment In the form of a 1967 Protocol removed these limitations and made the Refugee Convention applicable globally.

- India has taken refuges from: Tibet, Sri Lanka, East Pakistan, Afghanistan, Myanmar.
- India was criticised for its latest policy-turn against Rohingya refugees.
- UN Global Compact on Refugees- The Global Compact on Refugees acknowledges the magnitude of the displacement crisis and calls for solidarity through a whole of society approach.
- It is built on the understanding that the responsibility towards the forcibly displaced is not limited to governments but extends to each one of us.
- It also recognizes that the Global South is disproportionately affected and that host communities need assistance.
- The Global Compact on Refugees strives to enhance the international response, support host countries, promote self-reliance, and explore long-term solutions such as resettlement and safe returns.

23. US wants to rejoin UNESCO

Syllabus: Important International institutions, agencies and fora- Structure and Mandate

Mains: Importance of UNESCO

Context: The United States' decision to rejoin the United Nations Educational, Scientific and Cultural Organisation (UNESCO) after a four-year hiatus has garnered attention worldwide. This move holds significant implications for international cooperation and cultural causes.

Why did the US Quit UNESCO?

- **Palestinian Membership:** The US's decision to leave UNESCO traces back to 2011 when Palestine was inducted as a member. In response, the US halted its funding to UNESCO, which amounted to millions of dollars during President Barack Obama's tenure.
- **Israeli Objections and Anti-Israel Bias:** Israel, alongside the US, opposed the inclusion of Palestine, citing concerns over anti-Israel bias within UNESCO.
  - Israel highlighted UNESCO's criticism of Israel's occupation of East Jerusalem and the recognition of ancient Jewish sites as Palestinian heritage sites.
- **Legal Restrictions and Funding Suspension:** US laws, influenced by historical ties with Israel, prohibit funding to any UN agency that implies recognition of Palestinian statehood.
  - Due to these legal restrictions, the US ceased funding UNESCO, leading to a significant accumulation of unpaid dues.

Why is the US Rejoining UNESCO?

- **Addressing Concerns and China's Influence:** US officials stated that the decision to rejoin UNESCO was influenced by China's growing influence within the organization.
  - China has taken a prominent role in shaping UNESCO policies related to artificial intelligence and technology education.
  - The US recognized the importance of actively participating to compete with China in the digital age.
- **Leadership and Multilateralism:** Under the leadership of UNESCO Director-General Audrey Azoulay, efforts were made to address US concerns since her election in 2017. The US's return to UNESCO is seen as a historic moment and a reaffirmation of commitment to multilateralism.

The US's Reentry and Implications:

- **Voting and Expected Outcome:** The USA's decision to rejoin UNESCO will be subject to a vote by member states. It is anticipated that the reentry will be approved with ease.
- **Strengthening International Cooperation:** The US's return to UNESCO signifies a renewed commitment to international cooperation in education, science, and culture. It provides an opportunity for the US to contribute to global initiatives and collaborate with other nations on important issues.

About UNESCO

- **UNESCO's Mission:** UNESCO is a UN agency dedicated to advancing international cooperation and peace through the promotion of education, science, and culture.
  - It plays a crucial role in designating and preserving World Heritage Sites globally, offering international recognition and potential funding for these locations.
- **US as a Founding Member:** The United States was one of the founding members of UNESCO when it was established in 1945.

Conclusion: The United States' decision to rejoin UNESCO highlights its commitment to international cooperation and the promotion of educational, scientific, and cultural causes. This move has the potential to foster global partnerships and contribute to the advancement of important initiatives led by UNESCO.

24. China's 'developmental' security approach

Syllabus: Effect of policies and politics of developed and developing countries

Mains: Recent instances of Chinese crackdown on U.S.-based and domestic firms and the Chinese policy of balancing development and security concerns.

Context: Recent instances of Chinese crackdown on U.S.-based firms as well as domestic firms dealing with overseas clients.

Background

- In May 2023, the Cyberspace Administration of China held that Micron, which is a U.S.-based chip company, failed to get a security clearance and also announced that its products posed a threat to national security after being investigated by the Cybersecurity Review Office.
  - Post this announcement by the Cyberspace Administration, business operators who are involved in critical information infrastructure were asked not to procure products made by Micron.
- Earlier during the second week of May 2023, the Chinese authorities had also raided the offices of Capvision, which is a Shanghai-based consultancy company that links Chinese experts in the fields of sectors such as finance, defence, military, high tech, trade, energy, medicine, etc. with the overseas clients.
  - Chinese security authorities had accused the company of using economic means to steal state secrets and facilitating the transfer of such confidential and sensitive information to overseas clients.
  - Capvision was found guilty of violating various legislations relating to national security.
- In April 2023, the offices of Bain and Co., which is an American consultancy firm, were raided, its employees working in China were interrogated and various computers and phones from its offices were seized.
- Even in March 2023, Chinese authorities raided the offices of Mintz and detained some of its employees which led to the shutdown of two of its offices in Beijing.
- Furthermore, Chinese officials have been blocking various mergers and acquisition applications involving foreign firms, which has led to increased operational costs for foreign businesses.

Rationale behind Chinese crackdown

- The U.S. in October 2022, increased its export controls which made it much more difficult for China to obtain and manufacture advanced computing chips and supercomputers.
- The recent actions by the Chinese authorities seem to be motivated by vengeance against the U.S. efforts to restrict Chinese tech advancements.
- By undertaking crackdown measures on American firms and by limiting their access to the vast domestic market, China aims to capitalise on the divergence that exists between the U.S. administration and the American business community over the former's China policy.

- The Chinese crackdown on consultancy and due diligence firms is expected to have ripple effects across all overseas businesses operating in China as businesses depend on consultancy firms to navigate the regulatory framework which is often challenging, especially in a country like China where there is uncertainty in the regulatory framework.
- However, various other experts also believe that there exists a domestic component to these actions.

National security at the forefront in Chinese politics
- Chinese authorities have justified each of the recent crackdown actions with the help of national security concerns.
- Experts point out that the threat to security has now become a ubiquitous concern in all aspects of governance in China as the Chinese administration under the leadership of President Xi Jinping has repeatedly emphasised that "the idea of development cannot be isolated from that of security" and the need to balance development with security has been highlighted in multiple instances.
- This attempt by China to securitise its development has resulted in according greater significance to various non-traditional security issues.
  - Among such non-traditional security issues, issues such as cybersecurity and data/information security have become the key cause for concern in China.
  - This has become evident through the recent attempts to strengthen cybersecurity and counter-espionage laws.
- China recently amended its Counter-Espionage Law with an aim to widen the scope of espionage by treating all "documents, data, materials, and items relating to national security and interests," at par with state secrets.
  - These latest amendments also expand the definition of espionage to include cyberattacks against state organs or critical information infrastructure.
  - The changes have also empowered authorities to seize data, electronic equipment, information on personal property, and even ban border crossing.
- The latest instances of crackdown also reflect the approach of "developmental security".
- There is this belief among the Chinese administration that the foreign businesses operating in China are indulging in espionage activities and there exists a suspicion that due diligence as well as consultancy firms are using their networks to extract sensitive data under the garb of free exchange of information.

Path ahead
- China is now experiencing a catch-22 situation as developmental and security issues are applying diametrically opposing forces.
  - The current dilemma is because development requires reforms, opening up economies and establishing a business-friendly environment, whereas the need to balance development with security requires enforcing restrictive measures.
- Further, the victims of the latest crackdown actions not only blame the U.S.-China competition but also China's evolving national security discourse.
  - The Chinese efforts to balance its development with national security are expected to further impact foreign business sentiments in the long run.
- Experts have however noticed an outright contradiction in China's discourse when it comes to its relationship with India.
  - While China has continuously insisted on the need to balance development with security, however, China has asked India to keep the border issue (security) away and not let it affect the overall diplomatic ties (economics and development) with China.

Nut graf: The recent incidents of a series of crackdowns by the Chinese authorities against American consultancies and domestic companies dealing with overseas clients indicate the fact that the concerns of national security have permeated each and every aspect of governance and developmental strategy in China.

25. Summit with substance

Syllabus: GS-2, Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Prelims: What is the new Global financing pact

Mains: Details and objectives of Global financing pact and its significance for Global South

Context: New global financing pact summit taking place in Paris.

What is the new Global Financing Pact?
- The aim of the Summit is to lay the groundwork for a new financial system suited to the common challenges of the 21st century, such as fighting inequalities and climate change and protecting biodiversity. The Summit is co-organized by France and India.
- In other words, the aim of **this Summit is to concurrently tackle the challenges of climate change, biodiversity protection, and the fight against inequality in order to achieve the Sustainable Development Goals (SDGs).**

- **Four major objectives for this Summit have been announced and will be followed up by four working groups:**
  - Restoring fiscal space to countries facing short-term difficulties, especially the most indebted countries
  - Promoting private sector development in low-income countries
  - Encouraging investment in green infrastructure for the energy transition in emerging and developing countries
  - Mobilising innovative financing for countries vulnerable to climate change

Strengthen solidarity with the Global South:
- The Summit will focus on discussing various ways to enhance financial solidarity with countries in the Global South. Its main objectives include creating **fiscal space, promoting private sector development, fostering green infrastructure investment, and generating innovative financing for countries vulnerable to climate change.**
- This Summit is one among numerous international events scheduled **throughout the year, such as the G20, the SDG Summit, and COP28**. These events are all designed to drive the achievement of tangible, impactful results.

Difference between the global south and the global north:
- 'Global North' refers loosely to countries like the US, Canada, Europe, Russia, Australia and New Zealand, while 'Global South' includes countries in Asia, Africa and South America.
- The commonality between the South countries is that most have a history of colonisation, largely at the hands of European powers.
- The countries in this region have been historically excluded from prominent international organisations – such as from the permanent membership of the United Nations Security Council.
- As bodies like the UN and the IMF are involved in major decision-making that affect the world in terms of politics, economy and society, the exclusion is seen by these countries as contributing to their slower growth.

Nut graf: A summit for a New Global Financing Pact is being held at a crucial juncture amidst discussions around reforms of the World Bank, India's G20 presidency, the UN's SDG Summit, the UN Secretary-General's Climate Ambition Summit, and COP28. The Summit also throws the much-needed focus on the Global South from where the bulk of global growth is expected.

26. Wall of Peace at UN headquarters

Syllabus: GS-2; International Relations; Important International institutions, agencies and fora- their structure, mandate.

Prelims: About Wall of Peace at UN headquarters and UN peacekeepers

Context: The Prime Minister of India recently paid tributes at the Wall of Peace at the UN Headquarters.

Wall of Peace at UN headquarters
- The Wall of Peace is located on the north lawns of the UN Headquarters in New York.
- The Wall of Peace acts as a "Memorial wall for fallen United Nations peacekeeping forces".
- Recognising the selfless service of UN Peacekeepers, the Prime Minister of India reiterated that their contributions would never be forgotten and their selflessness will forever be etched in our memories.

About United Nations peacekeeping forces
- United Nations Peacekeeping is a joint effort by the Department of Peace Operations and the Department of Operational Support.
- The United Nations Peacekeeping operations are policing and peacebuilding actions carried out by the UN to bring order and stability to war-torn nations.
- United Nations Peacekeeping helps countries torn by conflict create the conditions for lasting peace.
- UN Peacekeeping is guided by three fundamental principles namely:
  - Consent of the parties
  - Impartiality
  - Non-use of force except in self-defence and defence of the mandate
- The 29th of March 2023 marked the 75th U.N. Peacekeepers Day.
  - The day marks the start of the first UN peacekeeping mission "U.N. Truce Supervision Organisation" in Palestine in 1948.
- A peacekeeping mission is funded collectively by the United Nations member states, while the establishment and maintenance of its operations are decided by the United Nations Security Council.
- At present, 12 UN peacekeeping operations are deployed on three continents.
- India is one of the largest troop-contributing nations to the UNPK and at present about 5,900 troops have been deployed on 12 missions.
- India has contributed around 2,75,000 troops to peacekeeping missions so far and 159 Indian Army soldiers have lost their lives across the globe.

27. St.Petersburg International Economic Forum (SPIEF)

Syllabus: GS-2; International Relations; Important International institutions, agencies and fora- their structure, mandate.

Prelims: About St.Petersburg International Economic Forum (SPIEF)

Context: The 26th edition of the St. Petersburg International Economic Forum (SPIEF) was recently held.

St. Petersburg International Economic Forum (SPIEF)
- The St. Petersburg International Economic Forum (SPIEF) has been held since 1997, and it has been held under the ambit of the President of the Russian Federation since 2006.
- The SPIEF is regarded as one of the unique events in the world of business and economics.
- The Forum brings together the chief executives of major Russian and international companies, heads of state, political leaders, prime ministers, deputy prime ministers, departmental ministers, and governors.
- The SPIEF has become a leading global platform for members of the business community to meet and discuss the key economic issues facing Russia, emerging markets, and the world as a whole.
- The SPIEF was known as "Russian Davos" since it was the only such elite gathering of global business community leaders in this part of the world.
- The main objective of the Forum is to provide practical solutions for businesses and governments, helping to overcome the geographic and information barriers between Russia and other countries.

28. Understanding the Wagner mutiny

Syllabus: GS-2, Effect of policies and politics of developed and developing countries on India's interests

Mains: Wagner mutiny and its global implications

Context:
The chief of Russia's Wagner Private Military Company staged a short-lived mutiny against the country's defense establishment and plunged Russia into an unprecedented internal security crisis.

About Wagner mutiny
- The conflict between Wagner's chief and Russia's Ministry of Defence has been simmering for some time.
- The main cause of the Wagner group's mutiny was a disagreement between its leader, Yevgeny Prigozhin, and the Russian military brass on matters related to the invasion of Ukraine. The Wagner group eventually opted to retreat.
- The revolt has revealed weaknesses in Russia's military and security apparatus.

Who is the Wagner Mercenary Group?
- The Wagner Group, often known as PMC Wagner, is a private army that has been battling alongside the Russian military's regular forces in Ukraine. They initially rose to fame in 2014.
- In recent years, Wagner's soldiers have been engaged in the Central African Republic, Mali, Libya, the Central African Republic, and Ukraine.
- The Wagner organisation is a recognised organisation, and its headquarters are in St. Petersburg, despite the fact that mercenary forces are outlawed in Russia.

Wagner Mercenary Group and its Role in Ukraine
- The Wagner group has significantly expanded and has now become an important part of the fight in Ukraine, according to the UK Ministry of Defence.
- Critics perceive it as a shadow force commanded by Russian President Vladimir Putin, deployed to advance Russian interests abroad by sending front-line fighters, trainers, and advisors.
- The creator of the organisation has assumed a more prominent position in Russia's invasion of Ukraine, raising concerns that he might have personal political ambitions.

Wagner Rebellion's Impact on the Ukraine War
- Experts have emphasised the significance of the Wagner Forces' conduct by drawing attention to the possible harm the Wagner Forces could cause to the Russian aerospace forces.
- The Russian civil war presents an opportunity for the Ukrainian military to reclaim areas lost to Russian forces, according to military analysts.
- This could rank as one of the most significant threats to Russia in the area because the Wagner forces were crucial to the Russian President's offensive in Ukraine.
- This uprising might take resources away from the battlefields in Ukraine and increase pressure on Moscow at home.

Nut Graf: The recent incident involving the Wagner warriors, a band of dissident mercenary soldiers in Russia, has generated a lot of fear and uncertainty in global politics.

29. China- Pakistan Nuclear Deal

Syllabus: India and its Neighborhood – Relations

Mains: Broader implications of recent nuclear deal between China-Pakistan

Context: Recent agreement between China and Pakistan on nuclear power plant.

Introduction:
- China and Pakistan signed an agreement on June 20 to establish a 1,200 MW nuclear power facility in Pakistan's Chashma nuclear complex.
- With a reported value of $4.8 billion, the agreement is critical for Pakistan as it is grappling with an energy and economic downturn.
- The implications of this nuclear deal extend beyond Pakistan, raising concerns about the global regulation of nuclear trade as China proceeded without obtaining required waivers from the Nuclear Suppliers Group (NSG).

About the deal:
- The new reactor will be the fifth reactor at the Chashma nuclear complex (C-5).
- C-5 will be the biggest reactor at Chashma, where China has already constructed four phases of the complex, with four reactors of around 325 MW each.
- It will use China's Hualong One reactor, which has also been installed in two plants in Karachi.
- Pakistan is currently operating six China-built nuclear plants, four smaller reactors at the Chashma complex and two at the Karachi Nuclear Power Plant (KANUPP).
- An agreement for KANUPP-3 was signed in 2013, the year Chinese President Xi Jinping launched his Belt and Road Initiative (BRI), and became a flagship energy project as part of the China Pakistan Economic Corridor (CPEC) of the BRI.

Broader Implications:
- China's civilian nuclear collaborations with Pakistan have faced scrutiny due to the restrictions imposed by the NSG.
- The NSG prohibits member countries from transferring nuclear technology to nations that haven't signed the nuclear Non-Proliferation Treaty (NPT).
  - Although China became an NSG member in 2004, it argued that the Chashma 3 and Chashma 4 reactors were exempt due to previous agreements with Pakistan predating its NSG membership.

How different is it from the India-U.S. nuclear deal?
- Chinese analysts have attempted to justify this nuclear cooperation by citing the India-U.S. nuclear deal.
- However, there are notable differences between the two cases.
  - The India-U.S. deal required a waiver from the NSG, which was granted in 2008, allowing India to participate in global nuclear trade.
  - India had to make commitments such as placing facilities under International Atomic Energy Agency (IAEA) safeguards, separating civilian and military nuclear programs, and maintaining a testing moratorium.
  - China, on the other hand, has not sought a waiver from the NSG, and Pakistan has not made similar commitments. China has argued that IAEA safeguards on the reactors would suffice.
- Additionally, China's opposition has impeded India's bid to become a full member of the NSG, as China linked India's membership with that of Pakistan's in 2015, creating obstacles in the process.
- Concerns are raised by experts regarding the erosion of global nuclear commerce regulations due to these recent deals, questioning the future and significance of the NSG and the governance of global nuclear commerce.

Nut Graf: China and Pakistan signed a $4.8 billion agreement for a 1,200 MW nuclear power plant in Pakistan. The deal raises concerns about global nuclear trade regulations and impedes India's NSG membership bid. Experts question the future of the NSG.

30. India-Egypt summit

Syllabus: Bilateral, Regional & Global Groupings & Agreements Involving India and/or Affecting India's Interests

Mains: Significance of Egypt to India

Context: Prime Minister Narendra Modi's visit to Egypt (June 24-25, 2023).

Introduction:
- India and Egypt, two ancient civilizations, have a longstanding history of cultural and economic ties that date back centuries.
- With shared values of democracy, diversity, and strategic regional importance, the bilateral relationship between the two nations has been growing steadily over the years.

- Despite historical goodwill and cultural exchanges, tangible outcomes have been limited. Therefore, historical inspiration must be invoked to enhance bilateral relevance and substance, building upon the rich past of India-Egypt relations.

Performance of bilateral ties:
- In the fiscal year 2022-23, India's trade with Egypt amounted to $6,061 million, with a significant portion being petroleum-related.
- However, this figure represented a 17% decline from the previous year. Egypt ranked as India's sixth largest trading partner, while India stood at the 38th position for Egypt.
- Indian investments in Egypt totalled $3.15 billion across 50 projects, with a substantial portion contributed by a single company. On the other hand, Egypt's investments in India were only $37 million.
- The current underperformance of bilateral ties cannot be attributed to a lack of bilateral institutional mechanisms, as numerous mechanisms exist.
  - These include a Joint Commission, Foreign Office Consultations, and various joint working groups.
- Furthermore, both countries have witnessed visits from their Defense and External Affairs Ministers, and a bilateral summit was held less than five months ago when the Egyptian President, Abdel Fattah El-Sisi, visited India.

Opportunities and challenges:
- The upcoming Cairo Summit must seize the opportunities available while navigating potential challenges.
  - With a large population of 105 million and a significant economy worth $378 billion, Egypt offers considerable potential for collaboration.
    - The country's major imports, including refined petroleum, wheat, cars, corn, and pharmaceuticals, present opportunities for India to supply.
  - Egypt's ambitious infrastructure development agenda, encompassing 49 mega projects such as New Cairo ($58 billion), a nuclear power plant ($25 billion), and a high-speed rail network ($23 billion), further opens avenues for cooperation with India.
  - Additionally, Egypt's position as the world's third-largest arms importer during 2015-19 provides potential opportunities for defense trade.
- However, these opportunities are countered by substantial challenges.
  - Egypt's economy is currently facing a severe crisis, with significant financial commitments coinciding with a stagnant economy, global slowdown, pandemic, and the Ukraine conflict.
    - These factors have led to a decline in tourism and increased costs for essential imports like cereals.
  - Annual inflation has surpassed 30%, and the currency has depreciated by more than half since February 2022. Foreign exchange scarcity has forced the deferral of payments for crucial items like wheat.
  - While a $3 billion bailout package was secured from the International Monetary Fund six months ago, it is conditional upon implementing challenging economic reforms. However, progress in these reforms has been hindered by entrenched interests and crony capitalism, resulting in a slowdown.
  - Egypt's foreign debt stands at over $163 billion, equivalent to 43% of its GDP, and the country's net foreign assets are in negative territory at minus $24.1 billion.

Road Ahead:
- Indian participants at the Cairo Summit should cautiously manage their engagement with Egypt while capitalizing on available opportunities.
- India could assess and accept manageable economic and political risks to access Egypt's lucrative prospects, utilizing innovative approaches such as the EXIM line of credit, barter, and rupee trading.
- India should also explore alternative funding arrangements for projects in Egypt or elsewhere, such as trilateral partnerships involving Gulf nations, the G-20, or multilateral financial institutions.
- By considering trilateral funding mechanisms, India can mitigate potential risks, share the financial burden, and ensure a more sustainable and equitable arrangement for construction projects in Egypt.
  - This approach would help India leverage its partnerships while avoiding potential financial liabilities that could adversely impact its domestic taxpayers.
- It is imperative for India and Egypt to reevaluate the efficacy and purpose of their existing bilateral mechanisms, moving beyond symbolic gestures.
- Both countries need to prioritize concrete actions and collaborations that foster economic growth, investment, and people-to-people exchanges. By doing so, the bilateral relationship can overcome its current underperformance and achieve greater relevance and substance in the future.

Nut Graf: Despite historical goodwill between India and Egypt, tangible outcomes have been limited. To enhance bilateral relevance and substance, India and Egypt must reevaluate existing mechanisms, prioritize concrete actions, and explore alternative funding arrangements for projects.

31. Escalating Israel-Palestine Violence

Syllabus: Effect of Policies & Politics of Developed & Developing Countries on India's Interests

Mains: Impact of Israel-Palestine issue on the region and its impact on India's interests.

Context: Israel conducts drone strike in West Bank, escalating already high tensions with Palestine.

Introduction:
- The occupied West Bank experienced a significant escalation in violence recently, reminiscent of the waves of attacks and counter-attacks during the second Intifada.
  - Intifada is a Palestinian uprising against Israeli occupation of the West Bank and Gaza Strip. The first intifada lasted from 1987 to 1993, and the second began in 2000.
- With increasing control over the West Bank and the gradual growth of Jewish settlements, Israel has witnessed the emergence of local Palestinian resistance groups like the Jenin Brigade.
  - These groups employ homemade weapons and low-tech bombs to carry out attacks on Israeli soldiers and settlers.
- Jenin, located in the northern West Bank, has become a hotspot for violent Palestinian resistance. Israeli raids in the region are a frequent occurrence, leading to casualties among Palestinians.
- According to the UN, as of June 12, 2023, Israel has killed at least 114 Palestinians, including civilians and militants, in the West Bank in 2023 alone. In the same period, Palestinian attacks have claimed the lives of at least 19 Israelis.

Source: BBC

Intensifying violence:
- The recent events highlight the intensifying conflict and tension in the West Bank, with both Israelis and Palestinians resorting to violence.
- This cycle of attacks and counter-attacks poses significant challenges to achieving peace and stability in the region.
- Despite the deepening occupation and the establishment of checkpoints by Israel in the West Bank, another organised resistance similar to the second Intifada has not yet emerged.
  - However, isolated knife attacks, often carried out by Palestinians in what has been dubbed the 'knife intifada,' have occurred as hopes for a political solution diminish.
- In the current phase of violence, local Palestinian groups are engaging in larger-scale attacks. In response, Israel responds with airstrikes on Palestinian villages and the demolition of attackers' homes.

Road Ahead:
- The Arab world, previously supportive of Palestinian aspirations for nationhood, is now focused on improving relations with Israel.
- The United States and Europe remain silent on the ongoing Palestinian-Israeli issue.
- The current situation in the West Bank and the blockaded Gaza Strip, along with the continued expansion of Israeli settlements, poses a significant threat and is highly precarious.
- Genuine efforts should be made to halt settlement expansion and initiate dialogue between the two sides to end the cycle of violence.

Nut Graf: The occupied West Bank has seen a surge in violence reminiscent of the second Intifada, with local Palestinian resistance groups emerging. Israel's control and settlement growth fuel the conflict. Israeli raids and casualties among Palestinians are frequent.

32. Outreach to diaspora and statesmanship

Syllabus: Indian diaspora

Mains: Challenges of Tamil diaspora and role of State government in strengthening interests of the Indian diaspora.

Context:
In a speech while addressing the Tamil diaspora in Tokyo, the Tamil Nadu Chief Minister had promised to protect the Tamil diaspora.

Tamil Diaspora
- Among the Indian diaspora, Tamils form the overwhelming majority of the Indian population in Malaysia, Singapore, and Sri Lanka, the European countries etc.
- In politics, economics, literature, the fine arts, athletics, and science, the Tamil diaspora has achieved success. A few names that shine include Indira Nooyi, Sundar Pichai, Raghuram Rajan and Kamala Harris.

Challenges faced by Indian Tamil Diaspora
The challenges that the Indian Diaspora encounters are strongly related to their migration patterns and the majority-minority problem in their host countries.
- **Ignoring their own Culture:** It has been highlighted frequently how important it is to protect the Tamil people. But in many countries, the Tamil community has forgotten about the Tamil language, which is one of the core components of Tamil culture.
- **Neighboring countries and Tamil issue:** The British government had transported Indian Tamils to Ceylon, and Sri Lanka's first piece of legislation required them to work on the country's tea plantations. India claims that Tamil refugees from Sri Lanka are illegal immigrants and demands that they return to Sri Lanka. Besides, the Burmese government exiled thousands of Indian Tamils and never granted them citizenship.
- **Inefficient Policies of Indian Government:** An analysis of India's policies towards Sri Lanka reveals that India was prepared to compromise the interests of the Indian diaspora in order to advance political relations. The Indian Tamil community was treated as a commodity to be shared between the two countries under the terms of the 1964 Sirimavo-Shastri Pact, which embraced a give and take policy.

Way Forward
- Indians living abroad must stay together, protect their rights, and lift their heads high in pride at being Indians—children of a nation with a glorious past and even brighter future.
- In order to advance the interests of Indian minority groups, bilateral connections with neighboring nations must strengthen ties with their governments on all fronts—politically, economically, and culturally.
- The national government has sole authority over how it will treat the Indian diaspora. Even then, state administrations have the power to change policies by mobilizing the populace. The state and federal governments must work together to find a cooperative solution as soon as possible.

Nut Graf: Diasporas have evolved as strong entities as they are recognised as 'soft power' in the field of foreign policy strategy. State governments must cooperate with the federal government to preserve the interests of the Indian diaspora.

ART AND CULTURE

1.   Archaeologist finds Mesolithic-era rock painting in Guntur

Syllabus: GS-1; Art and Culture; Rock paintings

Prelims: Mesolithic-era rock painting in Guntur

Details
- A Mesolithic period rock painting has been found by Archaeologists of the Archaeological Survey of India (ASI) in Orvakallu village of the Guntur district in Andhra Pradesh.
- Archaeologists while surveying the lower River Krishna Valley to analyse the architectural features of shrines, identified a new prehistoric rock painting on the walls and ceiling of natural rock shelters on a hillock at Orvakallu.
- According to the report, these paintings were made using natural white kaolin and red ochre pigments.
  - Kaolinite is a soft, earthy, and white mineral made during the chemical weathering of aluminium silicate minerals such as feldspar.
  - Red ochre is a pigment made of clay, sand, and ferric oxide.
- These paintings shed light on the social and cultural life of the people who then lived in these areas.
- This recently found rock painting belonging to the Mesolithic period (from about 5000 BC) depicts an individual tilling a piece of land indicating a "semi-settled life pattern" wherein members belonging to this community cultivated crops.
  - Another painting depicted a man catching a wild goat with his left hand while wielding a hook-like implement to control it.
  - Another painting showed two couples standing with their hands raised while a child stood behind them.

2.   International Day of Yoga

Syllabus: GS-1; Art and Culture

Prelims: About International Day of Yoga and TRIFED

Context:
The Tribal Cooperative Marketing Development Federation of India (TRIFED) is collaborating with the Ministry of Ayush to supply 34,000 yoga mats procured exclusively from tribal artisans across the country as a part of the International Day of Yoga celebrations.

Details
- Each mat produced will represent the diverse cultural heritage of India's tribes and reflect their culture, stories, folklore and artistic legacy.
- India apart from spreading awareness of the benefits of yoga and meditation will also be promoting the skill of Indian tribal artisans as a part of International Yoga Day.

International Day of Yoga
- International Yoga Day is being celebrated every year on June 21.
- International Yoga Day was declared by the UN General Assembly on 11th December 2014.
- The day is dedicated to raising awareness about the various benefits of practising yoga and promoting its holistic approach to health and well-being.
- The theme for International Yoga Day 2023: "Yoga for Vasudhaiva Kutumbakam".

3.   Palkhi Festival

Syllabus: Art and culture

Prelims: Palkhi Festival

Context: Palkhi festival is held every year in the month of Jyestha (June). This year the delegates of G20 Digital Economy Working Group Conference got to observe the same.

Source: Hindustan Times

About the Palkhi Festival:
- 1000 year old tradition, celebrated by Warkaris
- Associated with the worship of Lord Vithoba, a Hindu deity also known as Vitthal or Panduranga, and his consort Rukmini.
- Consists of an annual 22 day yatra (pilgrimage) to Pandharpur, the seat of God Vithoba.
- The Pilgrims walk with Palkhis (chariots) which have padukas (sandals) of saints, especially Dnyaneshwar and Tukaram.
- Tradition of keeping padukas started in 1685 by Narayana Baba
- The Palkhis of Dnyaneshwar and Tukaram converge in Pune for a short pause and then separate at Hadapsar, only to reunite once again at Wakhri, a nearby village to Pandharpur
- During the procession, Warkaris sing devotional songs and bhajans dedicated to Lord Vithoba, creating a vibrant and festive atmosphere. Traditional musical instruments are also played.
- They reach Pandharpur on Ashadhi Ekadashi, after which they engage in a purifying bath in the holy Chandrabhaga River/Bhima River before continuing their visit to the Vitthal temple.

SCIENCE AND TECHNOLOGY

1. MQ9 Reaper, Anjadip and Sanshodhak

Syllabus: Indigenization of Technology & Developing New Technology

Prelims: MQ9 Reaper, Anjadip and Sanshodhak

Context: India is going to acquire 31 MQ-9B Reapers from the USA.Indigenously built ships Anjadip and Sanshodhak have been launched.

What are MQ-9B Armed Drones?
- The MQ-9B is a variation of the MQ-9 "Reaper" drone, which was used to launch a modified version of the Hellfire missile that killed al-Qaeda leader Ayman al-Zawahiri in Kabul.
- SkyGuardian and SeaGuardian are two variations of the MQ-9B. Since 2020, the Indian Navy has been using the MQ-9B Sea Guardian.
- The drone can fly at altitudes of over 40,000 feet, providing the Indian military with surveillance capability in high-altitude Himalayan border areas.
- The Predator has a maximum endurance of 40 hours, which makes it excellent for long-term surveillance.
- Advanced features of MQ-9B drones include automated take-off and landing, a detect and avoid system, anti-spoofing GPS, and encrypted communication lines.

Sanshodhak ship:
- The fourth of four Survey Vessels (Large) (SVL) Project ships for the Indian Navy was launched on June 13 at Kattupalli, Chennai.
- The name 'Sanshodhak,' which means 'Researcher,' refers to the ship's principal mission as a Survey Vessel.
- According to the contract signed between the MoD and Garden Reach Shipbuilders & Engineers (GRSE), Kolkata, the first ship was to be built at GRSE, Kolkata, and the next three ships were to be built at M/s L&T Shipbuilding, Kattupalli, up to the outfitting stage.
- The project's first three ships, Sandhayak, Nirdeshak, and Ikshak, were launched in 2021.
- To collect oceanographic data, SVL ships will replace the existing Sandhayak Class survey ships with new-generation hydrographic equipment.

Anjadip Ship:
- Anjadip', the third of eight ships in M/s GRSE's ASW Shallow Water Craft (SWC) Project for the Indian Navy, was launched on June 13 at M/s L&T, Kattupalli.
- The ship has been named Anjadip after the island of Anjadip, which is located off the coast of Karwar.
- **It represents the Island's strategic maritime importance:**
  - The island is part of INS Kadamba and is connected to the mainland via a breakwater.
  - The deal between the MoD and Garden Reach Shipbuilders & Engineers (GRSE), Kolkata, is for the construction of eight ASW SWC ships.
  - Four ships are being built at GRSE in Kolkata, with the remaining four ships being built by M/s L&T Shipbuilding in Kattupalli in accordance with the contract requirements.
  - The Arnala class ship will replace the Indian Navy's Abhay class ASW Corvettes.

2. MAHIR Mission

Syllabus: Indigenization of Technology & Developing New Technology

Mains: Potential of Emerging Technologies in the Power Sector

Context: Mission on Advanced and High-Impact Research (MAHIR) launched to leverage Emerging Technologies in the Power Sector. The Ministry of Power and the Ministry of New and Renewable Energy have jointly launched a National Mission to quickly identify emerging technologies in the power sector and develop them indigenously, at scale, for deployment within and outside India.

Importance:
- By identifying emerging technologies and taking them to the implementation stage, the Mission seeks to leverage them as the main fuel for future economic growth and thus make India a manufacturing hub of the world.
- Planned for an initial period of five years from 2023-24 to 2027-28

Objectives:
- To identify emerging technologies and areas of future relevance for the Global Power Sector
- To provide a common platform for Power Sector Stakeholders for collective brainstorming, synergetic technology development and devise pathways for smooth transfer of technology
- To support pilot projects of indigenous technologies and facilitate their commercialization
- To leverage foreign alliances and partnerships to accelerate research & development of advanced technologies
- To seed, nurture and scale up scientific and industrial R&D and to create vibrant & innovative ecosystem in the Power Sector of the country
- To make our Nation among the leading Countries in Power System related Technologies & Applications development

Areas Identified for Research:

To begin with, the following eight areas are identified for research:
- Alternatives to Lithium-Ion storage batteries
- Modifying electric cookers / pans to suit Indian cooking methods
- Green hydrogen for mobility (High Efficiency Fuel Cell)
- Carbon capture
- Geothermal energy
- Solid state refrigeration.
- Nano technology for EV battery
- Indigenous CRGO (cold rolled grain-oriented steel) technology

3. Synthetic Embryos

Syllabus: Developments in Science and Technology and Applications of scientific developments in everyday life

Prelims: About Synthetic Embryos

Context: A woman scientist reported at the annual meeting of the International Society of Stem Cell Research in Boston that her team has succeeded in producing synthetic human embryos using stem cells, eliminating the need for egg and sperm.

About synthetic human embryos:
- Synthetic embryos are embryos made without the need of fertilisation. These are also referred to as artificial embryos.
- These embryos do not require an egg or sperm cell to be created. These are the primitive embryos, which contain cells that will develop into the placenta, the yolk sac, and the embryo itself.
- To imitate the normal process of early human development, these embryos rely on self-assembling stem cell structures.

Components of Synthetic Embryos:
- These synthetic embryos, which are made completely of embryonic stem cells, show fundamental features of human development.
- Despite the absence of a beating heart or the beginnings of a brain, they contain cells that build the placenta, yolk sac, and embryo itself.
- This innovation gives researchers a one-of-a-kind model for studying the early phases of human development.

Insights into Recurrent Miscarriages:
- One of the possible advantages of synthetic embryos is the opportunity to learn more about the biology causes of recurrent miscarriages.
- With an estimated 23 million miscarriages worldwide each year, understanding the underlying variables becomes critical in treating this serious issue.
- Synthetic embryos could be a useful tool for investigating and unravelling the complexity of recurrent miscarriages.

Exploring the "Black Box" Period of Development:
- The term "black box" refers to the critical time of human development that occurs between approximately 16 or 17 days after fertilisation and more than a week after the embryo attaches itself in the uterine lining.
- Scientists are now limited in their ability to develop embryos in the lab for a maximum of 14 days.
- Synthetic embryos offer a way around this barrier and research the important developmental stage more thoroughly.

The Benefits of Modeling Human Embryonic Development:
- Scientists can get significant insights into the early phases of human life by using stem cells to replicate normal human embryonic development.
- This method allows researchers to comprehend the early stages of development, identify potential anomalies, and investigate the impact of numerous factors without the ethical difficulties that come with using early-stage embryos for research.

Looking Towards a Future of Advancements:
- The ability to create synthetic human embryos from stem cells constitutes a significant advancement in the science of human reproduction.
- Scientists want to solve the mysteries of human development, enhance the success rates of reproductive technology, and perhaps address significant challenges such as recurrent miscarriages through continued research and inquiry.
- This ground-breaking discovery opens up new avenues for studying and improving human reproductive health.

4. Chikungunya Vaccine

Syllabus: Developments in Science and Technology

Prelims: About Chikungunya Vaccine

Context: A live chikungunya vaccine was found to be "highly protective" in a human Phase III experiment. After the shot was tested on humans for the first time, a fresh clinical research revealed promising outcomes.

About Chikungunya:
- Chikungunya Fever is a virus-borne sickness spread by mosquitoes.
- The chikungunya virus (CHIKV) causes it.
- Because the infection produces significant joint and muscular pain, the moniker "bends you up" or "stooped walk" was coined.
- The disease was originally identified in 1952 during an outbreak in southern Tanzania.

Symptoms:
- High temperature, headache, exhaustion, rash, nausea, and red eyes are some of the symptoms.
- Chikungunya symptoms usually occur 2 to 7 days after being bitten by an infected insect.
- A fever is usually the initial symptom of chikungunya, followed by a rash.
- The beginning of disease usually occurs 4 to 8 days after being bitten by an infected mosquito (although this might vary from 2 to 12 days).
- Symptoms include:
  - Sudden onset of high fever (typically above 102 degrees F)
  - Joint pains
  - Headache
  - Myalgia
  - Conjunctivitis
  - Nausea
  - Vomiting
  - Rash

The recent Vaccine
- The VLA1553 live-attenuated vaccine is based on the East Central South African genotype of the La Reunion strain of chikungunya.
- This could be the first chikungunya virus vaccine candidate for active immunization of visitors and inhabitants of endemic or at-risk locations for an imminent outbreak.

5. Powassan Virus

Syllabus: Developments in Science and Technology

Prelims: Powassan Virus

Context: A tick-borne virus called Powassan virus has claimed its first victim in the United States of America. The Powassan virus, often called a ticking time bomb, is named after Powassan, Ontario where it was first discovered in 1958.

About The Virus:
- Powassan virus is a Flavivirus, which is transmitted by ticks. In Eurasia, it is a part of tick-borne encephalitis virus-complex.
- It is generally transmitted to humans through bites by infected deer ticks, groundhog ticks, or squirrel ticks, commonly found in the Great Lakes region of North America between late spring and mid-autumn.
- A considerable number of people infected with the virus exhibit no symptoms. For individuals with symptoms, the time from tick bite to feeling ill ranges from one week to one month. The early signs of Powassan virus infection include fever, headache, vomiting, and weakness

In Serious Cases:
- In severe cases, individuals may experience symptoms like confusion, difficulty speaking, loss of coordination, and seizures.
- This can cause encephalitis (brain infection) or meningitis (infection of the membranes surrounding the brain and spinal cord). Moreover, it can have a lasting impact on an individual's well-being

Mitigation:
- Currently, there are "no medications" that can prevent or treat Powassan virus infection. Antibiotics are ineffective against viruses.
- However, according to the expert, symptoms can be relieved by resting, consuming fluids, and using over-the-counter pain medications

6. Research and production of Graphene in India

Category: GS03- Science and Technology

Syllabus: Indigenization of Technology & Developing New Technology

Mains: Various applications of Graphene based systems in India

Context: This article discusses India's need to bridge the gap in graphene research and production.

Introduction:
- Graphene is a two-dimensional allotrope of carbon arranged in a hexagonal lattice, making it the thinnest and strongest material known to date.
  - It is 200 times stronger than steel but six times lighter.
- Its unique structure gives it exceptional properties such as high electrical and thermal conductivity, mechanical strength, and flexibility.
- The discovery of graphene has opened up a realm of possibilities for future advancements.
- According to the Grand View Research, the global graphene market size was valued at $175.9 million in 2022 and is expected to grow at a CAGR of 46.6% between 2023 and 2030.
- China, the U.S., the U.K., Japan, South Korea, Russia, and Singapore stand out as prominent nations in the field of graphene research.
- Until 2012, the U.S. held a dominant position in terms of patent filings related to graphene. However, in 2018, China alone filed 218 patents, while the combined filings of the other leading nations amounted to 79. India contributed eight filings to the overall count.
- China and Brazil are global leaders in the commercial production of graphene. India produces about one-twentieth compared to China and one-third compared to Brazil.

Applications of Graphene:
- As research and development continue, graphene is expected to play a significant role in shaping the future of technology and materials science.
- It is almost perfectly transparent as it absorbs only 2% of light. It is impermeable to gases, even those as light as hydrogen and helium.
- It has the potential to revolutionise electricity, conductivity, energy generation, batteries, sensors and more.
- Graphene composites are used in aerospace, automotive, sports equipment, and construction, while its derivatives are utilised in high-performance batteries, super-capacitors, touchscreens, conductive inks, and water purification.
- Graphene is valuable in defence and aerospace due to its exceptional strength, ability to absorb electromagnetic waves, and sensitivity to environmental changes.
  - It can be used for armour, stealth coatings, sensing hazardous substances, and protection against chemical and biological attacks.
- Graphene's exceptional sensitivity to environmental variations positions it as a prime choice for detecting chemical and biological agents, explosives, radiation, and other dangerous substances.

India's progress:
- India has made significant advancements in graphene technology, exemplified by the collaboration between the Centre for Nano Science and Engineering at IISc Bangalore and KAS Tech, which produced a graphene-based system.
- Additionally, several start-ups and foreign subsidiaries have begun utilising graphene or graphene derivatives in India.
- Tata Steel has successfully grown graphene, with large domains of about 50 micrometres, using annealing techniques and extracting atomic carbon from steel surfaces.
  - Furthermore, Tata Steel has innovatively combined graphene with used plastic products for recycling purposes.
- India has explored the application of graphene oxide-based wrappers loaded with preservatives to extend the shelf life of fruits and vegetables.
  - This discovery holds great potential for reducing food waste and improving agricultural practices.
- The establishment of the India Innovation Centre for Graphene in Kerala, in partnership with Tata Steel and C-MET, Thrissur, marks a commendable step towards fostering large-scale innovation activities in the field of graphene.

Way Forward:
- Overall, India's progress in graphene technology has been notable, but concerted efforts are required to accelerate and expand these advancements.
- Government shall prioritise graphene research and development by establishing a national graphene mission and entrusting a dedicated ministry with the responsibility.
- Government must also develop a clear regulatory framework for graphene production, ensuring safety standards and environmental regulations are in place.
- Encourage the protection of intellectual property rights to incentivize innovation and commercialization. Streamline patent processes and establish mechanisms to support patent filing and enforcement.
- This proactive approach is essential to ensure that India becomes a leader in the graphene industry, as the dynamics of this technology favour early adopters and concentrated production centres.

Nut Graf: India's progress in graphene technology is promising, with collaborations, start-ups, and innovative applications. To accelerate growth, India should prioritise R&D, establish a regulatory framework, protect intellectual property, and streamline patent processes. Proactive measures will position India as a leader in the graphene industry.

7.   Artificial Intelligence- Good and bad

Syllabus: Application of Science and Technology.

Mains: Generative AI and associated concerns.

Prelims: Artificial Intelligence.

Introduction:
- Generative artificial intelligence (AI) refers to AI that can create new data. Currently, it is being used to generate text, images, and code in response to users' requests.
- For instance, OpenAI's ChatGPT chatbot mimicking intelligence has become synonymous with the abilities of generative AI at large.
- AI models backed by neural networks and trained through large datasets are used to find new antibiotics, alloys, etc. It is also used for entertainment and many banal tasks.
- Many critics caution that "Mitigating the risk of extinction from AI should be a global priority alongside other societal-scale risks like pandemics and nuclear war."

Associated Concerns:
- The inscrutability of the internal workings of AI models.
- The use of copyrighted data and concerns associated with human dignity and privacy.
- False information is also a serious issue.
- It is argued that the new working models disregard the above risks.

Way Ahead:
- It is important to regulate generative AI as it can pose serious risks for the country.
- The Indian government should:
  - Proactively launch and maintain an open-source AI risk profile
  - Establish sandboxed R&D environments to test potentially high-risk AI models
  - Encourage the development of explainable AI
  - Define the scenario and approach to interventions

Nut Graf: Despite several associated issues, India should take advantage of Artificial Intelligence and harness its capabilities for all good reasons. The government can regulate it to some extent and allow its use for innovations.

8.   The decade-long search for a rare Higgs boson decay continues

Syllabus: Developments in the field of science and technology.

Mains: Higgs boson.

Prelims: Higgs boson.

Details:
- A very rare decay process was observed by the physicists working with the Large Hadron Collider (LHC) particle smasher at CERN (Europe).
  - The Higgs boson decayed into a Z boson particle and a photon.

Higgs Boson:
- It is a type of boson, a force-carrying subatomic particle.
- The Higgs boson carries the force that a particle experiences in the Higgs field.
  - The Higgs field is an energy field that is present in the entire universe.
  - For instance, when an electron interacts with the Higgs field, the effect it experiences is due to its interaction with the Higgs boson.
- It should be noted that the stronger a particle's interaction with the Higgs boson, the more mass it has.
- However, photons don't interact with Higgs bosons as they have no mass.
  - Photons are particles of light.

Analysis of the Study:
- As discussed above, photons don't interact with the Higgs boson. But the research shows that the Higgs boson decayed into a Z boson and photon.
  - This is because of spacetime.
  - The standard model theory shows that the Higgs boson will decay to a Z boson and a photon 0.1% of the time.
- It should be noted that as the Higgs boson is a heavy particle and unstable and thus decays into lighter particles.
- Moreover, the Z boson is also unstable which further decays into two muons (3% of the time).
- ATLAS and CMS, the two detectors that announced the new measurement found the decay earlier in 2018 and 2020. They combined their data and increased their statistical precision.

Challenges:
- There is still some uncertainty about the result, reflecting the rarity of the decay pathway.
- Despite several accurate predictions by the Standard Model, some questions remain unanswered. For example, what is dark matter? and why Higgs Boson is so heavy?

Nut Graf: A fascinating new result has been discovered about the Higgs boson, where it is found to decay into a Z boson particle and a photon. However, it is still not 100% certain due to the rarity of the decay pathway.

9.　Dealing with deepfakes

Syllabus: Applications of important discoveries in Science and Technology.

Mains: Deepfake and associated concerns.

Prelims: Deepfake Technology.

Details:
- Deepfake is produced by machines using deep learning. It contains false information.
- Deepfaking is a significant 'upgrade' from photoshopping images, as it transcends the limits of human skill.
- **Deepfakes have been mischievously used to:**
  - Create videos of Barack Obama verbally abusing Donald Trump
  - Hack facial recognition software, etc.
- These tools falsify media elements at a large scale. This causes the viewers to believe certain information to be 'true' because it was given by a machine.

Deepfakes:
- Deepfakes are digital media, including video, audio, and images, that have been edited and manipulated using Artificial Intelligence (AI). This synthetic media content is referred to as deepfakes, a term coined by combining "deep learning" and "fake."
- Deepfakes are created using deep learning techniques, specifically through the use of Generative Adversarial Networks (GANs). GANs consist of two neural networks—the generator and the discriminator.
  - The generator creates fake media by superimposing multiple images of the targeted person from various angles onto the original face, while the discriminator determines whether the media is real or fake.
  - The generator learns and improves its technique with each iteration based on feedback from the discriminator.
- Deepfakes have several applications in areas such as film production, education, artistic expression, and criminal forensics. In film production, they can be used to create realistic visual effects and enhance storytelling.
- Deepfake technology has been misused by cybercriminals for various illicit activities. They employ deepfakes in phishing attacks, financial fraud, identity theft, information manipulation, and even political unrest.
  - High-profile individuals like celebrities and political leaders are often targeted due to the abundance of available data on the internet. Deepfakes can severely damage the reputation and credibility of these individuals.
- The proliferation of deepfakes raises concerns regarding misinformation, privacy, and the erosion of trust in digital media. The ability to create highly convincing fake content poses a significant challenge in distinguishing between real and manipulated media.

Significance of Deepfake:
- Deepfake technology can be used for good reasons also. For example, in the U.S., a voice-claiming initiative was founded to restore the voices of those who had lost it to amyotrophic lateral sclerosis.
- It can also be used in cinema, music, and gaming. It can also be used in understanding and reinterpreting history.

Way Ahead:
- It is important for individuals to become scientifically, digitally, and public-spiritedly literate.
- Some amount of regulation or self-restraint is required.
  - China has strongly responded by banning deepfaked visuals whose creators don't have permission to modify the original material and materials which aren't watermarked accordingly.
- It is important to democratically allow the technology to flourish as it is a powerful future technology.
- However, the use of deepfakes should not have planet-wide consequences like solar geoengineering.

Nut Graf: Deepfake technology has both pros and cons. It can be used to rupture the social fabric by spreading false news or can be used to solve some real-time problems. The technology should be carefully regulated giving ample scope for innovations in the future.

10. A global order as technology's much needed pole star

Syllabus: GS-3, Implications of Science and Technology.

Mains: Impact of emerging technology on the nation-state.

Details:
- The rapid scale and speed of technological developments have radically and disruptively transformed societies and daily lives.
- Though lives have become much easier, several other complex challenges have appeared.

Challenges Posed by Technology:
- There are several externalities occurring beyond the scope of geographical national borders like Cyberattacks.
  - Cyberattacks challenge socio-economic and political existence by creating a ripple effect.
  - The advent of the internet and other technologies like blockchain allows state and non-state actors to influence areas of trade, commerce, health, and education even while remaining outside the financial and judicial scope.
- There is a declining significance of conventional geographical borders as data travels across the world wide web at an unimaginable speed.
  - The existing constitutionally established institutions are inadequate in tackling malicious 'virtual activities'.
  - It is also difficult to establish the applicability of any country-specific law due to the universal nature of technology.
  - In the absence of a globally-accepted norm, it is difficult to collect evidence and book the recalcitrant actors.
- Constantly emerging technologies expose the inability and incapacity of the nation-state to administer them.
  - Technological entities have transcended boundaries to collaborate with the rest of the world. For example,
    - Topographical maps which used to be produced by public and military institutions are now available through private entities like Google Maps.
- The five largest American tech companies (namely Google, Amazon, Facebook, Apple, and Microsoft) have a valuation of approximately $4,100 billion (more than Germany's GDP).
- Data has become one of the most important raw materials with only a few countries having power and influence over it.

Way Ahead:
- A principle-based global order can streamline the enforceability and challenges in the adoption and diffusion of technology.
- Moreover, it will provide guidance to emerging and least-developed countries.
- India also needs to have laws for data transfer and data privacy. It should be complemented by global regulation architecture trusted by all countries.
- It is a great opportunity for India (as a current chair of G20) to take a leadership role similar to the International Solar Alliance and the Coalition for Disaster Resilient Infrastructure.

International Solar Alliance:
- The International Solar Alliance (ISA) is an international organisation launched jointly by India and France in 2015. It aims to promote solar energy deployment, reduce dependence on fossil fuels, and address climate change challenges.
- The ISA consists of countries that lie between the Tropics of Cancer and Capricorn, also known as the "Sun Belt" region. As of 2021, it has over 121 member countries.
- The ISA has initiated various programs and initiatives to promote solar energy adoption.
- For instance, the ISA's Solar Risk Mitigation Initiative aims to mobilise $1 trillion in investment by 2030 for solar projects in member countries.

- The ISA has collaborated with several countries, international organisations, and private sector entities to undertake solar energy projects.
  - One notable project is the "One Sun, One World, One Grid" initiative, which seeks to create a global electricity grid powered by solar energy.
- The ISA's efforts have the potential to transform the global energy landscape and contribute significantly to sustainable development. It can help countries achieve their renewable energy targets, create employment opportunities, and mitigate climate change effects.

Nut Graf: The anonymous users and borderless nature of technology have challenged the traditionally accepted concepts of sovereignty and privacy. There is a need for a globally-coordinated approach agreed upon by all countries to tackle the complex challenges posed by technology.

11. Impact of Chronic Stress on Human body

Syllabus: Awareness in Different Fields

Mains: Various issues with mental health and its impact of physical body

Context: This article discusses the impact of psychological stress on the intestine.

Introduction:
- A recent study published in the Cell journal shed light on the connection between mental health and gastroenterology, specifically in relation to inflammatory bowel disease (IBD).
- The study emphasised the profound impact of mental health on inflammatory responses in the body, particularly during disease flares in IBD patients.
- With further research, the study's author envisions the development of drugs that can effectively block the inflammatory cascades triggered by psychological stress.

Key Details:
- The study brings attention to the influence of stress on the body, particularly the gastrointestinal (GI) system. It highlights the role of stress in stimulating the adrenal gland to produce glucocorticoids, a stress hormone.
- Short-term stress, such as before an exam, can lead to reduced appetite and increased bowel movements.
- However, chronic or long-term stress, like toxic work environments, difficult relationships, or childhood pressure to perform, can result in inflammation of the gastrointestinal tract, such as IBD.
  - In cases of chronic stress, the body continuously releases glucocorticoids.
- Chronic stress not only triggers the production of glucocorticoids but also initiates inflammatory responses in the gastrointestinal tract. These responses involve both physical damage to the intestine and functional changes in gut motility due to inflammatory mediators.
- The study emphasises the interconnectedness of the body's response to stress and the functioning of the gut-brain axis. Stress triggers a cascade of physiological changes involving various systems and hormones, ultimately affecting the GI system and contributing to conditions like irritable bowel syndrome (IBS) and IBD.
- Understanding these complex mechanisms is crucial for comprehending the effects of chronic stress on the gastrointestinal system.

IBD v/s IBS:
- In contrast to IBS, which is associated with stress and commonly affects women, IBD is a distinct condition.
- Unlike IBD, IBS does not involve an inflammatory response as its cause or consequence.
  - Physical changes such as ulcers and structural alterations are observable in the colon during an endoscopy for individuals with IBD, whereas such changes are not present in IBS characterised by symptoms like bloating, constipation, and diarrhoea.
  - IBD is immunologically mediated and can have hereditary factors, while IBS is part of a group of disorders known as gut-brain interaction disorders (DGBI).
- IBD, such as ulcerative colitis and Crohn's disease, carries the risk of colorectal cancer, highlighting the severity and potential complications of this condition.
- On the other hand, IBS is part of a broader spectrum of disorders involving the interaction between the gut and the brain.
- The study's findings emphasise the importance of addressing biases and misconceptions surrounding IBS within the medical community, as they can impact patient care and treatment outcomes.

Treatment to manage stress:
- Use of specific GI-directed behavioural therapies that employ cognitive-behavioural approaches can address anxiety related to GI symptoms.
- Aerobic exercise and yoga are beneficial in managing stress. Aerobic exercises release endorphins, which enhance mood and improve pain tolerance.
- Regular yoga practice increases brain-derived neurotrophic factor (BDNF) levels, which are crucial for learning and memory. Additionally, yoga induces a relaxation response.

Nut Graf: A recent study highlights the link between mental health and gastroenterology, particularly in inflammatory bowel disease (IBD). Chronic stress triggers inflammatory responses in the gastrointestinal tract, but further research may lead to drugs that block these cascades. Behavioural therapies and activities like aerobic exercise and yoga can help manage stress.

12. Hydrogen generation from seawater

Syllabus: Indigenization of Technology & Developing New Technology

Mains: Potential of Green Hydrogen as alternative fuel

Context: IIT-Madras generates hydrogen from seawater using solar energy.

Key Details:
- Researchers at IIT-Madras' Department of Physics have made significant advancements in the field of seawater electrolysis to produce hydrogen.
- The team successfully tackled the challenges associated with current alkaline water electrolysis technology, which consumes high energy, relies on expensive oxide-polymer separators, and requires fresh water for the process.
- Instead of using pure or fresh water, they developed an electrolysis technique that utilises alkaline seawater.
- They employed a carbon-based support material for the electrodes, which greatly minimises the risk of corrosion compared to traditional metal-based electrodes.
- Additionally, the researchers created transition metal-based catalysts capable of catalysing both oxygen and hydrogen evolution reactions. These catalysts enhance the production of hydrogen and oxygen, even in the presence of impurities and chemical deposition on the electrodes.
- To address the issue of crossover between oxygen and hydrogen, the team devised a cellulose-based separator that is cost-effective.
  - This separator allows hydroxide ions to pass through while effectively preventing the crossover of oxygen and hydrogen gases.
  - The novel cellulose-based separator offers an efficient and cost-effective alternative to the commonly used zirconium oxide-based material.
- Furthermore, the researchers optimised various parameters, enabling the water electrolysis system to directly utilise photovoltaic-derived voltage for splitting seawater, thereby generating green hydrogen and oxygen. The generated oxygen can be utilised in other applications.

Reactions:
- In an alkaline water electrolyser, two half-reactions occur at the anode and cathode.
  - At the cathode, water dissociates into H+ and hydroxide ions, leading to the conversion of H+ ions into hydrogen.
  - Meanwhile, the hydroxide ions permeate through the separator, resulting in the generation of oxygen at the anode.
- When seawater is used for electrolysis, the hypochlorite formation causes electrode support material corrosion and competes with the oxygen evolution reaction, consequently reducing the amount of oxygen produced.
  - At the cathode, impurities adsorbed on the electrode surface slow down the hydrogen evolution reaction.
- The catalyst employed contains transition bimetals, which exhibit higher selectivity towards the oxygen evolution reaction compared to hypochlorite formation. This resolves the issue of hypochlorite formation reducing the production of oxygen.

Green Hydrogen:
- Green hydrogen is a type of Hydrogen that is produced through the electrolysis of water using renewable energy sources like solar or wind energy. It is a clean source and has the potential to reduce carbon emissions.
- Green hydrogen has numerous applications across various sectors. It can be used as a fuel for transportation, particularly in fuel cell vehicles, where hydrogen is converted back into electricity to power the vehicle. It can also be utilised in industrial processes such as steel and chemical production, where hydrogen is a key input.
- One of the key advantages of green hydrogen is its potential to decarbonize sectors that are difficult to electrify directly. Industries such as heavy transportation, aviation, and shipping rely heavily on fossil fuels and contribute significantly to greenhouse gas emissions.

Nut Graf: IIT-Madras researchers have developed critical components that significantly enhance the efficiency, scalability, and cost-effectiveness of seawater electrolysis for hydrogen production. Their innovative approach overcomes the limitations of current technology and enables the direct use of photovoltaic-derived voltage for sustainable hydrogen generation.

13. Xposat

Syllabus: Indigenization of Technology & Developing New Technology-Space

Mains: Various applications of Xposat

Context: Recently, the chairman of ISRO addressed students and scientists during the 'User Meet of XPoSat' at the ISRO headquarters in Bengaluru.
● He emphasised the importance of effectively utilising data from science-based space missions and encouraged Indian scientific institutions to identify talented students and motivate them to work with emerging data technologies like XPoSat.

Status of XPoSat: Testing for XPoSat is nearing completion, and the mission is in its advanced stages and is scheduled to be launched sometime in the year 2023.

About XPoSat:
● XPoSat stands for X-ray Polarimeter Satellite. It is India's pioneering polarimetry mission aimed at studying various dynamics of astronomical sources in extreme conditions.
● It is only the world's second polarimetry mission using X-Ray after NASA's Imaging X-ray Polarimetry Explorer (IXPE) that was launched in 2021. XPoSat is a collaboration between the ISRO and the Raman Research Institute (RRI), Bengaluru, Karnataka.
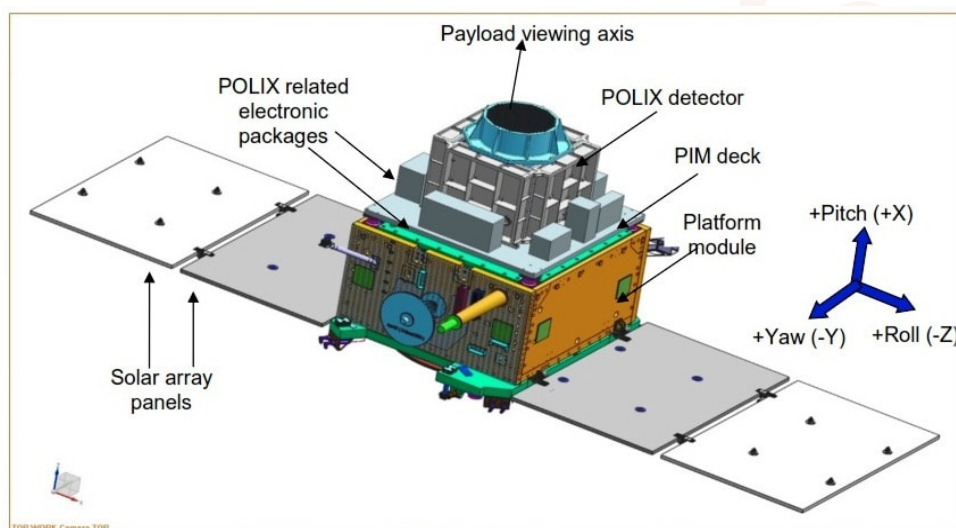
Significance of XPoSat:
● XPoSat will carry two scientific payloads: Polarimeter Instrument in X-rays (POLIX) and X-ray Spectroscopy and Timing (SPECT) in a low Earth orbit.
● POLIX payload will enable the measurement of polarimetry parameters such as the degree and angle of polarisation in the medium X-ray energy range of 8-30 keV photons originating from astronomical sources.
● Polarimetry measurements offer an excellent diagnostic tool for comprehending the emission processes from various astronomical sources.
● Astronomical sources, including black holes, neutron stars, active galactic nuclei, and pulsar wind nebulae, present complex emission mechanisms that challenge the current understanding.

Other important ISRO missions:
● **Aditya-L1:** India's first dedicated solar observatory mission, scheduled for June-July 2023
● **Chandrayaan-3:** Scheduled for June 2023.
● **Shukrayaan-1: I**ndia's first orbiter mission to Venus
● **Gaganyaan Mission:** A manned space mission that will put astronauts 400 km in orbit.
● **NISAR:** A joint Earth-observing mission between ISRO and NASA that will provide information on global environmental changes.

14. Agni Prime

Syllabus: Indigenization of Technology & Developing New Technology-Space

Prelims: Various applications of Agni Prime

Context: New Generation Ballistic Missile 'Agni Prime' was successfully flight-tested by Defence Research and Development Organisation (DRDO) from Dr APJ Abdul Kalam Island off the coast of Odisha.
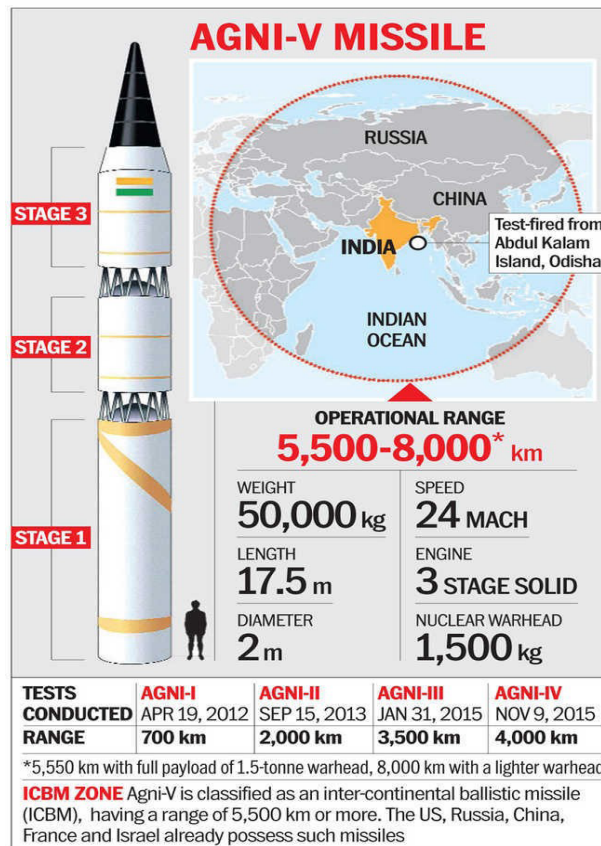
- **Agni I:** Range of 700-800 km.
- **Agni II:** Range more than 2000 km.
- **Agni III:** Range of more than 2,500 Km
- **Agni IV:** Range is more than 3,500 km and can fire from a road mobile launcher.
- **Agni-V:** The longest of the Agni series, an Inter-Continental Ballistic Missile (ICBM) with a range of over 5,000 km.
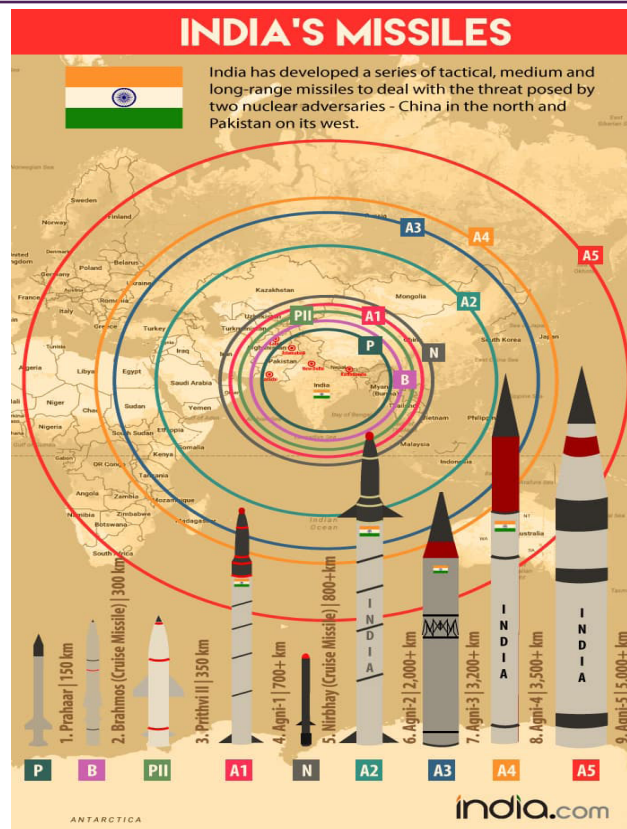
Source: India.com

- The 5 missiles (P-A-T-N-A) developed under the Integrated Guided Missile Development Program are:
- **Prithvi:** Short-range surface-to-surface ballistic missile.
- **Agni:** Ballistic missiles with different ranges, i.e., Agni (1,2,3,4,5)
- **Trishul:** Short-range low-level surface to air missile.
- **Nag:** 3rd generation anti-tank missile.
- **Akash:** Medium-range surface-to-air missile.

About Agni- Prime:
- It is a two-stage canisterised missile.
- It is the latest and sixth variant of the Agni series missiles (under IGMDP - Integrated Guided Missile Development Program).
- With multiple independently targetable reentry vehicles, the missile is capable of delivering a number of warheads at separate locations at a distance of 1,000 - 2,000 km.
- The 10.5 metre tall missile with a diameter of 1.2 metre can carry warheads up to 1.5 tonne.

Significance of the Launch:
- This was the first pre-induction night launch conducted by the Tri-services strategic forces command, which handles the country's nuclear arsenal, after three successful developmental trials of the missile.
- It validated the accuracy and reliability of the system.
- The AI objectives were successfully demonstrated in the test.
- This missile will gradually replace the Agni-I ballistic missile.

15. Male-centric medicine is affecting women's health

Syllabus: Developments & their Applications & Effects in Everyday Life

Mains: Male-centric approach within medicine and its implications on women's health across various domains.

Context: This article discusses the ill effects of poor research on women-centric medicine.

Introduction:
- The field of Medicine has historically been developed through a male-centric lens. However, this gender bias within medicine has had adverse effects on women's health.
- From diagnostic practices to treatment protocols, women have often faced disparities that have compromised their healthcare outcomes.

Limited Research on Women's Health:
- Historically, medical research predominantly focused on male subjects, leading to a lack of understanding and awareness about gender-specific health issues.
- This gender bias has resulted in limited research on conditions that predominantly or exclusively affect women, such as endometriosis, polycystic ovary syndrome (PCOS), and gestational complications.
- Consequently, healthcare providers may struggle to diagnose these conditions accurately and develop appropriate treatment strategies, ultimately compromising women's health outcomes.
- Diagnostic procedures, including laboratory tests and imaging techniques, have often been designed based on male physiology and may not be equally effective in diagnosing women's conditions.
- Women have historically been underrepresented in clinical trials, further exacerbating the gender bias within medicine.
  - This underrepresentation limits our understanding of how diseases and treatments specifically affect women, as well as the potential side effects and efficacy of medications.
  - Consequently, women may be prescribed treatments that are less effective or have higher risks due to the lack of gender-specific data.

- Women's reproductive health, including contraception, family planning, and menopause, has often been overshadowed by a male-centric approach.
  - For instance, contraceptive methods have predominantly focused on female contraception, placing the burden of responsibility solely on women.
  - Such neglect of women's reproductive health perpetuates gender inequality in healthcare and restricts women's agency over their own bodies.
- In India, known as the "pharmacy of the world," the gender disparity in clinical trials has significant implications for generic drug production.
  - Studies have shown that women's responses to generic drugs differ from men's due to underrepresentation in trials.
- Studies in the United States reveal a significant disparity in funding for research on illnesses like migraines, endometriosis, and anxiety disorders, despite their substantial impact on women's health.

Way Forward:
- Achieving equity in healthcare requires recognizing women as a distinct category, with considerations for factors such as race, age, and socioeconomic status.
- Equal time, resources, and understanding must be dedicated to finding and providing appropriate treatment and healthcare for women's unique health concerns.
- In India, there are notable advancements in women's health policies, including the right to abortion. However, it should focus on policy intervention and implementation of sex-specific research in medicine.
- With India's G-20 presidency, it presents a favorable opportunity to address this issue and align with the Sustainable Development Goals focused on women's health.

Nut Graf: The field of medicine has historically neglected women's health, leading to disparities in diagnosis, treatment, and research. The male-centric approach within medicine has undeniably affected women's health across various domains. To achieve equity, policy interventions and sex-specific research implementation are crucial.

16. Reflections on Artificial Intelligence, as friend or foe

Syllabus: IT & Computers - Artificial Intelligence

Mains: Uses and Limitations of Artificial General Intelligence (AGI)

Context: This article discusses various parameters of Artificial Intelligence and its regulation.

Introduction:
- The extensive coverage of Artificial Intelligence (AI) in the media highlights both its triumphs and the concerns raised by experts in the field.
- In response to these concerns, the Association for Computing Machinery released a statement in October 2022 called 'Principles for Responsible Algorithmic Systems,' encompassing a broader category of systems that include AI.
- Other esteemed organisations, including the Future of Life Institute, the Association for the Advancement of Artificial Intelligence, and the Center for AI Safety, have issued cautionary messages, indicating a widespread unease among those who possess substantial knowledge about AI.

Uses and Limitations of Artificial General Intelligence (AGI):
- Current AI systems excel in narrow tasks, displaying superhuman performance and becoming valuable aids to humans.
- However, their performance declines when confronted with more general or ill-defined tasks that require integrating inferences based on common sense.
- **Artificial General Intelligence (AGI)** refers to intelligence that is not restricted or specialised. It encompasses the human-like "common sense" that is absent in current AI systems.
  - There is a range of expert opinions regarding the feasibility of building AGI, with some asserting that machines may never achieve it, while others speculate that it could potentially emerge in the distant future.
- A significant development in the AI field occurred with the release of ChatGPT that utilises a Large Language Model (LLM) to generate text.
  - LLMs are massive artificial neural networks trained on vast amounts of text data to establish a statistical "model."
- ChatGPT's remarkable success in generating coherent paragraphs garnered widespread attention, leading to speculation about the emergence of AGI in future iterations like GPT-4.
- However, critics argue against such claims, emphasising that LLMs operate at a fundamental level by predicting the most probable or relevant words based on their statistical models.
  - They are often referred to as "stochastic parrots" devoid of any understanding of meaning.
  - LLMs are also notorious for generating false information and fabricating citations for non-existent academic papers.
- The advent of true AGI will have profound implications. AGI could potentially surpass humans in various intellectual or mental tasks.

Challenges with Superhuman AI:
- AGI systems could represent a superior species created by humans, bypassing natural evolution.
- Consequently, the arrival of AGI warrants serious consideration and preparation.
- Building AI tools has become relatively accessible, and even narrow AI tools can cause significant harm when used with malicious intent.
- Large Language Models (LLMs) can generate convincing fake news, leading to mental distress and even self-harm. They can also manipulate public opinion, impacting democratic elections on a global scale.
  - The absence of effective defence against such malicious behaviour raises concerns, particularly regarding AI-powered weapons and the lack of enforceable bans.
- As AI systems improve and assist humans, unintended harm may occur, disproportionately affecting certain groups due to inherent biases present in the data used for training.
  - For example, facial recognition systems have shown greater accuracy on fair-skinned men than on dark-skinned women.
  - Such biases can have catastrophic consequences in autonomous vehicles and medical diagnoses. Privacy is also at risk, as algorithmic systems constantly monitor individuals, violating the right to privacy.
- Recent advancements in AI have primarily taken place in companies with substantial computational, data, and human resources but lack effective public oversight.
  - Ensuring ethical practices and the alignment of AI systems with public interests becomes crucial.

Tailored framework for India:
- In India, there is a significant absence of awareness and extensive discussions on issues related to AI. This hampers the understanding of AI's potential impact on society and limits informed public discourse.
  - AI holds significant potential in various sectors such as public health, agriculture, transportation, and governance.
  - To fully exploit these advantages, it is necessary to engage in more discussions and deliberations to shape AI systems in a manner that promotes responsibility, fairness, and justice within Indian society.
- Reliance on foreign-made AI systems raises questions about their compatibility with Indian contexts and the need for a more localised approach.
- Therefore, it is essential to conduct systematic evaluations of AI systems in Indian settings to understand their effectiveness and shortcomings.
  - This evaluation will help identify areas where improvements are needed and ensure that AI systems align with India's specific requirements.
- Before the widespread deployment of AI systems, it is crucial to establish mechanisms of checks and balances.
  - This ensures that the implementation of AI technology is accompanied by appropriate regulations, safeguards, and oversight to mitigate potential risks and ensure ethical and responsible use.
- India should develop its own framework, taking into account past experiences of heavy-handed regulations as well as lax enforcement. Striking the right balance is crucial to foster innovation while ensuring the protection of citizens' rights and interests.

Way Forward:
- Regulation is needed to address the potential negative impacts of AGI on individuals without compromising the balance between regulation and fostering innovation.
- Rather than resorting to extreme measures like banning or halting AI research and development, which are impractical and ineffective, it is important to focus on the insufficient scrutiny and potential unintentional harm caused by AI.
- Public discussions should emphasise the solvability of these issues through concerted efforts, considering parameters that require careful monitoring and implementing effective regulation without stifling creativity.

Nut Graf: The extensive media coverage of Artificial Intelligence (AI) highlights both its successes and concerns raised by experts. Superhuman AI poses various challenges, which necessitates the need for ethical practices and public oversight. In India, there is a lack of discussion on AI's impact, necessitating a tailored framework and systematic evaluations.

17. Chollima-1 rocket

Syllabus: GS-3; Science and Technology; Awareness in the field of Space

Prelims: About the Chollima-1 rocket

Context: North Korea's attempt to launch its spy satellite failed as the Chollima-1 rocket fell into the sea.

Details
- Chollima-1 is a new rocket developed by North Korea.
- The Chollima-1 rocket was launched from North Korea's Sohae Satellite Launching Ground in the northwest, carrying the "Malligyong-1 satellite".
  - Malligyong-1 is a military reconnaissance satellite and the county's first spy satellite.
- However, the Chollima-1 rocket crashed off the Korean Peninsula's western coast as it lost thrust after the separation of its first and second stages and the carrier rocket fell in the Yellow Sea.

- The launch was criticised by South Korea, Japan and the U.S.
  - South Korea also retrieved some of the debris from the water.
- Concerns about the launch have been expressed as a satellite launch by North Korea is a violation of UN Security Council (UNSC) resolutions that have banned the country from conducting any launch based on ballistic technology.

18. Satellite bandwidth for OTT

Syllabus: GS03-Science and Technology

Prelims: OTT platforms in India

Context: OTT streaming players advocate for increased use of satellite bandwidth in India.

Introduction:
- The Asia Video Industry Association (AVIA), representing major OTT streaming players such as Netflix, Amazon, and Disney+ Hotstar, has advocated for increased use of satellite bandwidth in India.
- AVIA emphasized that millions of Indians depend on the media industry for various purposes, including entertainment, information, education, and religious participation, and satellite-based distribution is crucial to reach these consumers.
- AVIA expressed concerns that auctioning satellite frequency assignments and granting exclusive rights to one user would diminish the current extensive reuse and significantly reduce India's available spectrum resources.
- Instead, AVIA urged the government to promote satellite broadband systems, which utilize constellations of Internet-connected satellites to provide Internet access to remote areas.
- At present, India primarily uses satellite broadband as "backhaul" in locations like Lakshadweep, which are not yet connected to terrestrial networks or undersea cables.

Significance of satellite bandwidth for OTT:
- Satellites offer high bandwidth capacity, allowing for faster and more reliable streaming of data. This helps in streaming high-quality videos, movies, and TV shows without experiencing buffering or interruptions.
- Satellites can provide coverage over a wide geographical area, making streaming accessible in remote and rural locations where traditional internet infrastructure may be limited.
- Satellite bandwidth can be easily scaled up or down based on demand. Streaming platforms can adjust their bandwidth allocation to meet the needs of their users, ensuring a smooth streaming experience even during peak usage periods.
- Satellites have a global footprint, allowing streaming services to reach audiences worldwide. This is especially advantageous for content creators and distributors who want to expand their reach to a global audience without relying on localized infrastructure.
- Satellite bandwidth can support high-definition and even ultra-high-definition streaming, providing viewers with an immersive and detailed streaming experience.

19. Satellites, AI to help certify fields growing organic cotton

Syllabus: GS 3- Science and Technology.

Prelims: AI to identify organic cotton fields.

Details
- The European Space Agency (ESA), Global Organic Textile Standard (GOTS) and Marple (an AI company) are aiming to combine data from satellite images and artificial intelligence (AI) to keep track of cotton certification in India.
- It will categorize cotton fields in India in line with cultivation standards.
- It will help in generating accurate estimates of organic cotton in specific regions.
- Moreover, the initiative will support those regions that demonstrate potential for a seamless transition to organic cultivation.
- The main objective of the initiative is to bolster the integrity of organic cotton and prevent fraud throughout the supply chain.
- It will also improve economic opportunity by bringing a greater number of small-scale farmers into the certified organic sector and supply chains.
- It would escalate consumer demand.
- The project was undertaken on a pilot basis in Uzbekistan (2021). It showed 98% accuracy in differentiating organic and conventional cotton fields.
- The first results in India are expected to be released in late 2023.

20. Transgenic Cotton

Syllabus: E-Technology in the Aid of Farmers, Technology Missions

Mains: Concerns and challenges associated with GM crops.

Context: Proposal to test transgenic cotton rejected by three States.

Introduction:
- The proposal endorsed by the Genetic Engineering Appraisal Committee (GEAC), which aimed to conduct field tests for a new type of transgenic cotton seed, has been rejected by Gujarat, Maharashtra, and Telangana.
- Bioseed Research India, based in Hyderabad, has developed a transgenic cotton seed containing the cry2Ai gene, which is believed to confer resistance to the pink bollworm, a significant pest.
  - However, Gujarat, Maharashtra, and Telangana have declined the GEAC's recommendation to test this seed in farmer's fields.
- According to the existing regulations, transgenic seeds must undergo field testing before obtaining clearance from the GEAC for commercial development.
- Bioseed sought permission from four states for conducting these tests, but only Haryana granted approval.

Educating the States:
- The GEAC has requested the Department of Biotechnology and the Indian Council of Agricultural Research to collaborate in organising capacity-building activities.
- These activities aim to inform State/UT Governments about the technology and regulatory framework associated with evaluating genetically modified (GM) crops.
- In India, transgenic cotton is the sole GM crop that has received approval and is currently being cultivated in fields.

Process of approval of GM Crops in India:
- RCGM (Review Committee on Genetic Manipulation) assesses and decides on the applications regarding the testing of GM crops. (conducts Biosafety Research Level 1 trial)
- GEAC (Genetic Engineering Appraisal Committee) then assesses the applications for field trials. (Biosafety Research Level 2 Trial)
- If approved, field trial assessment is done to decide if the crop can be commercialised.
- The developers of GM crops conduct field trials to assess their performance, agronomic traits, and potential environmental impacts.
  - These trials are carried out under strict containment and biosafety guidelines, ensuring that the GM crops do not escape into the environment.
- MEC (Monitoring and Evaluation Committee) monitors small-scale trials on behalf of GEAC and reports them.
- The GEAC forms a sub-committee of scientific experts, known as the Institutional Biosafety Committee (IBC), to review the data submitted by the developers. The IBC examines the safety, efficacy, and environmental impact of the GM crop and prepares a report.
- Following the IBC review, the GEAC invites public comments and suggestions on the GM crop. This step allows stakeholders, including farmers, NGOs, scientists, and concerned citizens, to voice their opinions and concerns regarding the potential release of the GM crop.
- After considering the IBC report and public comments, the GEAC makes a decision on the approval or rejection of the GM crop. If approved, specific conditions, restrictions, or monitoring requirements may be imposed to ensure the safe use and cultivation of the GM crop.
- The Union Ministry of Agriculture, after checking the seed act, allows for the seed to be released in the market.
- Once a GM crop is approved, post-approval monitoring and surveillance are conducted to monitor its performance, potential impacts, and compliance with the prescribed conditions.

Nut Graf: Three states, Gujarat, Maharashtra, and Telangana, have rejected the proposal endorsed by the GEAC for field tests of a transgenic cotton seed developed by Bioseed Research. Only Haryana granted approval, highlighting the need for educating states about GM crop evaluation and regulations.

21. Phonons on the chopping block: Are 'sound particles' quantum too?

Syllabus: Awareness in the fields of IT, Computers, robotics, and nanotechnology

Prelims: About Quantum computers and qubits

Mains: Key findings of the recent studies on Quantum computing

Context:
A recently published paper by IBM has demonstrated that a quantum computer could solve various real-life problems and challenges that conventional computers can't solve.

Quantum computers and qubits
- Quantum computing is a fast-emerging technology that utilises the laws of quantum physics to solve challenges that are complex for conventional computers.
- Quantum computers use the properties of quantum physics and quantum mechanics to store data and perform computations.
- Quantum computers use "qubits" as their basic units of information.
  - "Qubit" can be similar to a particle such as an electron, a collection of particles, or a quantum system engineered to behave like a particle.
- Quantum computers with the help of such particles can perform various complex operations that large objects such as the semiconductors of conventional computers, can't perform.
  - This is because particles are guided by the rules of quantum physics and such rules allow qubits to have the values 'on' and 'off' at the same time.
- The basic assumption of quantum computing is that information can be "encoded" in some property of the particle such as a spin of an electron and then processed using these unique abilities to perform sophisticated calculations that cannot be performed even by the best supercomputers of today.
- Various other forms of quantum computing use other units of information such as linear optical quantum computing (LOQC) which uses "photons" as qubits.
- As per the existing theory and assumptions, any particle that can be controlled or manipulated using quantum-mechanical phenomena can be deployed as an information unit in quantum computing.

Photons and phonons as qubits
- Photons are particles of light. Photons are packets of light energy, whereas phonons are packets of vibrational energy.
- Similar to operations of processing and encoding information on electrons and then having electrons interact in different ways, LOQC uses optical tools such as mirrors, lenses, splitters, and waveplates with photons to process information.
- While electrons could be manipulated with the help of electric currents, magnetic fields, etc. photons could be manipulated using mirrors, lenses, etc.
  - However, there exists a need for using new tools to manipulate phonons and the researchers from the University of Chicago have come up with an acoustic beam-splitter to serve the purpose.
- Beam-splitters are extensively used tools in optics research. A beam-splitter, when placed in the light's path (stream of photons), will split the beam into two i.e. it reflects 50% of the photons to one side and allows the other 50% to pass straight through.

Development of an acoustic beam-splitter
- Researchers have recently developed an acoustic beam-splitter which is a tiny comb-like device with 16 metal bars extending out of it.
- Researchers placed this acoustic beam-splitter in the middle of a two-mm-long channel of lithium niobate.
  - Further, each end of the channel had a superconducting qubit i.e. a qubit whose circuit components were superconducting and could both emit as well as detect individual phonons.
  - This setup was maintained at an ultra-low temperature.
  - If the phonons emitted were converted to sound, their frequency would be too high for humans to hear and each phonon in the study illustrated the "collective" vibration of around one quadrillion atoms.
- During this study, the team of researchers observed that these phonons interacted with the comb in a similar way that photons interact with an optical beam-splitter.
- **Observations:**
  - Phonons, when emitted from the left side of the channel, were reflected half of the time and transmitted to the right side the other half.
  - Phonons, when emitted simultaneously from the left and the right sides, both ended up on one side.

Nut graf: Recent studies and research have demonstrated that phonons can be used as qubits or units of information in quantum computing. Experts believe that phonon-based computing has the ability to revolutionise the fields of quantum computing, artificial intelligence, cryptography and big data analysis.

22. Semiconductor fab: the unfinished agenda

Syllabus: GS-3, Indigenization of technology and developing new technology.

Prelims: Moore's Law

Mains: Comparing and analysing semiconductor policies and strategies of India and China

Stats related to semiconductors:
- Semiconductors are the small-sized building blocks of almost every modern electronic device from smartphones to connected devices in the Internet of Things (IoT). They help give computational power to devices.
- **The global semiconductor industry is currently valued at $500-$600 billion and caters to the global electronics industry currently valued at about $3 trillion.**

Semiconductor policy: Earlier attempt
- First, the establishment of the semiconductor fab was made in 2007 in the form of a **Special Incentive Package (SIP).**
- The second attempt in this direction was made in 2012 by introducing some amendments to the previous scheme.
- Semiconductors work on the principle of **Moore's Law, which says that the number of transistors in the unit doubles after every 18 months.** But, miniaturisation of fabs requires technical know-how and investment.

Semiconductor policy:
- The scheme for setting up of **Semiconductor Fabs in India provides fiscal support to eligible applicants for setting up Semiconductor Fabs.** This is aimed at attracting large investments for setting up semiconductor wafer fabrication facilities in the country.
- The scheme for setting up Display Fabs in India provides fiscal support to eligible applicants for setting up Display Fabs which is aimed at attracting large investments for setting up TFT LCD/AMOLED-based display fabrication facilities in the country. **The Scheme provides fiscal support of up to 50% of Project Cost subject to a ceiling of INR 12,000 crore per fab.**

Challenges faced by the semiconductor industry in India:
- Semiconductor is a **capital-intensive industry** and requires a huge amount of investment for it to fructify. India has limited exposure to funds which presents a huge challenge.
- **Rare earth minerals lie at the foundation of the semiconductor industry**. India does not produce rare earth minerals and it is dependent upon other countries for it.
- Various gases and chemicals are required in the process of constructing chips and thus **it leads to environmental concerns.**
- **High-end technical knowledge** is another prerequisite of the chip industry. India needs to provide training to a lot of people in order to realise the dream of chip manufacturing.
- The chip industry requires a **huge quantity of clean water** for it to operate. In a country like India where there is already a shortage of water, it is a difficult case.

Way forward:
- India needs to develop joint collaboration with countries that have advanced knowledge in this field. Providing training to the workforce would help in realising the dream of becoming a semiconductor hub in the world.

Nuf graf: Despite increased government focus and the introduction of various initiatives such as the 2022 Semiconductor Mission, uncertainty still looms over the semiconductor fabrication industry in India. This requires attempts to understand, examine and compare the approaches adopted by India with other approaches adopted in other countries such as China which have a flourished semiconductor fab industry.

23. GEMCOVAC-OM

Syllabus: GS-3; Science and Technology; Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Prelims: About GEMCOVAC-OM and mRNA vaccines

Context:
India's first mRNA vaccine against Omicron has been approved under emergency use guidelines by the Drug Controller General of India (DCGI).

GEMCOVAC-OM
- GEMCOVAC-OM is the country's first indigenous mRNA vaccine for the Omicron variant of coronavirus.
- GEMCOVAC-OM has been developed by the Pune-based Gennova Biopharmaceuticals.
  - The Gennova Biopharmaceuticals had earlier got approval for GEMCOVAC-19, which was India's first m-RNA vaccine against COVID-19.
- GEMCOVAC-OM is a mRNA-based vaccine that uses the spike protein of the omicron variant of the SARS-CoV-2 as an antigen.
- The most striking feature of the GEMCOVAC-OM vaccine is that it was seen to be stable in a 2-8°C range and hence could be stored in "ordinary" refrigerators.
  - It is a lyophilized (freeze-dried) vaccine.
- GEMCOVAC-OM vaccine will be given as an intradermal (ID) injection only using a Needle-free Tropis Injection system developed by PharmaJet, USA.

24. Matsya-6000 submersible

Syllabus: GS-3; Science and Technology; Achievements of Indians in science & technology; indigenization of technology and developing new technology.

Prelims: About Matsya-6000 submersible and Samudrayaan project

Context:
Amidst the search for Titan submersible, the proposed Matsya-6000, Indian submersible dive has come to the limelight.

Background
- Titan is a 22-foot carbon-fibre and titanium craft deployed by a Canadian expedition ship, the M.V. Polar Prince, to travel nearly 13,000 feet down to explore the site of the Titanic shipwreck in the North Atlantic.
- However, this submersible watercraft with five people on board has been missing after it set out to explore the shipwreck site.

Matsya-6000 submersible
- Matsya-6000 is India's indigenous submersible dive vehicle currently being developed.
- The Matsya-6000 vehicle is being developed with an aim to carry humans to a 6000-metre (6km) depth underwater as a part of the ambitious "Samudrayaan project".
- The Matsya-6000 submersible vehicle is being designed and developed by the National Institute of Ocean Technology (NIOT), Chennai under the Ministry of Earth Sciences.
- It has an endurance of 12 hours under normal operation and 96 hours in case of emergency for human safety.
- The Matsya-6000 submersible vehicle is designed in such a way as to carry three people in a 2.1-meter diameter Titanium Alloy Personnel Sphere.
- Manned Submersible helps facilitate direct human observation in deep sea or ocean exploration of critical mineral resources such as Nickel, Cobalt, Rare Earths, Manganese, etc. and collection of samples.
- Apart from the scientific research and technological empowerment, the Manned Submersible mission also helps promote underwater engineering innovations in asset inspection, tourism and ocean literacy
- This underwater Manned Submersible mission is expected to be realised by the year 2026.

25. India's Largest radio telescope plays vital role in detecting universe's vibrations

Syllabus: GS-3, Achievements of Indians in science and technology, recent developments in the field of space and astronomy.

Prelims: Radio telescopes, technological advancements in space exploration.

Details
- India's Giant Metrewave Radio Telescope (GMRT) played a crucial role in confirming the presence of gravitational waves through pulsar observations.
- Using six of the world's most sensitive radio telescopes, including India's largest telescope called the uGMRT (upgraded GMRT) based in Pune, an international team of astronomers from India, Japan, and Europe conducted the study.

Evidence for Gravitational Waves
- The study's results provide evidence for the presence of ultra-low frequency gravitational waves.
- Gravitational waves are expected to originate from massive black hole pairs much heavier than our sun.
- The observations hint at the relentless vibrations of the fabric of the universe caused by these gravitational waves.

Research Collaboration and Publications
- The group of researchers involved in the study included individuals from both the European Pulsar Timing Array and the Indian Pulsar Timing Array consortia.
- Their findings on the detection of gravitational waves in their dataset were published in two papers in the Astronomy and Astrophysics journal.

Pulsars: Nature's Best Clocks
- Pulsars are rapidly rotating neutron stars, remnants of dead stars, located in our galaxy.
- They emit radio beams that regularly flash towards the Earth, making them akin to cosmic lighthouses.
- The signals from pulsars are precisely timed, making them valuable for studying the mysteries of the Universe.

Creating a Galactic-Scale Gravitational Wave Detector
- Scientists utilize highly stable pulsar clocks distributed throughout the Milky Way galaxy to detect gravitational wave signals.
- These pulsars collectively form an "imaginary" galactic-scale gravitational wave detector.

26. Radio Telescopes

Syllabus: GS-3; Science and Technology

Prelims: About Radio Telescopes

Introduction:
- Telescopes are essential tools for astronomers, enabling them to explore the universe.
- Among the different types of telescopes, radio telescopes play a crucial role in observing celestial objects using radio waves, which range from 1 mm to over 10,000 km in wavelength.

Detection and Amplification
- Radio telescopes collect faint radio waves emanating from deep space.
- Specialized equipment assists in focusing and amplifying these waves for scientific analysis.

Celestial Objects Studied
- Radio telescopes can detect radio waves emitted by various celestial objects, including stars, galaxies, and black holes.
- The ground-based nature of radio telescopes is attributed to their large size, as the size of the antenna correlates with the wavelength being observed.

Dish Antenna
- Parabolic dish antennas are commonly employed in radio telescopes.
- The curved shape of the dish allows radio waves to bounce and converge at a focal point known as the focus.
- At the focus, a receiver collects the radio waves for further analysis.
- Dish antennas have the capability to collect multiple wavelengths simultaneously, requiring the use of receivers designed to detect various wavelengths.

Advantages of Radio Waves
- Radio waves possess a large wavelength, enabling them to travel long distances without significant interference.
- This property makes radio waves suitable for observing objects obscured by dust clouds or other obstacles.
- However, as radio waves travel longer distances, their intensity diminishes, necessitating measures to maximize signal collection and utilize amplifiers to enhance their strength.

Prominent Radio Telescope:
- The Five-hundred-meter Aperture Spherical Telescope (FAST) in China is one of the largest radio telescopes worldwide.
- It features a massive 500-meter-wide dish, allowing for extensive observation and analysis of radio waves from distant celestial objects.

27. India's Third Moon Exploration Mission: Chandrayaan-3

Syllabus: GS-3; Science and Technology:

Prelims: About Chandrayaan-3

Background on Chandrayaan-2:
- Chandrayaan-2 lander and rover configuration, along with the payloads, were lost when the Vikram lander crashed during a soft landing on the lunar surface.
- ISRO aims to launch Chandrayaan-3 in mid-July aboard the LVM3 (formerly GSLV Mk-III) rocket from Sriharikota.

Retaining Names from Chandrayaan-2
- The Indian Space Research Organisation (ISRO) intends to keep the same names for the Chandrayaan-3 lander and rover as their Chandrayaan-2 counterparts.
- The Chandrayaan-3 lander will be named Vikram after Vikram Sarabhai, the father of the Indian Space Programme.
- The rover for Chandrayaan-3 will be named Pragyan.

Mission Details:
- A propulsion module will carry the land rover configuration to a 100 km lunar orbit.
- Upon safe arrival on the moon, the Vikram lander module will deploy the Pragyan rover for in-situ chemical analysis of the lunar surface.

Scientific Experiments:
- The lander, rover, and propulsion module will carry payloads for conducting experiments to gain insights into the moon's characteristics.
- Lander payloads: Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere (RAMBHA), Chandra's Surface Thermo Physical Experiment (ChaSTE), Instrument for Lunar Seismic Activity (ILSA) and the LASER Retroreflector Array (LRA).
- Rover payloads: Alpha Particle X-ray Spectrometer (AAPXS) and the LASER Induced Breakdown Spectrometer (LIBS).
- Propulsion module payload: SHAPE (Spectro-polarimetry of HAbitable Planet Earth).

28. Euclid set to launch next week in quest for dark energy

Syllabus: GS-3, Science and technology

Syllabus: Current events of national and international importance

Prelims: Euclid Mission, Dark Energy

Mains: Science and technology developments and their application and effects in everyday life.

Context: The Euclid Space Telescope, launched by the European Space Agency (ESA), is set to embark on an extraordinary mission to survey billions of galaxies and unravel the secrets of the Universe.
This article explores the mission, the significance of the Euclid mission, and its potential to shed light on the remarkable phenomena of dark energy and dark matter.

About Euclid Mission:
The Euclid mission is part of ESA's 'Cosmic Vision' program, which seeks to explore the origin, composition, and fundamental laws governing the Universe.
With its advanced instruments, the mission will survey more than a third of the sky, capturing data from billions of galaxies and their characteristics.

About the components of Euclid:
- Elucid is made up of advanced instruments.
- It is equipped with a 1.2-meter-wide telescope.
- The Euclid Space Telescope carries a visible-wavelength camera (VISible) and a near-infrared camera/spectrometer (NISP).
  - The NISP will analyze the motion of galaxies, providing valuable insights into the effects of gravity and the distribution of matter.
  - The VISible camera will investigate subtle distortions in the shapes of distant galaxies, enabling scientists to study the interplay between gravity and dark energy.

Potential discoveries and significance:
- **Exploring the evolution of the Universe:**
  - The Euclid mission aims to study the light emitted by galaxies that existed 10 billion years ago, offering a glimpse into the early stages of the Universe's evolution.
  - By analyzing these light emitted billions of years ago, scientists can develop a better understanding of the formation, structure, and development of galaxies over vast cosmic timescales.
- **Shedding more light on Dark Energy:**
  - Dark energy is responsible for the accelerated expansion of the Universe.
  - Dark energy constitutes approximately 68% of the Universe and play a significant role in its evolution and shaping its structure.
  - The Euclid mission seeks to gather essential data to unravel the mysteries surrounding dark energy and dark matter, providing insights into their nature and influence on the cosmos.
- **Shedding more light on Dark Matter:**
  - Dark matter is an invisible substance that shapes cosmic structures.
  - Dark matter, comprising roughly 27% of the Universe, exerts gravitational effects on visible matter, influencing the formation of galaxies and galaxy clusters.
  - The Euclid mission aims to gather data that will enhance our understanding of dark matter's properties, distribution, and its role in the cosmic web.
- **Collaboration and Scientific Endeavor:**
  - The Euclid Consortium has physicists, astronomers, engineers, and managers, to foster collaboration and ensure the mission's success.
  - Combining expertise and resources, the consortium aims to harness the potential of the Euclid Space Telescope to revolutionize our understanding of the cosmos.

Nut graf: The Euclid Space Telescope, an ambitious mission to survey billions of galaxies, in unraveling the mysteries of the Universe offer huge potential in the field of science. By exploring the phenomena of dark energy and dark matter, the mission offers mankind the opportunity to expand its understanding of the cosmos, and shape the future of astrophysics and scientific laws.

DEFENCE AND INTERNAL SECURITY

1. CoWIN vaccination data out, govt. denies breach

Syllabus: Cyber Security- Data security.

Mains: Data breach and data privacy.

Prelims: CoWIN portal.

Introduction
- There is an alleged data leak of COVID vaccination beneficiaries, including several politicians.
- The Union Health Ministry has denied the allegations citing that such reports are without any basis and are mischievous in nature as the CoWIN portal was completely safe with adequate safeguards for data privacy.

Details:
- According to reports, if the mobile number of the person is entered, details like the identification number of the document submitted (Aadhaar/passport/PAN), gender, date of birth, and the centre of vaccine administration are provided as a reply. Indicating data breach.
- However, the Ministry of Electronics and Information Technology clarified that CoWIN is safe and the database breached was other than the CoWIN.
- Notably, CoWIN is integrated into the Aarogya Setu and UMANG Apps and thus has raised serious concerns.
- The Union Health Ministry requested the Indian Computer Emergency Response Team (CERT-In) to investigate this issue and submit a report.
  - In its initial report CERT-in pointed out that the back-end database for the Telegram bot(that is giving details of individuals) was not directly accessing the APIs of the CoWIN database.
  - Despite accusations, health authorities maintain that CoWIN has a state-of-the-art secure infrastructure and has never faced a security breach.
- In a similar incident in June 2021, a hacker group named 'Dark Leak Market' claimed that it had a database of about 15 crore Indians who registered themselves on the CoWIN portal. The authorities rubbished the claim even then.

Nut Graf: There is an alleged data breach of the CoWIN portal. However, government authorities are dismissing the claims. The government should immediately address the concerns as the privacy of millions of citizens are at stake if any such breach exists.

2. What does the alleged CoWIN data leak reveal?

Syllabus: Cyber Security

Mains: Significance of a strong data protection law to protect personal and confidential data

Context: This article discusses the alleged CoWIN data leak by a bot on a messaging platform.

Introduction:
- On 12th June, 2023, a report revealed that a bot is disclosing personal data of people who had registered on the COVID-19 vaccination portal CoWIN.
- The Health Ministry of India denied such reports of data breach the same day, and said the allegations were "mischievous."

What is CoWIN?
CoWIN is a government owned online portal which was set up in 2021 to administer and manage India's COVID-19 vaccination drive. It tracks vaccines and beneficiaries and helps people schedule their vaccine appointments. It also issues a vaccine certificate, for which it needs some personal data including the Aadhaar number of the beneficiaries.

What might have gone wrong?
- The CoWIN online platform has been developed from the ground up on Amazon Web Services (AWS).
- It's a microservice architecture that arranges an application as a collection of fine grained services. These services interact with each other through certain set protocols.
- The cloud-native platforms like AWS provide security only for the underlying infrastructure, not for securing the applications and databases. It's the responsibility of the customer (hosting the data) to maintain the secrecy of their data.
- The traditional software-based systems termed as "legacy systems" deployed in virtual servers (CoWIN portal in this case) are the weak links in the chain. Such links are an easy route for hackers to gain entry into the database.
- Human error, negligence or third-party apps' involvement could also contribute to the breach of data.

Why it matters:
- This is not the first time reports about data leaks have emerged. Earlier also it was alleged that the government could not keep the CoWIN data confidential.
- The country needs a strong data protection system and a strong data protection law may help in this regard.

Nut graf: A recent report revealed a possible data breach on CoWIN, India's COVID-19 vaccination portal. The Health Ministry denied the allegations, highlighting the need for a robust data protection system.

3. Massive Carrier Battle Group (CBG) Operation

Syllabus: GS03- Security-Various Security Forces & Agencies & Their Mandate

Prelims: Massive Carrier Battle Group (CBG) Operation

Details:
- The Indian Navy conducted an extensive operation in the Arabian Sea, showcasing its operational capabilities involving more than 35 aircrafts.
- A Carrier Battle Group (CBG) comprises an aircraft carrier accompanied by multiple escort vessels. It serves as a formidable naval fleet capable of various missions.
- Recent exercise on June 10,2023 featured a twin CBG operation, highlighting the participation of both of India's aircraft carriers, INS Vikramaditya and INS Vikrant.
  - These carriers were accompanied by a diverse fleet of escort ships, submarines, and aircraft, creating a robust and coordinated force.
- The exercise emphasised India's commitment to safeguarding national interests and maintaining regional stability. It also marked a significant milestone in the Indian Navy's efforts to enhance maritime security and extend its power-projection capabilities in the Indian Ocean and beyond.
- The operation highlighted the pivotal role of sea-based air power in maintaining maritime superiority, aiming to demonstrate India's preparedness in the face of increased Chinese activities in the Indian Ocean.

4. Army Air Defence (AAD)

Syllabus: GS03- Security-Various Security Forces & Agencies & Their Mandate

Prelims: Army Air Defence (AAD)

Context: This article discusses the present transformation of the Army Air Defence (AAD).

Introduction:
- The Indian Army has shifted its focus from the western borders to the northern borders following the 2020 standoff with China.
- The Army Air Defence (AAD) is undergoing a transformation with the induction of new systems, many of which are indigenous. These new technologies are tailored to address the current realities and challenges.
- Lessons from the Ukraine conflict have prompted the Army to consider new threats to air defence, including unmanned aerial vehicles (UAVs), loitering munitions, swarm drones, and cruise missiles.
- The Ukrainian conflict highlighted the effectiveness of Man Portable Air Defence Systems (MANPADS) equipped with night vision capabilities.

Project Akashteer:
- Project Akashteer is an automation initiative aimed at creating a comprehensive air defence system for monitoring, tracking, and neutralising air defence assets.
  - It draws inspiration from the Indian Air Force's Integrated Air Command and Control System network.
- The contract for Akashteer, valued at nearly ₹2,000 crore, was signed in March 2023. It is expected to be implemented by March 2024, making it one of the fastest projects in the Army.
- Akashteer will connect all radars and control centres of AAD, streamlining the air defence picture by eliminating duplications and overlaps.
- Additionally, it will integrate all weapons, providing a much-needed comprehensive air defence solution.
- Akashteer will possess the capability to establish communication with the Indian Air Force's network, enhancing coordination between the two branches.

Surface-to-air missile (SAM) systems:
- In March 2023, the Defence Ministry signed a contract with Bharat Dynamics Limited for two regiments of upgraded Akash surface-to-air missile (SAM) systems.
- These modified Akash regiments are specifically designed for mountainous regions and have undergone extensive trials.
- However, the global shortage of components and hardware for air defence systems, stemming from the Ukrainian conflict, could potentially hinder the pace of inductions.
  - For example, the scarcity of radar chips, predominantly imported, may slow down manufacturing and deliveries.

Army Air Defence (AAD):
- The Corps of Army Air Defence (abbreviated as AAD), is an active corps of the Indian Army and a major combat support arm tasked with air defence of the country from foreign threats.
- The AAD is responsible for the protection of Indian air space from enemy aircraft and missiles, especially below 5,000 feet.
- The origins of AAD can be traced back to 1939 during the era of British Raj in India. The corps actively served in the Second World War on behalf of the British Empire.
- Following India's independence, the corps played a significant role in all subsequent wars involving the country, beginning with the 1947 Indo-Pakistani War and extending to the 1999 Kargil conflict.
- In 1994, the AAD achieved autonomous status when it was separated from the Army's Regiment of Artillery, resulting in the formation of the Corps of Air Defence Artillery as a distinct entity.

5. 'Soul of Steel' Challenge

Syllabus: Various Security forces and agencies and their mandates

Prelims: 'Soul of Steel' Challenge

Context: The 'Soul of Steel' challenge launched in the forward areas of Garhwal Himalayan region in Joshimath, Uttarakhand, by a group of special forces veterans, under CLAW Global, in partnership with the Army to test an individual's high-altitude endurance has entered the final phase of training.

About The Challenge:
- Soul of Steel-Himalayan Challenge is the world's first self-sustained, high-altitude skill and endurance at such glaciated and snow bound terrains. It is modelled on the lines of the 'Ironman triathlon' long-distance triathlon challenge in Europe which tests an individual's grit and endurance.
- **The challenge was planned in four stages:**
  - **Stage 1:** jungle and mountain training over 40 days;
  - **Stage 2:** high altitude training over 30 days;
  - **Stage 3:** refresher course for international teams over 15 days and
  - **Stage 4:** the challenge over seven days. The general area of the expedition is the Nanda Devi national park which has several 7,000 feet plus peaks.
- The challenge was formally flagged off by Defence Minister Rajnath Singh on January 14 and encompassed 12 weeks of training where participants from across India were trained in self-sustained style of mountaineering, survival, self-defence, navigation and emergency medicine to become self-sufficient.
- Soul of Steel Himalayan challenge, joint initiative by Indian Army and CLAW Global was flagged off from Auli, Uttarakhand. The three months long skill and endurance challenge will culminate on June 18
- **Team CLAW:** Team CLAW (Conquer Land Air Water) is a team of ex-Indian Special Forces commandos.

6. INS Kirpan

Syllabus: GS-3; Security; Various Security forces and agencies and their mandate.

Prelims: About INS Kirpan and India-Vietnam relations

Context:
India gifted INS Kirpan to Vietnam to strengthen that country's naval capabilities.

INS Kirpan
- INS Kirpan is an indigenously-built in-service missile corvette.
- INS Kirpan is a Khukri-class missile corvette that was commissioned into the Indian Navy in January 1991.
- INS Kirpan was built by the Garden Reach Shipbuilders & Engineers, Kolkata.
- The missile corvette is 91 metres in length, has a beam of 11 metres, is capable of reaching speed in excess of 25 knots and has a displacement of close to 1,400 tonnes,
- INS Kirpan is equipped with a medium-range gun, 30 mm close-range guns, chaff launchers, and surface-to-surface missiles.
- INS Kirpan can be deployed to undertake a wide variety of roles such as coastal and offshore patrol, coastal security, surface warfare, anti-piracy, and Humanitarian Assistance and Disaster Relief (HADR) operations.

India-Vietnam relations
- India and Vietnam signed a Memorandum of Understanding (MoU) on mutual logistics support in June 2022.
- The Defence Ministers of the two countries signed the "Joint Vision Statement on India-Vietnam defence partnership towards 2030" with an aim to enhance the scope and scale of existing defence cooperation.
- Vietnam has procured 12 high-speed patrol boats for the Vietnamese border guard force under a $100 million Line of Credit (LoC) extended in September 2014.
- Further, India extended another $500 million defence LoC in 2016 and discussions are underway to identify the equipment.

- India has also announced gifting two simulators and a monetary grant towards the setting up of a Language and IT Lab at the Air Force Officers Training School.
- The two countries have shared a Comprehensive Strategic Partnership since 2016.
- Vietnam has been a crucial partner in India's "Act East policy" and the "Indo-Pacific vision".

7.   Internet Suspension in Manipur

Syllabus: Challenges to Internal Security Through Communication Networks

Mains: Implications of Internet Shutdowns

Context: Manipur government's decision to extend net shutdowns.

Introduction:
- The Manipur High Court recently allowed limited Internet access in designated areas of the state following a petition for its restoration.
- Shutdowns, enforced since May 3, 2023, have adversely affected economic activities and livelihoods.
- Citizens have been unable to access vital services such as e-commerce-related activities, except for those who can get exemptions from the shutdowns with government permission.

Reasons behind shutdown extensions:
- Threats to law and order and anti-social elements are cited as reasons for the shutdown extensions.
- The Manipur government also told the High Court that the shutdowns were needed to block websites where inflammatory material could be published.
- However, the government fails to meet the requirements of a public emergency or public safety as per the Telegraph Act, 1885 and Telegraph rules and such a sledgehammer approach is clearly problematic.

Supreme Court on Internet suspensions:
- The Supreme Court, in Anuradha Bhasin vs Union of India (2020), has ruled that indefinite suspension of Internet services violates freedom of speech and commercial rights, emphasising the principle of proportionality and necessary duration.
- The court also criticised the use of internet shutdowns as a substitute for maintaining law and order, highlighting the need for a balanced approach that respects individual rights and ensures public safety.

Road Ahead:
- The Manipur situation calls for restoring confidence, engaging civil society, isolating extremists, and pursuing a step-by-step approach towards peace.
- Despite the challenges posed by a troubled Chief Minister and ongoing ethnic tensions resulting in sporadic violence and displacement, it is imperative that the Internet shutdown, which has been enforced for an extended period of time, be terminated.

Nut Graf: The recent decision by the Manipur High Court to allow limited Internet access addresses the adverse impact of shutdowns on economic activities and livelihoods. The reasons behind the shutdown extensions, including threats to law and order and the blocking of inflammatory websites, do not meet the requirements of a public emergency or public safety.

8.   Refugee influx into Mizoram

Syllabus: Role of External State & Non-State Actors in Creating Challenges to Internal Security

Mains: Various parameters of refugee crisis in India

Context: This article discusses the implications of increasing refugee influx into Mizoram.

Introduction:
- Over the past few years, Mizoram has experienced an increase in the number of refugees from Myanmar, and more recently from Bangladesh and Manipur, which has impacted the region's internal security situation.
- Discrepancies exist between the figures provided by the State government and security forces regarding the number of refugees from Myanmar.
- However, there are approximately 8,000 individuals from Manipur and over 900 people from Bangladesh, and these numbers are expected to rise further.
- The State government has allowed entry to individuals arriving from Myanmar, with the requirement that they be properly registered, as directed by the Central government.
- Currently, camps have been established, but a majority of the refugees have chosen to stay with relatives or seek employment elsewhere.

Implications of refugee influx:
- The existing population in Mizoram may experience challenges in terms of accommodating and integrating a large number of refugees from different cultural backgrounds. This can lead to cultural clashes, strained social relations, and potential conflicts.
- The scarcity of local resources in south Mizoram, primarily due to the challenging terrain, has been compounded by the influx of refugees. This shortage has the potential to incite unrest among the local population.
- The arrival of a large number of refugees can have both positive and negative economic implications for Mizoram.
  - On one hand, it can lead to increased economic activity and demand for goods and services, potentially benefiting local businesses.
  - On the other hand, it can also create competition for limited resources and job opportunities, leading to potential unemployment and economic disparities among the local population.
- The increased population density resulting from a growing refugee influx can have environmental implications.
  - Deforestation, land degradation, and increased pressure on natural resources can occur as more land is utilised for housing and infrastructure to accommodate the growing population.

Narcotics smuggling:
- Officials on the ground express particular concern about the influx from Bangladesh, as it may create opportunities for smuggling narcotics and weapons, posing a new challenge for security forces.
- A significant issue on the India-Myanmar Border (IMB) is the escalating smuggling of narcotics, with seizures steadily increasing each year.
- Concerns have been raised about the presence of guides leading refugees through the dense jungles of south Mizoram, which could be exploited for smuggling arms and narcotics.
  - In Mizoram alone, the total value of confiscated narcotics in the current year reached ₹603.43 crore, compared to ₹355 crore in 2022.
- The Assam Rifles, deployed along the IMB, are actively monitoring the situation and addressing security concerns.
- The imposition of martial law by Myanmar's military junta in several states and regions, coupled with recent air strikes near the IMB, has heightened tensions in border-adjacent areas. Nevertheless, the security situation along the IMB in Mizoram remains stable.

Nut Graf: In recent years, Mizoram has witnessed an increase in refugees from neighbouring countries, impacting the region's internal security. Officials express concerns about narcotics smuggling and weapon trafficking, while security forces actively monitor the situation along the India-Myanmar Border.

9.   Manipur, a rude reminder of northeast tensions

Syllabus: Internal Security Challenges.

Mains: Violence in Manipur.

Introduction:
- Manipur Violence has claimed more than 100 lives and has left thousands of people displaced.
- It is argued that despite several developments in the northeast, ethnic divide and violence is still prevalent

Associated Concerns:
- Though communications, transit facilities, and support for special needs of the region have improved, there is still a divide between tribes and plains people within the region.
- In case of an outbreak of violence, the reasons cited are:
  - Excess of region-centric calculus
  - Lack of internal cohesion
  - Ethnic/caste rivalries
  - Presence of ethnic sub-nationalism and identity politics in an aggravated form
- It is highlighted that in the Northeast, ethnic identities still overshadow all other considerations.
- Additionally, various reports point out that consolidation efforts by different tribal entities resulted in subterranean pressures and ultimately led to the reopening of several issues that were deemed settled.

Details about 2023 Violence in Manipur:
- It is highlighted that though Meities lack a significant militaristic profile, they have developed a networking strategy with other northeastern resurgent outfits and militant groups.
- The current polarisation appears total and irreconcilable, despite peace moves by authorities.
- The Kuki tribes have blamed the state government (more specifically Chief Minister) for ongoing violence.
- The police are also accused of siding with the Meitei attackers.
- Meities have threatened to form a 'civilian defence force' to protect their people against attacks by Kuki militants.
- Tribal groups like the Kukis-Chins-Mizos-Zomis are urging the Centre to give the region inhabited by them a separate administration. While some are demanding the imposition of President's rule under Article 356 of the Constitution.

Proposed Solutions and its Consequences:

- The Home Minister announced the judicial probe into ethnic violence and a three-member committee to look into the situation. This is well-received by the public.
  - However, to many the solutions seem uncertain.
- It is argued that the proposal for the establishment of a unified command to oversee security in the State appears draconian in the prevailing circumstances.

Way Ahead:

- The Centre should achieve 'optimal positioning'. It requires both sensitivity and innovative thinking.
- The cultural factors should be critically understood as the Meity versus Tribal divide is a cultural as well as sociological phenomenon.
- It is important to find a solution soon as it has the potential to ignite conflicts elsewhere in the region.
- The impression that the Central Government is neutral in any conflict, and is only on the side of justice should be properly communicated.

Nut Graf: The violence in Manipur reminds that despite development, the ethnic divide is still prevalent in Northeast India. It is important to urgently find a solution to the problem, otherwise, it can ignite similar conflicts elsewhere in the region.

ENVIRONMENT AND ECOLOGY

1. As humans exit, wildlife has the run of Debrigarh

Syllabus: GS-3: Conservation, environmental pollution and degradation, environmental impact assessment.

Prelims: Wildlife sanctuaries, human-wildlife conflict.

Details:
- Debrigarh, a wildlife sanctuary in the Bargarh district of Odisha, achieves complete removal of human settlements.
- Considered one of the largest 'peaceful' relocations of forest dwellers in the country.
- Positive impact observed through a reduction in human-wildlife conflicts.

Background:
- Debrigarh sanctuary spans 353.81 sq. km and previously housed human settlements.
- Permanent human settlements within wildlife sanctuaries are common in the state.
- Debrigarh and Nalabana Bird Sanctuary in Chilika Lake are exceptions.

Relocation Process:
- Consultations were conducted with the 400 families residing in Debrigarh.
- Families voluntarily agreed to move out of their villages.
- No use of force during the relocation process.
- Compensation of ₹15 lakh paid to each eligible family.

Reasons for Relocation:
- Villagers lacked access to basic facilities like electricity, healthcare, and education.
- Mandate to protect critical wildlife sanctuaries from human interference.
- Ensures inviolability of the sanctuary.

Impact of Relocation:
- Reduction in incidents of human-wildlife conflicts observed after relocation.
- Recent incident: A tiger from neighbouring Chhattisgarh crossed over into Debrigarh.
- Relocation benefits both wildlife conservation and the villagers.

2. International trade has a carbon problem

Syllabus: Effect of policies and politics of the developed world.

Mains: EU's Carbon Border Adjustment Mechanism (CBAM).

Prelims: CBAM.

Context: European Union's Carbon Border Adjustment Mechanism.

Details:
- India is apprehensive about the European Union's Carbon Border Adjustment Mechanism (CBAM) which has the potential to cripple India's export of carbon-intensive products.
- New Delhi has called CBAM protectionist and discriminatory. It is also looking forward to challenging the law at World Trade Organization (WTO)'s dispute settlement body.
- However, India's export to European Union is only 1.8% and is limited only to aluminium, iron, and steel.
- Though the international trade regime allows countries to adopt unilateral measures for safeguarding the environment, it should not be used for trade protectionism.

Carbon Border Adjustment Mechanism (CBAM):
- The EU adopted the Emissions Trading System (ETS) in 2005.
  - It is a market-based mechanism that intends to reduce greenhouse gas (GHG) emissions by allowing bodies emitting GHG to buy and sell these emissions amongst themselves.
  - The ETS is now at its fourth stage.
- The EU is worried that the ETS mechanism might put domestic industries at a disadvantage.
- It is also concerned that European firms operating in carbon-intensive sectors might possibly shift to countries having less stringent GHG emission norms. This phenomenon is called 'carbon leakage'.

WTO's Stand:
- WTO law is based on the fundamental principle of non-discrimination. It accords equal treatment to 'like' products irrespective of their origin country (Most-Favoured Nation Clause).
- The countries are also required to treat foreign-made 'like' products as they treat domestic ones (National Treatment Principle).

Associated Concerns:
- Despite being origin-neutral, CBAM might discriminate between goods from different countries on account of an inadequate carbon pricing policy.
- Moreover, there is a concern about whether the carbon-intensive products to which the CBAM applies are 'like' or not. For example,
  - Steel production by electric arc furnaces is less carbon-intensive than the steel produced in blast furnaces.
- It has re-ignited debates on the comparison of products based on processes and production methods.
- It is argued that the CBAM violates WTO law by discriminating between EU and foreign products based on embedded emissions.
- However, there might be a claim for justifying CBAM under the General Exceptions clause given in Article XX of the General Agreement on Tariffs and Trade (GATT).
  - According to Article XX, measures taken by countries that otherwise violate GATT obligations are permitted if:
    - They fall under one of the listed policy grounds.
    - They fulfil the requirements of the introductory clause of Article XX, called the chapeau.
- The commentators argue that the CBAM considers only 'explicit' carbon prices and excludes the 'implicit' costs (non-price-based costs) borne by the products originating in some countries.
- It also arbitrarily discriminates between countries having the same environmental conditions.

Conclusion:
India should deliberate with the EU to secure gains on CBAM and help in maximizing the benefits of Indian exporters through bilateral trade.

Nut Graf: The Carbon Border Adjustment Mechanism might be used for trade protectionism in the pretext of environmental protection. There are several concerns associated with its discriminatory approach. It is suggested that India should deliberate on a bilateral trade deal with the EU or use WTO to address its challenges.

3. Miyawaki forests

Syllabus: Environmental Conservation

Mains: Concept of Miyawaki forests

Context: PM Modi talks of Miyawaki forests in Mann ki Baat

About Miyawaki Forests:

Source: thebetterindia.com

- Miyawaki Forests is a technique for creating dense, diverse, and fast-growing forests in a short period.
- **Developed by Dr. Akira Miyawaki**
- **Method- Involves planting a wide variety of native tree species in a small area, densely packed together.**
  - The trees are planted in a random pattern, which helps to create a diverse and resilient forest ecosystem.
  - Saplings also help each other grow by preventing sunlight from reaching the ground, blocking weed growth.
- **Key Features of Miyawaki Forests**
  - Dense plantings and vertical structure
  - Biodiversity and native species
  - Quick growth and carbon sequestration
  - Low maintenance and self-sustainability
- **Environmental Benefits**
  - Carbon sequestration and climate change mitigation
  - Enhanced biodiversity and wildlife habitat
  - Improved air and water quality
- **Social and Economic Benefits**
  - Health and well-being benefits for communities
  - Urban beautification and aesthetics
  - Research and recreational opportunities
  - Economic potential and green job creation

Challenges and Limitations
- Poor awareness
- Initial investment and time required
- Land acquisition
- Long-term maintenance and sustainability

4. Decarbonizing the steel sector

Syllabus: Environmental Conservation and pollution

Mains: Decarbonizing in industries

Context: The development requirements of India, is going to increase the appetite for steel in the coming years. India's steel industry accounts for about 11 per cent of the country's emissions currently

Present Situation:
- India is the world's 2nd largest producer of crude steel and 2nd largest consumer of finished steel.
- The National Steel Policy 2017 has set a target to reach 300 million tonnes (MT) of annual production by 2030 from the existing level of 120 MT.
- India's crude steel production is expected to increase to about 435 million tonnes (mt) by 2050.

Importance of decarbonization:
- Will save crucial foreign exchange - import of coking coal
- Setting up of a global supply base - early mover advantage
- Meeting of the international commitments on climate change
- Helps adapt to changing regulatory regimes like Carbon Border Adjustment Mechanism by the European Union.

Issues and challenges:
- Hydrogen based production is uncompetitive - price disadvantage
- Green hydrogen is much costlier than other types
- Technological efficiency is lacking in non carbon based production
- Carbon capture and storage is a costly process

Way Forward:
- Rapid advancement in Hydrogen technology
- Introducing CO_2 pricing
- Policies for scrap metal usage
- Policy measures to provide support for green steel
- Exploring international markets
- Creation of production hubs

5. Green GDP : Concept and Prospects

Syllabus: Environmental Conservation

Mains: Green GDP - Concept and Prospects

Context: Growing environmental concerns have resulted in the demand for green national accounts that highlight the stock of environmental wealth, and its use and depletion by a society in its conventional national accounts.
- Incorporation of green accounts in conventional GDP requires expansion of the definition of production, consumption, and wealth.
- Both environmentally beneficial and harmful products must be accounted for in the national accounts. The social value of such products must be integrated with related economic activities.

What is green GDP?
- Green GDP, is an indicator of economic growth with environmental factors taken into consideration along with the standard GDP of a country. Green GDP factors biodiversity losses and costs attributed to climate change.

Green national accounts highlight the stock of environmental wealth | Photo Credit: RGBAlpha

How is it used?
- In production: It would amount to including environmentally beneficial/harmful goods and services.
- In consumption: To be segregated based on zero carbon generating, less environmentally degrading, and major environment depleting products.
- Investment: Zero carbon and conventional carbon generating technologies as categories
- Human capital: Bifurcation of jobs in conservation and conventional sectors
- Income of the government: Taxes levied on and subsidies advanced to polluting sectors, environment-conserving technologies and efficient technologies.

The significance of green GDP:
- Sustainability
- Tangible valuation of the environmental costs
- Resource Management
- Policy direction
- Nudge to the private sector

Challenges:
- Lack of available and reliable data
- What value to be assigned
- Policy implementation
- Developmental urgencies
- No comparative study

Way Forward:
- Development of a common framework
- Increasing awareness - Masses and the policymakers
- Pilot projects on a smaller scale
- Role of academia and civil society
- Promotion as a good practice

Related Factoid - Global Green Economy Index:
- The Global Green Economy Index (GGEI) is a measure of the green economy performance of 160 countries published by Dual Citizen, a consultancy firm.
- India's rank in 2022 - 144th
- The GGEI covers four dimensions and 18 indicators:
- Climate Change & Social Equity
- Sector Decarbonization
- Markets & Investment
- Environmental Health

6.   Groundwater depletion and recovery

Syllabus: Environmental Pollution & Degradation

Mains: Water Stress in India & Prevention of groundwater depletion

Context: This article discusses various parameters of groundwater recovery.

Introduction:
- Over the past few decades, the rapid depletion of groundwater in north India has become a common occurrence, with 95% of India's groundwater depletion happening in this region between 2002 and 2022.
- The two main factors driving groundwater storage are groundwater use and variability in summer monsoon rainfall.

Impact of Climate change on groundwater:
- Climate change poses new challenges for groundwater sustainability by increasing the need for groundwater pumping to meet irrigation demands.
- The warming climate is expected to bring more hydroclimate extremes like floods and droughts, which will further strain groundwater resources.
- Increased evapotranspiration resulting from a warming climate will reduce water availability for groundwater recovery, although its impact will be overshadowed by increased groundwater use for irrigation.

Research Findings:
- A team from IIT Gandhinagar analysed groundwater well data, satellite observations from Gravity Recovery and Climate Experiment (GRACE) and hydrological model simulations to understand groundwater storage variability under a warming climate.
- The team discovered that continued unsustainable groundwater extraction and excessive pumping from non-renewable sources will worsen groundwater loss.
- Despite the potential for periods of high precipitation to contribute to partial groundwater recovery, the projected increase in rainfall may not lead to an overall increase in groundwater storage due to the dominant influence of evapotranspiration in the long run and at higher warming levels.

Implications and Solutions:
- Climate projections suggest that an increase of 6-8% in summer monsoon rainfall could aid in groundwater recovery.
- However, even in the most optimistic scenario, this increase would only help recover about 50% of the groundwater lost in the last two decades, emphasising the need to address unsustainable groundwater usage.
- It is crucial to restrict unsustainable groundwater use for irrigation to maximise the benefits of increased precipitation.

- With the possibility of more frequent droughts, efficient irrigation practices and the relocation of crop-growing areas is a way forward to mitigate the adverse effects on groundwater storage.
- Promoting groundwater conservation is essential for long-term sustainability, as groundwater plays a vital role, especially during periods of drought, even when increased rainfall can enhance recharge.

Nut Graf: The warming climate and unsustainable groundwater extraction pose significant challenges to groundwater sustainability in north India. While increased summer monsoon rainfall could aid in groundwater recovery, it is crucial to address unsustainable groundwater usage through efficient irrigation practices and groundwater conservation efforts.

8. Sambar Deer and Mudumalai Tiger reserve

Syllabus: GS03-Biodiversity & Conservation

Prelims: Vulnerable Species; National Parks and Wildlife Sanctuaries

About Sambar Deer:
- Sambar is a large deer species native to the Indian subcontinent and Southeast Asia.
- They are primarily found in forested areas, including both deciduous and evergreen forests.
- They are highly adaptable and can also be found in grasslands, swamps, and even coastal areas. They are known to thrive in a variety of habitats, from sea level to high altitudes.
- One of the notable features of sambar deer is their large and impressive antlers. These antlers are typically present only on males and can grow up to a meter (3.3 feet) in length.
  - The antlers are shed and regrow annually, with the new antlers typically reaching their full size by the breeding season.
- They are listed as vulnerable due to hunting, insurgency, and habitat exploitation.
- They are known to be selective feeders and can adapt their diet depending on the availability of food in their habitat. They are also important seed dispersers, contributing to the regeneration of forests by spreading seeds through their droppings.
- They are also an important prey species for carnivores and conservation efforts are underway to protect it.

Mudumalai Tiger Reserve:
- Mudumalai Tiger Reserve is a renowned wildlife sanctuary and tiger reserve located in the Nilgiri Hills of Tamil Nadu and shares boundaries with the states of Karnataka and Kerala.
- It is a part of the larger Nilgiri Biosphere Reserve, which is recognized as a UNESCO World Heritage Site.
- It is known for its rich biodiversity and serves as an important habitat for a wide range of flora and fauna. It spans an area of approximately 321 square kilometers (124 square miles) and is home to numerous species of mammals, birds, reptiles, and amphibians.
- It provides a crucial sanctuary for Tigers, along with other carnivores such as leopards, dholes (Indian wild dogs), and sloth bears.
- The reserve also boasts a diverse array of wildlife. It is inhabited by several herbivores like elephants, gaurs (Indian bison), sambar deer, chital (spotted deer), and wild boars. The park is also home to langurs, macaques, and various species of smaller mammals.

- Mudumalai Tiger Reserve hosts over 200 species of birds. It attracts both resident and migratory birds, including endangered species like the Indian white-rumped vulture and long-billed vulture. Bird species commonly sighted here include eagles, owls, flycatchers, hornbills, and many more.
- It is drained by the Moyar River and several tributaries.
- The reserve is actively involved in conservation initiatives, including anti-poaching measures and habitat preservation.
- Recently, Prime Minister Narendra Modi paid a visit to Mudumalai Tiger Reserve and made a stop at the Theppakadu Elephant camp within the Mudumalai Tiger Reserve, where he interacted with the elephant keepers who were featured in the Oscar award-winning documentary, 'The Elephant Whisperers'.

9. How can we transition to a low-carbon city?

Syllabus: National Environment Agencies, Legislations and Policies

Mains: Significance of low carbon cities for climate change mitigation

Context: This article discusses various strategies necessary for transition of polluting cities into low-carbon cities.

Introduction:
- In the year 2020, an enormous amount of 29 trillion tonnes of carbon dioxide was released into the atmosphere by cities.
- Considering the substantial influence cities have on the environment, the presence of low-carbon cities becomes essential in order to alleviate the consequences of climate change.
- The process of transitioning towards cities with low carbon emissions, or even achieving net-zero emissions, necessitates the incorporation of mitigation and adaptation strategies across various sectors.
- This approach, known as the 'sector-coupling approach', is vital for reducing carbon footprints in urban systems.

Sector-coupling approach:
- It involves the integration of different energy sectors, such as electricity, heating and cooling, transportation, and industry, to create a more efficient and sustainable energy system.
- By coupling these sectors, low-carbon cities can optimise the use of renewable energy sources, such as solar and wind power, and better manage energy demand and supply.
- Energy storage technologies, such as batteries or thermal storage systems, can store excess renewable energy for later use during periods of high demand or when renewable energy generation is low.
  - This decentralised approach enhances energy resilience, reduces transmission losses, and minimises the need for fossil fuel-based backup power.
- Sector-coupling emphasises demand-side management and flexibility to optimise energy consumption and reduce carbon emissions.

Significance of energy-system transitions:
- An energy-system transition has the potential to significantly decrease urban carbon dioxide emissions, potentially reaching a reduction of around 74%.
- Recent advancements in clean energy technologies, coupled with declining costs, have eliminated economic and technological obstacles, making it feasible to adopt low-carbon solutions.
- To achieve a successful transition, efforts should be focused on both the demand and supply sides.
  - On the supply side, this involves phasing out fossil fuels, increasing the use of renewable energy sources, and implementing carbon capture and storage (CCS) technologies.
  - On the demand side, employing the "avoid, shift, improve" framework entails reducing energy and material consumption, substituting fossil fuels with renewables, and addressing remaining emissions through the adoption of carbon-dioxide removal (CDR) technologies.

Tailored strategies for different cities:
- The strategies for addressing low-carbon challenges differ based on the unique characteristics of each city, highlighting the need for customised approaches.
- Policymakers shall consider both social and environmental fairness, taking into account factors such as a city's spatial structure, land use, development level, and degree of urbanisation while formulating energy-transition policies.
- Established cities can enhance energy efficiency and encourage sustainable modes of transportation like walking and cycling by retrofitting and repurposing existing infrastructure.
- Rapidly growing cities can optimise their urban planning to reduce transportation energy demand by locating residential areas closer to places of work. These cities also have the opportunity to adopt low-carbon technologies, including renewables and carbon capture and storage, as they develop.

Ensuring equitable energy governance:
- The social and economic impacts of transitioning to renewable energy sources vary across different sectors and economies.
- A one-size-fits-all approach may lead to disproportionate effects on certain groups or communities. Therefore, issues such as energy security, urbanisation, land dispossession, poverty concentration, gender disparities, and reliance on fossil fuel exports need to be considered.
- Developing economies heavily dependent on fossil fuel exports, like Nigeria and Venezuela, may face economic hardships during the transition.
- Developed countries also experience energy poverty and inequity, with high energy costs impacting low-income households' ability to afford essential amenities.

Way Forward:
- Achieving a transition to low-carbon energy systems in cities necessitates tailored strategies focusing on governance, behavioural changes, technology, and institutional capacity building.
- It is also essential to ensure that all members of society have fair and equal access to clean energy resources and benefits. By promoting inclusivity and addressing socio-economic disparities, energy governance can contribute to a just transition towards a low-carbon future.
- Governments must focus on engaging diverse stakeholders in energy governance, promoting energy efficiency, increasing climate investments, and incorporating diverse knowledge sources, including indigenous and local perspectives.
- The transition requires comprehensive actions that include mitigation and adaptation, encouraging participation in decision-making to ensure a just and sustainable energy future.

Nut Graf: To mitigate climate change, low-carbon cities are crucial, and a sector-coupling approach integrating energy sectors is key to reducing carbon footprints. Energy-system transitions can significantly decrease urban carbon emissions, aided by advancements in clean energy technologies.

10. People's Biodiversity Register

Syllabus: Biodiversity & Conservation

Mains: Status of Biodiversity Management in India.

Context: The National Campaign for Updating and Verifying the People's Biodiversity Register (PBR) was started in Goa, marking an important step forward in the documentation and preservation of India's vast biological variety. The Union Ministry of Environment, Forests, and Climate Change organized it.
- Till now, 2,67,608 PBRs have been prepared in the country.

What is the People's Biodiversity Register?
- The People's Biodiversity Register is a comprehensive record of numerous aspects of biodiversity, such as habitat conservation, preservation of land races, folk variants and cultivars, domesticated stocks and breeds of animals, and microorganisms.
- The Biological diversity Act of 2002 established Biodiversity Management Committees (BMC) to promote biological variety protection, sustainable use, and recording.
- BMCs are local bodies in states and union territories that are tasked with creating People's Biodiversity Registers in collaboration with local communities.

Importance:
- It aids in the conservation of biodiversity, which is essential for preserving natural balance. It also allows local populations to benefit from genetic resources and related traditional knowledge.
- It supports the implementation of the Biological Diversity Act of 2002, which aims to regulate access to biological resources and ensure fair and equitable benefit sharing.
- It is also a means of understanding the overlap of cultural and ecological biodiversity because it is a bottom-up exercise.
- It envisions a decentralised approach that is inclusive.
- It is consistent with the concept of "Lifestyle for the Environment (LiFE)" established by Indian Prime Minister Narendra Modi during COP26 in Glasgow.
- This notion encourages individuals and institutions all over the world to use resources wisely and deliberately in order to maintain and preserve the environment.

What is the Status of Biodiversity Management in India?
- With only 2.4% of the world's land area, India is home to 7-8% of all recorded species.
- The Himalayas, Western Ghats, Indo-Burma region, and Sundaland are four of the world's 36 biodiversity hotspots.
- Two of these, the Indo-Burma region and Sundaland, are spread over South Asia and are not entirely contained within India's borders.

Biodiversity Governance in India:
- The Biological Diversity Act (BDA) of India, enacted in 2002, is closely aligned with the Nagoya Protocol and intends to implement provisions of the Convention on Biological Diversity (CBD).
- The Nagoya Protocol attempted to ensure that commercial and research use of genetic resources resulted in benefits being shared with the government and society that maintained such resources.
- The BDA was lauded as a crucial step towards preserving India's vast biodiversity because it accepted a country's sovereignty over its natural resources.
- It aims to address bio-resource management concerns in the most decentralised way feasible.
- It also has three layered structures in mind:
- At the national level, the National Biodiversity Authority (NBA).
- State Biodiversity Boards (SSBs) at the state level and local Biodiversity Management Committees (BMCs).
- The measure also improves the country's position in the face of anyone claiming intellectual property rights to biodiversity-related knowledge.

Challenges related to Biodiversity Conservation:
- **Invasive Alien Species:** Invasive alien species are plants, animals, and pathogens that are not native to an ecosystem and inflict environmental harm or disrupt ecological equilibrium.
  - Invasive alien species, according to CBD studies, have contributed to roughly 40% of all animal extinctions.
- **Climate Change and Global Warming** pose hazards to plant and animal species since many creatures are sensitive to carbon dioxide concentrations in the atmosphere, which may lead to their extinction.
  - Pesticide use, tropospheric ozone depletion, sulphur and nitrogen oxide emissions from industry all contribute to the destruction of natural ecosystems.
- **Marine Biodiversity Threatened:** Microplastics are being discharged into seas due to a lack of efficient plastic waste management, strangling and starving marine life, inflicting hepatic, reproductive, and gastrointestinal harm in animals, and negatively altering marine biodiversity.
- **Concerns About Genetic Modification:** Because superior features obtained by altering genes can result in the favouring of one organism, genetically engineered plants pose significant hazards to ecosystem and biodiversity disturbance.
  - As a result, it may eventually alter the natural process of gene flow, threatening the sustainability of indigenous varieties.

11. Ambergris

Syllabus: Conservation-National Guidelines, Legislations & Other Programmes.

Mains: Significance of Mandate of Wildlife Crime Control Bureau

Context: A Wildlife Crime Control Bureau squad apprehended five people and seized 16 kg of ambergris, or whale vomit, which is used to make perfume.

About Ambergris:
- Ambergris, which is French meaning grey amber, is also known as whale vomit.
- It is a solid waxy material found in the sperm whale's intestine.
- Ambergris is only produced by about 1% of sperm whales.
- Ambergris contains alkaloids, acids, and a molecule called ambreine, which is similar to cholesterol in structure.
- It floats on the surface of the sea and occasionally lands on the shore.
- It is known as floating gold due to its high value. In the international market, 1 kg of ambergris is worth Rs 1 crore.

Use:
- It is utilised in the perfume industry, specifically to create smells such as musk.
- It is thought to be in high demand in nations with a significant perfume market, such as Dubai.
- It was used as incense by the ancient Egyptians. It is also thought to be used as a spice and in some traditional remedies.

Smuggling:
- Because of its high value, it has been a target for smugglers, particularly in coastal locations.
- There have been multiple instances where Gujarat's coastline has been used for such smuggling.
- Because the sperm whale is a protected species, hunting is prohibited. Smugglers, on the other hand, are reported to have illegally targeted the fish in order to extract the valuable Ambergris from its stomach.

Sperm Whale
- The sperm whale (Physeter catodon), sometimes known as the cachalot, is the largest of the toothed whales, distinguished by its massive square head and small lower jaw.
- The sperm whale has a dark blue-gray or brownish body with white spots. It has little paddle-like flippers and a series of rounded humps on its back and is thickset.
- They can be found in both temperate and tropical waters around the world.
- The most serious threats to sperm whales are habitat disturbances such as noise pollution and climate change.
- Other dangers include entrapment in fishing gear, ship collisions, and attempts to reintroduce commercial hunting.
- In the Indian context, the sperm whales are a protected species under Schedule 2 of the Wildlife Protection Act and possession or trade of any of its by-products, including Ambergris and its byproducts, is illegal under provisions of the Wildlife Protection Act, 1972.

12. Plastic Recycling : Increased Toxicity

Syllabus: Environmental Pollution & Degradation

Mains: Plastic waste and problems with plastics.

Context: Recycling may not be the panacea for plastic pollution it is touted to be and a new research shows that the process actually increases toxicity of plastics.

Cause for alarm:
- Plastics contain more than 13,000 chemicals and 3,200 of them known to be hazardous to human health.
- Recycled plastics often contain higher levels of chemicals that can poison people and contaminate ecosystems.
- Increase in stockpiles - risk of wildfires
- Three poisonous pathways for recycled plastic material to accumulate toxic chemicals:
- Direct contamination from toxic chemicals in virgin plastic
- Substances like plastic containers for pesticides, cleaning solvents and others that enter the recycling chain and can contaminate plastic
- The recycling process, when plastics are heated

Impact on health:
- Carcinogenic fumes from recycling process
- Bioaccumulation
- Adverse birth outcomes
- Toxicant exposure

Way forward:
- Need for a legally binding global treaty
- Need for greener and cleaner plastic manufacturing - newer product development - circular economy
- Sharp reduction in consumption - policy measures

Prelims bytes:
- Initiatives to Tackle Plastic Pollution:
- Plastic Waste Management (Amendment) Rules, 2022
- Extended Producer Responsibility (EPR)
- National Dashboard on Elimination of Single Use Plastic and Plastic Waste Management

13. Coral Reef Sharks

Syllabus: GS03-Biodiversity & Conservation

Prelims: Vulnerable Species

Coral Reef Sharks
- A global study reveals that the populations of five prominent shark species inhabiting coral reefs have experienced a significant decline of 60-73%.
- Notably, certain shark species were completely absent from 34-47% of the surveyed reefs.
- The primary factor behind this decline is believed to be overfishing, which has led to the depletion of shark populations as well as their prey sources.
- Coral reef ecosystems are under increasing pressure from human activities—including intense fishing, degraded water quality, and climate change that threaten species supporting a wide range of ecosystem functions.
- Consequently, ray species have shown an increase in abundance within reef ecosystems.
- The study indicates that protected marine sanctuaries maintain shark-dominated reef communities, while areas with limited governance and economic challenges tend to be dominated by rays.

14. Responsibility and the complexities of climate leadership

Syllabus: International Environment Agencies & Agreements

Mains: Potential challenges of Climate finance on Vulnerable countries

Context: Issues with President-Designate of COP28

Introduction:
- In recent weeks, there has been an escalating campaign aimed at removing Minister Sultan Al Jaber, the President-Designate of COP28, from his position.
- Al Jaber is the Minister of Industry and Advanced Technology of the United Arab Emirates (UAE), which is the host nation for the event.
- This campaign has gained momentum, with a letter from parliamentarians in the United States and Europe demanding his removal due to his role as the CEO of the Abu Dhabi National Oil Company.
- However, representatives of countries at the forefront of climate change, such as Bangladesh and the Maldives, and as leaders of the Climate Vulnerable Forum see an opportunity to engage the fossil fuels industry to make some significant and quantifiable commitments with Al-Jaber as COP President-Designate.
  - Climate Vulnerable Forum is a collective of 58 countries most vulnerable to climate impacts and home to 1.5 billion of the world's poorest people.
  - They have experienced economic losses amounting to $500 billion due to climate-related factors in the past two decades.

Need for unity towards a clean energy future:
- Fossil fuel-dependent economies are critical towards a clean energy future, and they have a more difficult task defining their energy transition strategy.
- It is crucial to avoid creating divisions and instead continue engaging with other parties at COP28 and beyond, discussing the most effective path for their economies and the planet.
- Sultan Al-Jaber has been at the helm of Masdar, a renewable energy company that has made significant investments in solar and wind projects.
  - The Barakah nuclear power plant in the UAE, recently inaugurated, generates a substantial 6 gigawatts of clean power.
  - Masdar and the International Renewable Energy Agency (IRENA) have entered into an agreement to triple global renewable energy capacity by 2030, showcasing their leadership in shaping our clean energy future.
- Sultan Al-Jaber has proposed that sovereign wealth funds and multilateral development banks (MDBs) could help mitigate risks associated with restructured debts and provide insurance for re-issued climate bonds.
- Financing plays a vital role in COP28. It recognizes that economic growth for the poorest nations is indispensable and should not be hindered to accommodate continued pollution by wealthier countries.

Road Ahead:
- UAE could potentially guide vulnerable countries towards securing investments supported by sovereign wealth funds and multilateral development banks, as they can provide the significant impetus necessary for climate prosperity.
  - These countries are burdened by unsustainable debts, exacerbated by climate damages primarily caused by emissions originating elsewhere.
  - Rather than individually facing financial crises, a collective approach that acknowledges the debt issue and the hindrance it poses to clean energy investments and climate adaptation is feasible.

- UAE could also establish a clean energy target beginning in 2025, transform the Abu Dhabi National Oil Company into the Abu Dhabi Clean Energy and Grid Company by 2030, and support global financial reform, including reforms within the International Monetary Fund.
- Economies reliant on fossil fuels can showcase their commitment to a shared future by making subscriptions to the Loss and Damage fund established in Sharm El-Sheikh well in advance of the COP to support funding for climate damages in the most vulnerable countries.

Nut Graf: The recent campaign to remove Minister Sultan Al Jaber as COP28 President-Designate has sparked debate. However, representatives from climate-vulnerable nations see an opportunity in UAE's presidency for fossil fuel-dependent economies to make substantial commitments to clean energy.

15. Europe is world's fastest warming continent

Syllabus: Conservation, environmental pollution and degradation

Prelims: About WMO and European Union's Copernicus Climate Change Service

Details:
- A joint report by the World Meteorological Organization (WMO) and the European Union's Copernicus Climate Change Service has noted that Europe is the world's fastest-warming continent.
- The report says that Europe would need to brace itself for more deadly climate change-triggered heat waves with its temperature rising by 2.3°C in 2022 compared to that in pre-industrial times.
  - Countries such as Germany, Spain, France, Italy, Portugal, and the UK witnessed their warmest year on record in 2022.
- Europe is currently experiencing increased pressure on its energy, transport infrastructure and healthcare systems due to extreme weather that has been aggravated by climate change.
- The report also noted that the sea surface temperatures reached record highs and there was also "unprecedented" glacier melting.
- Furthermore, overall climate and weather hazards resulted in about 16,365 deaths, mainly due to heat waves, and caused $2 billion in damage, largely connected with floods and storms.

16. What is the New Collective Quantified Goal?

Syllabus: Conservation, environmental pollution and degradation

Prelims: About Bonn climate conference

Mains: New Collective Quantified Goal and the need for a new climate finance target.

Context:
The existing climate finance architecture and framework were reviewed and reformed at the recently-concluded Bonn climate conference held in Germany.

What is the New Collective Quantified Goal (NCQC)?
- According to the target set at the Conference of Parties (COP) in 2009, developed countries had committed to extending $100 billion per year till 2020 to developing nations.
  - This is based on the understanding that the economic growth of developed countries has come at the cost of high carbon emissions, and hence they must be accorded greater responsibility.
  - However, recent estimates and reports have revealed that efforts to mitigate the impact of climate change may cost billions, and even trillions of dollars.
- This led to the adoption of a New Collective Quantified Goal (NCGQ) for climate financing before 2025 during the Paris Climate Agreement in 2015.
- The New Collective Quantified Goal (NCGQ) acts as a reference point that accounts for the needs and priorities of developing nations and is regarded as the "most important climate goal".
- The NCGQ, thus widens the ceiling on commitment from developed countries and aims to cater to the evolving needs and priorities of developing countries based on scientific evidence.

The need for a new finance goal
- According to a report published by the Organisation for Economic Co-operation and Development, the developed countries in 2020 provided only about $83.3 billion out of the promised $100 billion per year.
- Reports also suggest that the yearly figures are misleading and inflated by close to about 225%.
  - For example, an analysis by Oxfam observed that "there is too much dishonest and shady reporting".
- Further, the $100 billion per year target was set way back in 2009 which was looked at as a political goal as there was no effort to provide clarity over the definition or source of climate finance.
- Although the funds available for climate finance have increased quantitatively it is seen that the funds have remained largely inaccessible, privately sourced, delayed and have also not reached countries that are actually in need.

- A recent report by the Centre for Science and Environment showed that only about 5% of climate finance comes in the form of grants, while the rest has been provided in the form of loans and equity which increase the burden on developing countries and heightened the risk of debt crisis.
  - This has forced the countries in need of finances to wait for years in order to access money which forces them to pay interest at higher rates and led to an increase in their debt burden.

Dissent expressed by the developed countries
- Developed countries have held that NCQG must be looked at as a "collective goal" for all developed and developing countries.
- Developed countries argue that the NCQG framework pushes the "net zero" pathways onto developing countries.
  - Experts fear that this mechanism would not be a feasible mechanism to pay for adaptation, mitigation, loss and damage.
- Developed countries further urge for mobilising private-sector investments and loans as they can act as a key component of climate finance.

Path ahead
- It is said that the countries are on a tight deadline to agree upon the NCQG ahead of 2024.
- According to the Sharm el-Sheikh Implementation Plan, the global transition to a low-carbon economy requires investments of about $4 trillion to $6 trillion per year.
- However, a few experts argue that instead of identifying a single aggregate figure, the NCQG must put in place separate targets or sub-goals on key focus areas which include mitigation, adaptation, loss and damage.
- The key objective at present is to focus on efforts to increase concessional financing, limit debt creation and facilitate NCQG to be a "process" rather than a goal towards an equitable and people-led transition.

Nut graf: The long-standing deadlock between developed and developing countries over the climate finance architecture has widened the gaps in the funding mechanism required to pay for critical climate action. In this context, there exists an urgent need for a fresh process or target for climate financing.

17. Centre plans 'market' scheme to promote sustainable living

Syllabus: GS-3, Environment & Ecology; Conservation, environmental pollution and degradation

Prelims: Green Credit Scheme

Context: The Indian government's Environment Ministry has brought a draft notification of the proposed 'Green Credit Scheme' aimed at incentivizing environmental actions and promoting sustainable living.

Details:
- The scheme has provisions to generate 'green credits' for individuals and organizations for their activities such as afforestation, water conservation, waste management, and addressing air pollution.
- These credits can be traded for monetary value. This is a market-based approach to encourage voluntary environmental actions and drive sustainable practices.
- The scheme aims to incentivize individuals, communities, and private sector entities to actively engage in environmentally beneficial activity.
- **Eligible Activities for Green Credits:** The draft notification identifies eight sectors or activities that qualify for generating green credits.
- **These are broadly covered in the following:**
  - Tree plantation-based credits: Promoting the expansion of green cover through tree plantation and related initiatives.
  - Water-based credits: Encouraging water conservation, water harvesting, efficient water use, and wastewater treatment and reuse.
  - Sustainable agriculture-based credits: Supporting natural and regenerative agricultural practices, land restoration, and improving soil health and nutritional value of food produced.
  - Waste management-based credits: Promoting sustainable waste management practices and driving improvements in waste disposal methods.
- The scheme will contribute to mitigating environmental challenges, such as deforestation, water scarcity, soil degradation, and pollution.
- It seeks to create a balance between ecological conservation and economic development by encouraging the private sector to participate actively.
- This type of model is operational in many countries but what makes this scheme unique is the wide range of activities covered in it giving scope for everyone's participation.

HEALTH ISSUES

1. Fortification of Rice

Syllabus: Issues related to Health.

Mains: Significance of Fortification of Rice

Context: The Narendra Modi government rolled out fortified rice under the public distribution system (PDS) without ascertaining the ill effects of such rice on the health of 80 crore beneficiaries, the Congress alleged.

What is Fortification of Rice?
● Fortification is the process of adding nutrients to food products that are not naturally present or are present in insufficient amounts.
● The fortification process adds essential elements such as Vitamin A, Vitamin B12, Vitamin B1, Iron, Zinc, and Folic Acid.

Food Safety and Standards (Fortification of Foods) Regulation 2016

● According to Food Safety and Standards Authority of India (FSSAI) norms, 1 kg fortified rice shall contain iron (28 mg-42.5 mg), folic acid (75-125 microgram) and Vitamin B-12 (0.75-1.25 microgram).
● Need for fortification:
● Malnutrition
● Iron deficiency - Anaemia
● Most common staple food
● Loss during milling and polishing

Benefits:
● Iron helps in attaining an improved cognitive development
● Enhanced maternal health
● Improved child health

Challenges:
● Time dependent - can become ineffective after some time
● Can trigger adverse reactions in people with genetic disorders
● Technological and social barriers

Way Forward:
● Biofortification
● Increased research and development
● Raising awareness levels

2.   Why is India rethinking its anaemia policy?

Syllabus: Issues related to Health.

Mains: India's Anaemia burden and related policy.

Prelims: Anaemia

Introduction:
- The National Family Health Survey (NFHS-6) will begin on 6 July 2023.
- The questions related to anaemia will be dropped from the survey as several experts have challenged the efficacy of the method being used.

Details about Anaemia:
- The World Health Organization (WHO) defines anaemia as a situation in which the number of red blood cells or the haemoglobin concentration within them is lower than normal.
- It causes fatigue, weakness, dizziness, and shortness of breath.
- Anaemia is caused by several factors, the major being iron deficiency.
- According to NFHS-5 (2019-21), India's anaemia burden is considerably high.
  - It is found that 57% of women in the age group 15-49 and 67% of children between 6 and 59 months are anaemic.
- The Health Ministry noted that Anaemia is a public health challenge. It has thus shifted its assessment to the new Diet and Biomarkers Survey in India (DABS-I).
  - DABS-I was launched in 2022 to map diet, nutrition, and health status.
  - It will provide the correct estimate of the disease among the rural and urban population.

New Changes in the Survey:
- Researchers argue that anaemia in India is being over-diagnosed as WHO cut-offs for haemoglobin are being followed. The cutoffs might not be suited to India, as it depends on several factors like age, gender, physiological status, and altitude.
- According to WHO, a person is anaemic if she meets one of the following situations:
  - Haemoglobin concentration is <110 g/L at sea level for children aged under five years and pregnant women.
  - Haemoglobin concentration <120 g/L for non-pregnant women.
- Indian researchers have also objected to the differences in the way blood is drawn for sampling in NFHS.
  - The survey measures it through a drop of capillary blood that oozes from a finger prick. However, it might give a false value.
  - The venous blood sampling method should be used as it gives a more accurate value.

Dietary Survey DABS-I:
- DABS-I is a comprehensive national-level dietary survey.
- It will collect individual dietary intake data of different age groups and will then define food and nutrient adequacy.
- **Significance of Anaemia survey**:
  - Anaemia data is important for monitoring public health and devising new policies as it is associated with morbidity and mortality of vulnerable sections (pregnant women and children).
  - It is also significant to monitor the progress of reproductive health.
  - Iron-deficiency anaemia reduces work productivity and hampers the economy and national development.
  - It will help in evidence-based policy-making and targeted interventions.

Nut Graf:
India is rethinking its anaemia policy due to concerns associated with the existing methodology. The new survey will collect individual data on food and nutrient intakes and will be a more comprehensive and evidence-based approach.

3.   NITI Aayog health index

Syllabus: Health related issues

Mains: Challenges of the Health Sector in India and Initiatives taken to address it

Context: Kerala, Tamil Nadu and Telangana emerged as the top performers among the 'larger states' in the NITI Aayog's annual 'health index' for the Covid year of 2020-21.

Highlights of the Index:

Based on Overall Performance
- **Larger States:** Among the 19 'larger states', Kerala, Tamil Nadu and Telangana have occupied first, second and third place respectively, in terms of overall performance.
  - Bihar (19th), Uttar Pradesh (18th) and Madhya Pradesh (17th) are at the bottom of the list.

- **Smaller States:** Among the eight smaller states, Tripura has recorded the best overall performance, followed by Sikkim and Goa; Arunachal Pradesh (6th), Nagaland (7th) and Manipur (8th) are at the bottom.
- **Union Territories(UT):** And among the eight UTs, Lakshadweep has been ranked as the top performer in terms of overall performance, while Delhi ranked at the bottom.
- **Based on Incremental Performance:** Rajasthan, Uttarakhand and Odisha emerged as the top three performers in 2020-21, as compared to their performance in 2019-20.

About NITI Aayog's Annual Health Index:
- In 2017, the National Institution for Transforming India (NITI Aayog) in collaboration with the Ministry of Health and Family Welfare (MoHFW) and the World Bank initiated an annual Health Index for tracking Overall Performance and Incremental Performance across all states and Union Territories (UTs).
- The objective of the Annual Health Index is to track and rank progress on health outcomes and health systems performance, develop healthy competition and encourage cross learning among states and UTs.
- **Parameters:** The health index assesses states and UTs on two parameters – incremental performance (year-on-year progress) and overall performance.
- **Categories:** The ranking is done under three categories: larger states, smaller states and Union territories (UTs) to ensure comparison among similar entities.
- **Composition:** The Health Index is a composite score that reflects the achievements and incremental improvements of the states and UTs on 24 indicators across three domains:
  - Health outcomes, governance and information, and key inputs and processes. Each domain has been assigned weight based on its importance with a higher score for outcome indicators.
  - The 'health outcomes' include indicators like neonatal mortality rate, total fertility rate, sex ratio at birth, immunisation coverage, proportion of institutional deliveries, total case notification rate of tuberculosis, and proportion of people living with HIV on antiretroviral therapy.
  - The 'governance and information' domain includes indicators like proportion of institutional deliveries, average occupancy (in months) of three key posts at state level, average occupancy (in months) of the chief medical officer, and days taken for fund transfer.
  - The 'key inputs/ processes' is a measure of health infrastructure available, including the proportion of functional 24X7 primary healthcare centres, districts with functional cardiac care units, and vacancies in healthcare provider positions.

4. Impact of Chronic Stress on Human body

Syllabus: Awareness in Different Fields

Mains: Various issues with mental health and its impact on the physical body

Context: This article discusses the impact of psychological stress on the intestine.

Introduction:
- A recent study published in the Cell journal shed light on the connection between mental health and gastroenterology, specifically in relation to inflammatory bowel disease (IBD).
- The study emphasised the profound impact of mental health on inflammatory responses in the body, particularly during disease flares in IBD patients.
- With further research, the study's author envisions the development of drugs that can effectively block the inflammatory cascades triggered by psychological stress.

Key Details:
- The study brings attention to the influence of stress on the body, particularly the gastrointestinal (GI) system. It highlights the role of stress in stimulating the adrenal gland to produce glucocorticoids, a stress hormone.
- Short-term stress, such as before an exam, can lead to reduced appetite and increased bowel movements.
- However, chronic or long-term stress, like toxic work environments, difficult relationships, or childhood pressure to perform, can result in inflammation of the gastrointestinal tract, such as IBD.
  - In cases of chronic stress, the body continuously releases glucocorticoids.
- Chronic stress not only triggers the production of glucocorticoids but also initiates inflammatory responses in the gastrointestinal tract. These responses involve both physical damage to the intestine and functional changes in gut motility due to inflammatory mediators.
- The study emphasises the interconnectedness of the body's response to stress and the functioning of the gut-brain axis. Stress triggers a cascade of physiological changes involving various systems and hormones, ultimately affecting the GI system and contributing to conditions like irritable bowel syndrome (IBS) and IBD.
- Understanding these complex mechanisms is crucial for comprehending the effects of chronic stress on the gastrointestinal system.

IBD v/s IBS:
- In contrast to IBS, which is associated with stress and commonly affects women, IBD is a distinct condition.
- Unlike IBD, IBS does not involve an inflammatory response as its cause or consequence.
  - Physical changes such as ulcers and structural alterations are observable in the colon during endoscopy for individuals with IBD, whereas such changes are not present in IBS characterised by symptoms like bloating, constipation, and diarrhoea.
  - IBD is immunologically mediated and can have hereditary factors, while IBS is part of a group of disorders known as gut-brain interaction disorders (DGBI).
- IBD, such as ulcerative colitis and Crohn's disease, carries the risk of colorectal cancer, highlighting the severity and potential complications of this condition.
- On the other hand, IBS is part of a broader spectrum of disorders involving the interaction between the gut and the brain.
- The study's findings emphasise the importance of addressing biases and misconceptions surrounding IBS within the medical community, as they can impact patient care and treatment outcomes.

Treatment to manage stress:
- The use of specific GI-directed behavioural therapies that employ cognitive-behavioural approaches can address anxiety related to GI symptoms.
- Aerobic exercise and yoga are beneficial in managing stress. Aerobic exercises release endorphins, which enhance mood and improve pain tolerance.
- Regular yoga practice increases brain-derived neurotrophic factor (BDNF) levels, which are crucial for learning and memory. Additionally, yoga induces a relaxation response.

Nut Graf: A recent study highlights the link between mental health and gastroenterology, particularly in inflammatory bowel disease (IBD). Chronic stress triggers inflammatory responses in the gastrointestinal tract, but further research may lead to drugs that block these cascades. Behavioural therapies and activities like aerobic exercise and yoga can help manage stress.

5. Amplify the subject of adolescent girl nutrition

Syllabus: Issues related to health; Welfare Schemes for vulnerable sections of society.

Mains: Nutrition of Adolescent Girls.

Introduction:
- Adolescence is a crucial period of cognitive development. Thus, improving access to nutrition during this "second window of opportunity of growth" compensates for any nutrient deficiencies acquired during childhood in the girl child.
- Notably, adolescent health is an important indicator of women's labour force participation in the long term.
- In order to improve the nation's demographic dividend, it is necessary to intervene in the nutrition of adolescent girls as better nutrition improves the productivity of an individual.

Details:
- Adolescent girls are highly vulnerable to undernutrition and anaemia due to the onset of menstruation. For instance,
  - According to NFHS-5, 59.1% of adolescent girls were found to be anaemic.
  - NFHS-4 reported more than 41.9% of school-going girls as underweight.
- Notably, multiple factors including cultural norms lack a gender-neutral environment within a household and thus hampers the nutrition uptake in adolescent girls.
- Despite improvements in crucial health indicators through government interventions, current health schemes do not focus on the nutritional status of adolescent girls.
- It should be noted that poorly balanced and insufficient diets affect adolescent girls' academic performance. It can further limit employment opportunities and economic self-sufficiency later in life.
- Moreover, undernourished adolescent girls are at a higher risk of pregnancy complications and other chronic diseases. It can thus result in financial instability and increased poverty.

Way Ahead:
- The interventions should be redefined and a life-cycle approach should be adopted. It should be ensured that no girl is left behind. As a result,
  - It will break the intergenerational cycle of poverty
  - Well-nourished girls can provide better care for family and the economy in the future
- There is also a need for the convergence of several government initiatives.
  - The convergence of the Scheme for Adolescent Girls (SAG) within POSHAN 2.0 is a great initiative.
- A stronger awareness and nutrition education programme can help sustain beneficiary compliance.
  - Better targeted and regionally contextualized Social and Behaviour Change Communication (SBCC) efforts around adolescent girls' nutrition will result in the adoption of good practices.

- Several government departments should collaborate and converge.
- Another important step is the routine training of health workers.
- The formulation and implementation of the scheme should be backed by evidence-based data.

Conclusion:
- It is important to acknowledge that the issue of nutrition among adolescent girls is not just a health concern but is an investment in the future of the country.
- All the stakeholders should collectively sow the seeds of a healthier, stronger India, where every girl can reach her full potential.

Nut Graf: One of the crucial health indicators is the nutrition and well-being of adolescent girls. It is important for the government to intervene in this aspect as it will not only secure the girls' health but also is an investment in India's economic future because a healthy girl can have better productivity both in the field of education and employment.

6.   Male-centric medicine is affecting women's health

Syllabus: Issues related to health; Welfare Schemes for vulnerable sections of society.

Mains: Male-centric approach within medicine and its implications on women's health across various domains.

Context: This article discusses the ill effects of poor research on women-centric medicine.

Introduction:
- The field of medicine has historically been developed through a male-centric lens. However, this gender bias within medicine has had adverse effects on women's health.
- From diagnostic practices to treatment protocols, women have often faced disparities that have compromised their healthcare outcomes.

Limited Research on Women's Health:
- Historically, medical research predominantly focused on male subjects, leading to a lack of understanding and awareness about gender-specific health issues.
- This gender bias has resulted in limited research on conditions that predominantly or exclusively affect women, such as endometriosis, polycystic ovary syndrome (PCOS), and gestational complications.
- Consequently, healthcare providers may struggle to diagnose these conditions accurately and develop appropriate treatment strategies, ultimately compromising women's health outcomes.
- Diagnostic procedures, including laboratory tests and imaging techniques, have often been designed based on male physiology and may not be equally effective in diagnosing women's conditions.
- Women have historically been underrepresented in clinical trials, further exacerbating the gender bias within medicine.
  - This underrepresentation limits our understanding of how diseases and treatments specifically affect women, as well as the potential side effects and efficacy of medications.
  - Consequently, women may be prescribed treatments that are less effective or have higher risks due to the lack of gender-specific data.
- Women's reproductive health, including contraception, family planning, and menopause, has often been overshadowed by a male-centric approach.
  - For instance, contraceptive methods have predominantly focused on female contraception, placing the burden of responsibility solely on women.
  - Such neglect of women's reproductive health perpetuates gender inequality in healthcare and restricts women's agency over their own bodies.
- In India, known as the "pharmacy of the world," the gender disparity in clinical trials has significant implications for generic drug production.
  - Studies have shown that women's responses to generic drugs differ from men's due to underrepresentation in trials.
- Studies in the United States reveal a significant disparity in funding for research on illnesses like migraines, endometriosis, and anxiety disorders, despite their substantial impact on women's health.

Way Forward:
- Achieving equity in healthcare requires recognizing women as a distinct category, with considerations for factors such as race, age, and socioeconomic status.
- Equal time, resources, and understanding must be dedicated to finding and providing appropriate treatment and healthcare for women's unique health concerns.
- In India, there are notable advancements in women's health policies, including the right to abortion. However, it should focus on policy intervention and the implementation of sex-specific research in medicine.
- India's G-20 presidency presents a favourable opportunity to address this issue and align with the Sustainable Development Goals focused on women's health.

Nut Graf: The field of medicine has historically neglected women's health, leading to disparities in diagnosis, treatment, and research. The male-centric approach within medicine has undeniably affected women's health across various domains. To achieve equity, policy interventions and sex-specific research implementation are crucial.

7. Non-communicable diseases in India

Syllabus: Health-related Issues

Mains: Challenges posed by NCDs in India

Context: This article discusses the prevalence of non-communicable diseases in India.

Introduction:
- Non-communicable diseases (NCDs), also known as chronic diseases, are medical conditions that are not caused by infectious agents and cannot be transmitted from person to person.
- NCDs pose a significant health burden globally, including in India.
- In recent years, India has witnessed a growing prevalence of NCDs, resulting in adverse health outcomes and socioeconomic implications for individuals and the healthcare system.
- The new national estimates for diabetes and other non-communicable diseases (NCD) show that 31 million more Indians became diabetic in four years (2019-2021).

Key Findings:
- A recent nationwide study conducted in India and funded by the Indian Council of Medical Research and the Department of Health Research, Ministry of Health and Family Welfare, revealed significant health concerns.
- The study found that in 2021, there were 101 million individuals diagnosed with diabetes and 136 million with prediabetes in the country.
- The study also highlighted the prevalence of other health conditions, indicating that 315 million people in India had high blood pressure, while 254 million had generalised obesity, and 351 million suffered from abdominal obesity.
  - These conditions pose significant risks to individuals' overall health and well-being.
- Furthermore, the study revealed alarming numbers related to hypercholesterolemia, a condition where fat accumulates in arteries, increasing the risk of heart attacks and strokes.
  - It reported that 213 million people had hypercholesterolemia, and 185 million had high levels of low-density lipoprotein (LDL) cholesterol, which is commonly referred to as "bad" cholesterol.

Significance of the study:
- This is the first comprehensive epidemiological research paper, encompassing participants from 31 states and Union Territories. It involved a large sample size of 1,13,043 individuals, providing valuable insights into the country's prevalence of metabolic non-communicable diseases.
- **The study identified two significant trends:**
  - Firstly, it revealed that diabetes and other metabolic NCDs, including hypertension, obesity, and dyslipidemia, are more prevalent than previously estimated in India.
  - Secondly, while urban areas currently exhibit higher rates of metabolic NCDs compared to rural regions, with the exception of prediabetes, rural India is projected to experience a surge in diabetes cases over the next five years if appropriate measures are not implemented.
- The research findings also shed light on interstate and inter-regional variations.
  - The states of Goa, Puducherry, and Kerala displayed the highest prevalence of diabetes, while Sikkim had a high prevalence of prediabetes.
  - Punjab exhibited the highest rates of hypertension, and Puducherry had the highest prevalence of generalised and abdominal obesity.
  - Kerala showed a high incidence of hypercholesterolemia and high LDL cholesterol.
  - Conversely, Uttar Pradesh (U.P.), Mizoram, Meghalaya, and Jharkhand had the lowest prevalence of NCDs.
- This growing burden of non-communicable diseases (NCDs) serves as an early warning sign, indicating that without effective control measures, India's population is at a higher risk of developing life-altering medical conditions, including strokes.
- The study underscores the urgent need for state-specific policies and interventions to combat metabolic NCDs in India, as while the diabetes epidemic is stabilising in more developed states, it continues to escalate in most other states, indicating significant implications for the nation as a whole.

Impact of this study on India:
- India is confronted with a dual challenge of both malnutrition and obesity. Despite the availability of abundant food, the influence of fast-food consumption, inadequate sleep, lack of exercise, and heightened stress levels have created an ideal environment for NCDs to take hold.
- The combination of nutritional imbalances and lifestyle factors has contributed to the vulnerability of the Indian population to NCDs.
- The Ministry of Health has recognized non-communicable diseases (NCDs) as a significant concern and identified four major categories: cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes.

- These diseases share four common behavioural risk factors, namely unhealthy diet, physical inactivity, tobacco use, and alcohol consumption.
- Therefore, it is important to promote healthier dietary choices, regular physical activity, adequate rest, and stress management techniques to mitigate the risk factors associated with these chronic conditions.

Nut Graf: Recent nationwide study on NCDs highlights the urgent need for effective preventive measures, improved healthcare infrastructure, and increased awareness campaigns to address the growing burden of chronic diseases and promote better health outcomes in the country.

8. How can India tackle its diabetes burden?

Syllabus: Issues Relating to Health.

Mains: National Health Policy.

Context: This article discusses the findings of a study by ICMR-InDiab which provides detailed information about India's diabetes scenario.

Introduction:
- In June 2023, a study was published in The Lancet regarding a long term study on metabolic factors in the Indian subcontinent.
- Launched in 2008, It was the largest long term study to estimate the country's Chronic Non-Communicable Diseases (NCD).
- Conducted over five phases between 2008 and 2020 across the whole country (except for some of the islands and Union Territories), 1.24 lakh individuals were part of this survey.

Key findings of the report:
- According to the report, about 11% (101.3 million) of the country's population is diabetic and 15.3 % (136 million) is in the prediabetic stage.
- The researchers found that the conversion from prediabetes to diabetes is faster in India.
- Urban India accounts for 16.4% of the cases of diabetes, while in the rural population the prevalence is 8.9%.
- The study also shows that diabetes has become as common in 2-3 tier cities as it is in the metro cities.
- Cases are surprisingly high even in the states like Kerala, Sikkim and Tripura- where socio-economic conditions are relatively better.

What does this study mean?
- The results of the study should be taken as a warning and the first thing that needs to be done is to save the people from diabetes who are already in the prediabetic stage.
  - About 422 million people worldwide have diabetes, and 1.5 million deaths are directly attributed to it each year.
- It is said that prevention is better than cure, so awareness campaigns should be run to focus on using lifestyle modifications, maintaining a healthy diet and getting sufficient exercise.Periodic check-ups should be promoted.
- In rural areas, where the prevalence is still low, the aim should be to keep it in control.

Way forward:
- Diabetes is a chronic issue that can lead to complications like cardiovascular diseases, kidney disease, neuropathy, blindness etc. Hence it becomes crucial to keep it away.
- Periodic check-ups should be promoted.
- Apart from the methods like awareness campaigns and regular check-ups, tie-ups as part of the public-private partnership are also being proposed. It can help cover larger communities with ease.

Nut graf: According to the World Health Organization (WHO), millions of people worldwide have diabetes and a significant number of deaths are directly attributed to the disease each year. These data present a dire need to check this disease at the earliest.

9. Experts warn of a severe dengue outbreak in Kerala, call for improved clinical surveillance

Syllabus: Issues Relating to Health.

Prelims: About dengue cases.
- Public health experts have urged close monitoring and surveillance of dengue cases reported in Kerala hospitals for analysing the possibility of a change in clinical patterns, such as unexpected liver failure.
- Epidemiologists who have been involved in analysing the evolution of the circulating dengue virus types in the State since 2017 believe that a switch in dengue virus (DENV) might have already occurred.
- The State of Kerala has been hyperendemic for all four serotypes of DENV for the last 20 years i.e. all four serotypes namely DENV1, DENV2, DENV3 and DENV4 are in circulation in the State throughout the year.

- Historically, the surge in cases has been linked to DENV1 and DENV2 serotypes, however, there has been a shift in this pattern since 2019, as there has been an increase in the proportion of DENV4 cases which poses a risk of a more severe future outbreak.
- According to experts, a dengue infection provides lifelong immunity only to that specific serotype and temporary cross-immunity against other serotypes.
  - As the temporary cross-immunity wanes, a second infection by a different serotype can cause a severe immune response resulting in severe and life-threatening conditions like dengue shock syndrome or haemorrhagic syndrome.

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HISTORY

1. Ahilyabai Holkar

Syllabus: Modern Indian History from about the middle of the eighteenth century until the present- significant events, personalities, issues

Mains: Prominent contributions of Ahilyabai Holkar

Context: The Maharashtra government recently stated that Ahmednagar district will be renamed Ahilyadevi Nagar in honour of 18th-century warrior-queen Ahilyadevi Holkar.

About Ahilyabai Holkar:
- She was born in Ahmednagar's Chondi village in 1725 to village chief Mankoji Shinde. After her husband died in the Battle of Kumbher against the King of Bharatpur in 1754, Ahilyabai gained control of Malwa.
- Malwa was never attacked during her reign.
- It goes on to say that under Holkar, Maheshwar became a literary, musical, artistic, and industrial centre, and she was instrumental in establishing a textile industry there, which is today home to the famous Maheshwari sarees.
- Hindu temple restoration: In 1780, she had the Kashi Vishwanath temple in Varanasi reconstructed, over a century after Mughal emperor Aurangzeb ordered its destruction.
- Holkar constructed the Somnath temple in 1783.
- Holkar encouraged the construction of resting lodges for travellers as well as public ghats in addition to holy sites like Badrinath, Dwarka, Omkareshwari, Gaya, and Rameswaram.

2. Veerangana Rani Durgavati

Syllabus: GS-1; History; Significant personalities

Prelims: About Veerangana Rani Durgavati

Context:
The Union Home Minister will launch the "Veerangana Rani Durgavati Gaurav Yatra", which is an initiative of the Madhya Pradesh State government to honour the legacy of Veerangana Rani Durgavati.

About Veerangana Rani Durgavati
- Veerangana Rani Durgavati was a 16th-century queen of the Gondwana kingdom.
- Rani Durgavati was the queen of Gondwana from 1550 to 1564.
- Rani Durgavati was born in 1524 A.D. in the family of Chandel emperor Keerat Rai.
- Rani Durgavati was married to Dalpat Shah, the son of King Sangram Shah of the Garha Kingdom in 1542.
- In 1545 A.D., the queen gave birth to a son who was named Vir Narayan.
- Dalpat Shah died in 1550 A.D. and with Vir Narayan being too young at that time, Rani Durgavati took the reins of the Gond kingdom.
- The queen was assisted by two able ministers named Adhar Kayastha and Man Thakur.
- During her reign, Rani Durgavati moved her capital to Chauragarh from Singaurgarh.
- Rani Durgavati is known for her resistance against Mughal domination.

SOCIAL JUSTICE

1. 508 districts in country are free of manual scavenging: Ministry report

Syllabus: GS 2- Social Issues.

Prelims: Manual scavenging free districts.

Details
- The Ministry of Social Justice and Empowerment declared that 508 of the 766 districts in India are free of manual scavenging.
- The data was published in a booklet released on the completion of nine years of the existing government.
- In the last two years, the government denied manual scavenging-related deaths in Parliament. This can be attributed to the distinction of manual scavenging from "hazardous cleaning of sewers and septic tanks".
- Nearly, 58000 manual scavengers have been identified in India.
- As per the scheme for rehabilitation of manual scavengers, identified sewer workers have been given a one-time cash payment of ₹40,000 each. Additionally, 22000 have been associated with the skills training programme.
- There are also provisions for subsidies and loans, in case they wish to establish their own business.
- The scheme for the rehabilitation of manual scavengers has now been merged with the NAMASTE scheme.
    - NAMASTE scheme was launched for 100% mechanization of sewer work.
    - ₹ 100 crores was allocated to the NAMASTE scheme under Union Budget 2023-24. But, no allocation was made for the rehabilitation scheme.
- The scheme for mechanization is still in progress and the Housing and Urban Affairs Ministry is doing the bulk of the work in the current phase.
    - The scheme would require 4,800 urban local bodies (ULB) to identify and profile all septic tank/sewer workers in their respective areas.
    - ULBs should further provide occupational training and safety equipment to the workers and register them for health insurance under the Ayushman Bharat scheme.
    - Additionally, it would facilitate capital subsidies for workers willing to mechanize their work and become empanelled with the associated local body.
    - The guidelines of the scheme are yet to be finalized.

2. International Trade Unions Confederation (ITUC)

Syllabus: GS-2; Social Justice; Issues relating to development and management of Social Sector/Services relating to Human Resources.

Prelims: About International Trade Unions Confederation (ITUC)

Context:
- Close to 10 Central Trade Unions (CTUs) have boycotted the Labour20 (L-20), which is the meeting of trade unions from G-20 countries as they are unhappy with the Centre's decision to appoint the trade union Bharatiya Mazdoor Sangh (BMS) as the chair of the L-20.
- Various CTUs have argued that the International Trade Unions Confederation (ITUC) used to chair the L-20 meetings and the BMS was not a member of the ITUC.

International Trade Unions Confederation (ITUC)
- The International Trade Unions Confederation (ITUC) was established on the 1st of November 2006 on account of the merger of the International Confederation of Free Trade Unions (ICFTU) and the World Confederation of Labour (WCL).
- **Headquarters**: Brussels in Belgium
- ITUC is regarded as the world's largest trade union federation and the voice of working people across the globe.
- The primary objective of the federation is to promote and defend workers' rights and interests, through international cooperation between trade unions, global campaigning and advocacy within the major global institutions.
- The key areas of its activity include trade union and human rights; economy, society and the workplace; equality and non-discrimination; and international solidarity.
- The function of ITUC is in line with the basic principles of trade union democracy and independence.
- ITUC is administered by four-yearly world congresses, a General Council and an Executive Bureau.
- ITUC also works very closely with the International Labour Organisation (ILO) and other UN Specialised Agencies.

3. Human dog conflict

Syllabus: Issues Relating to Development & Management of Social Sector-Children and Health

Mains: Stray dog menace in India, Human-dog conflict, Legislation in this regard

Context: Rising incidences of human dog conflict has raised serious issues in the urban area.

Stats related to stray dogs in India:
- According to Family Welfare's Central Bureau of Health Intelligence (CBHI) 2021 report, there were 105 cases of human death from rabies in India in 2019.
  - The 2018 edition put the figure at 97 in 2017. According to various data, there were 86 human deaths from rabies in 2016, 113 in 2015, 125 in 2014 and 132 in 2013.
- Over the last five years, more than 300 people, mostly children from poor and rural families, have been killed by dogs. Dogs are responsible for over 20,000 rabies deaths.
- According to Lok Sabha data, Delhi has 60,472 stray dogs as of 2019. There were at least 1.53 crore dogs in the streets of India till 2019, the Animal Husbandry Ministry said in parliament.

Dog Control Laws in India:
- The Animal Birth Control (Dog) Rule, 2001, deals with the population control of strays. It provides for the neutering of strays to achieve population stabilization, as opposed to killing them.
  - It also proposes the formation of monitoring committees that will take steps to limit the population of strays in an area through animal birth control programmes.
  - Rules will also address the role of resident welfare associations (RWAs) to end frequent conflicts between dog feeders and other residents.
- The Animal Welfare Board of India, a statutory body under the Prevention of Cruelty to Animals Act, promulgated the Animal Birth Control (Dogs) Rules in 2001.
  - This policy was meant to control both the dog population, as well as the deadly rabies virus.
  - The Animal Birth Control programme can be conducted by the local bodies which will help in reducing the stray dog population addressing the animal welfare issues.
  - The Municipal Corporations need to implement the ABC and Anti Rabies Program jointly.

Alternative of the Animal Birth Control:
- There is a need for the participative approach to deal with the issue of the dog menace in India.
- There is a need to streamline the monitoring system of stray dogs in India.
  - Monitoring committee is set up at the state, district and the municipal level to track dogs.
- The recent rules also require investment in expansion of the infrastructure for capture, housing, surgery and release of dogs.
  - Standard operation procedure (SOP) has been devised for the purpose of upkeep of the dogs, reporting and conflict management.
- Engagement with NGOs to ensure the ABC system is diligently followed.
- Efforts are also being made to differentiate between the pet dogs and the stray dogs in India. This would clearly help in better understanding and implementation of the policies.

Nut graf: Dealing with the problem of stray dogs requires a multi-dimensional approach and participative policies. Urgent measures are needed to check human deaths due to strays and also ensure a humane way to combat this menace.

4. Same-sex marriage: Morality vs equality

Syllabus: Mechanisms, laws, institutions, and Bodies constituted for the protection and betterment of vulnerable sections

Mains: Same-sex marriages.

Context: Supreme Court commenced hearings on same-sex marriages.

Introduction:
- The Supreme Court of India commenced hearings on the same-sex marriage issue. During that time Michael Sandel, one of the world's leading philosophers also visited India.
- Sandel's critique of contemporary liberalism highlights a difficulty in any attempt to sort out the issue of same-sex marriage within a liberal framework of individual rights.

Details:
- If the court is to adjudicate the right to marry, there would be a need to break its neutrality on moral questions like the desirability of marriage, the institution of marriage, etc.
  - Notably, constitutional morality is used by the SC in many cases to maintain neutrality on moral issues.

- Considering neutrality, the court stopped at just ensuring legal protection in live-in relationships.
- If the court recognizes same-sex marriage on the basis of equality, it will have to recognize marriage as a social honour and pronounce its moral worth.
- The citizens who see and value marriage as a heterosexual institution would be required to recognize same-sex marriages as "a duty we owe to strangers."
- However, other important concerns are raised regarding whether the court (or centralized state) is capable of deciding on or resolving moral issues in society.

Other Details:
- In the Goodridge v. Dept. of Public Health (2003) case in Massachusetts, Supreme Judicial Court legalized same-sex marriage not just on grounds of equality and freedom of choice but by pronouncing the virtues of marriage.
- However, in India marriage is seen in traditional terms.
- Several scholars have noted that Indian society has not shared the same sense of disgust or hatred with which homosexuals were treated in other parts of the world.
- Moreover, there were no serious rumblings when homosexuality was decriminalized in India.
- It is recommended that questions on same-sex marriages should be left for citizens' assemblies or citizens' initiatives like in Ireland or Finland.

Nut Graf:
As the Supreme Court is commencing hearings on same-sex marriages in India, there are concerns about the morality, neutrality, and equality aspects. It is suggested that the best possible solution is to leave the matter to citizens' assemblies/groups as marriage is a traditional concept in Indian society.

5. Amplify the subject of adolescent girl nutrition

Syllabus: Issues related to health; Welfare Schemes for vulnerable sections of society.

Mains: Nutrition of Adolescent Girls.

Introduction:
- Adolescence is a crucial period of cognitive development. Thus, improving access to nutrition during this "second window of opportunity of growth" compensates for any nutrient deficiencies acquired during childhood in the girl child.
- Notably, adolescent health is an important indicator of women's labour force participation in the long term.
- In order to improve the nation's demographic dividend, it is necessary to intervene in the nutrition of adolescent girls as better nutrition improves the productivity of an individual.

Details:
- Adolescent girls are highly vulnerable to undernutrition and anaemia due to the onset of menstruation. For instance,
  - According to NFHS-5, 59.1% of adolescent girls were found to be anaemic.
  - NFHS-4 reported more than 41.9% of school-going girls as underweight.
- Notably, multiple factors including cultural norms lack a gender-neutral environment within a household and thus hampers the nutrition uptake in adolescent girls.
- Despite improvements in crucial health indicators through government interventions, current health schemes do not focus on the nutritional status of adolescent girls.
- It should be noted that poorly balanced and insufficient diets affect adolescent girls' academic performance. It can further limit employment opportunities and economic self-sufficiency later in life.
- Moreover, undernourished adolescent girls are at a higher risk of pregnancy complications and other chronic diseases. It can thus result in financial instability and increased poverty.

Way Ahead:
- The interventions should be redefined and a life-cycle approach should be adopted. It should be ensured that no girl is left behind. As a result,
  - It will break the intergenerational cycle of poverty
  - Well-nourished girls can provide better care for family and the economy in the future
- There is also a need for the convergence of several government initiatives.
  - The convergence of the Scheme for Adolescent Girls (SAG) within POSHAN 2.0 is a great initiative.
- A stronger awareness and nutrition education programme can help sustain beneficiary compliance.
  - Better targeted and regionally contextualised Social and Behaviour Change Communication (SBCC) efforts around adolescent girls' nutrition will result in the adoption of good practices.
- Several government departments should collaborate and converge.
- Another important step is the routine training of health workers.
- The formulation and implementation of the scheme should be backed by evidence-based data.

Conclusion:
- It is important to acknowledge that the issue of nutrition among adolescent girls is not just a health concern but is an investment in the future of the country.
- All the stakeholders should collectively sow the seeds of a healthier, stronger India, where every girl can reach her full potential.

Nut Graf: One of the crucial health indicators is the nutrition and well-being of adolescent girls. It is important for the government to intervene in this aspect as it will not only secure the girls' health but also is an investment in India's economic future because a healthy girl can have better productivity both in the field of education and employment.

6.   Strengthening the ICDS Scheme

Syllabus: Welfare Schemes for Vulnerable Sections

Mains: Significance of Integrated Child Development Scheme for Women and Children.

Context: This article discusses various parameters regarding current social sector initiatives on children and women's health.

Introduction:
- India faces significant public health concerns due to the widespread occurrence of stunting, wasting, and anaemia among children and women.
- To address this issue effectively, India needs to enhance its current social sector initiatives, including the Integrated Child Development Services (ICDS).
- The ICDS focuses on various vulnerable groups such as children aged 0-6 years, pregnant women, and lactating mothers.
- It encompasses non-formal pre-school education and aims to interrupt the cycle of malnutrition, illness, and death caused by these conditions.

Integrated Child Development Services:
- ICDS is a comprehensive program aimed at ensuring the holistic development of children under the age of six. It focuses on their physical, cognitive, social, and emotional growth through various interventions, including healthcare, nutrition, early learning, and immunization.
- ICDS places a strong emphasis on providing healthcare and nutrition support to children. It includes regular health check-ups, immunizations, growth monitoring, and the provision of nutritious meals and supplements.
- ICDS recognizes the importance of early childhood education and aims to provide a strong foundation for learning. It offers preschool education and developmentally appropriate activities that stimulate cognitive skills, language development, and social interaction.
- ICDS also extends its support to mothers and pregnant women. It provides prenatal and postnatal care, counseling, and guidance on maternal health, breastfeeding, and child rearing practices.
- ICDS recognizes the importance of community participation and engages local communities in the planning, implementation, and monitoring of its programs. It promotes awareness among parents, caregivers, and community members about the importance of early childhood development, health, and nutrition.

What studies show:
- Extensive research has demonstrated a strong connection between early-life poverty, malnutrition, and insufficient stimulation, and the subsequent cognitive and economic challenges individuals face later in life.
- Studies conducted in developing countries have shown that interventions targeting nutrition, education, and health during early childhood can have a significant positive impact on human capital.
- A study published in World Development highlighted the favourable effects of the ICDS on cognitive achievements, particularly among economically disadvantaged girls.
- Another study revealed that children who were exposed to the ICDS in their first three years of life completed 0.1-0.3 more grades of schooling compared to those who did not have access to the program.
- A study published in the Natural Library of Medicine found that adolescents aged 13-18 who were born in villages with effective ICDS implementation exhibited a 7.8% increased likelihood of school enrollment and completed an average of 0.8 additional grades compared to their counterparts without access to the ICDS.

Reassessing our Approach:
- To strengthen the ICDS program, a vital initial step is to empower Anganwadi workers, who play a central role in the program but often face overwhelming demands.
  - As key actors in the Poshan 2.0 initiative, these workers bear the responsibility of promoting child nutrition, health, and education in their communities.
- Therefore, to alleviate the workload of Anganwadi workers in India's 13,99,661 centres, one possible solution is to add an additional worker to each centre.
- This approach offers several advantages, including improved health and educational outcomes.
- The new Anganwadi worker can focus solely on preschool and early childhood education.
  - This would allow existing workers to dedicate more time to child health and nutrition. It would also enable the

Anganwadi workers to expand their reach and serve a larger number of families.

- In addition,the government shall invest in training programs due to significant variation in ICDS implementation and the level of skills among Anganwadi workers.
- Furthermore, infrastructural improvements are crucial for Anganwadi centres in India. Many centres lack functional sanitation facilities, potable water, and proper buildings.

Nut Graf: India faces a significant public health challenge with high rates of stunting, wasting, and anaemia. Strengthening initiatives like ICDS and empowering Anganwadi workers can improve outcomes through enhanced education, nutrition, and health interventions. However, addressing the workload, investing in training, and improving infrastructure are also crucial for success.

7.   Non-communicable diseases in India

Syllabus: Health related Issues

Mains: Challenges posed by NCDs in India

Context: This article discusses the prevalence of non-communicable diseases in India.

Introduction:
- Non-communicable diseases (NCDs), also known as chronic diseases, are medical conditions that are not caused by infectious agents and cannot be transmitted from person to person.
- The main types of NCD are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes.
- NCDs pose a significant health burden globally, including in India.
- In recent years, India has witnessed a growing prevalence of NCDs, resulting in adverse health outcomes and socioeconomic implications for individuals and the healthcare system.
- The new national estimates for diabetes and other non-communicable diseases (NCD) shows that 31 million more Indians became diabetic in four years (2019-2021).

Key Findings:
- A recent nationwide study conducted in India and funded by the Indian Council of Medical Research and Department of Health Research, Ministry of Health and Family Welfare, revealed significant health concerns.
- The study found that in 2021, there were 101 million individuals diagnosed with diabetes and 136 million with prediabetes in the country.
- The study also highlighted the prevalence of other health conditions, indicating that 315 million people in India had high blood pressure, while 254 million had generalised obesity, and 351 million suffered from abdominal obesity.
  - These conditions pose significant risks to individuals' overall health and well-being.
- Furthermore, the study revealed alarming numbers related to hypercholesterolemia, a condition where fat accumulates in arteries, increasing the risk of heart attacks and strokes.
  - It reported that 213 million people had hypercholesterolemia, and 185 million had high levels of low-density lipoprotein (LDL) cholesterol, which is commonly referred to as "bad" cholesterol.

Significance of the study:
- This is the first comprehensive epidemiological research paper, encompassing participants from 31 states and Union Territories. It involved a large sample size of 1,13,043 individuals, providing valuable insights into the prevalence of metabolic non-communicable diseases in the country.
- **The study identified two significant trends:**
  - Firstly, it revealed that diabetes and other metabolic NCDs, including hypertension, obesity, and dyslipidemia, are more prevalent than previously estimated in India.
  - Secondly, while urban areas currently exhibit higher rates of metabolic NCDs compared to rural regions, with the exception of prediabetes, rural India is projected to experience a surge in diabetes cases over the next five years if appropriate measures are not implemented.
- The research findings also shed light on interstate and inter-regional variations.
  - The states of Goa, Puducherry, and Kerala displayed the highest prevalence of diabetes, while Sikkim had a high prevalence of prediabetes.
  - Punjab exhibited the highest rates of hypertension, and Puducherry had the highest prevalence of generalised and abdominal obesity.
  - Kerala showed a high incidence of hypercholesterolemia and high LDL cholesterol.
  - Conversely, Uttar Pradesh (U.P.), Mizoram, Meghalaya, and Jharkhand had the lowest prevalence of NCDs.
- This growing burden of non-communicable diseases (NCDs) serves as an early warning sign, indicating that without effective control measures, India's population is at a higher risk of developing life-altering medical conditions, including strokes.
- The study underscores the urgent need for state-specific policies and interventions to combat metabolic NCDs in India, as while the diabetes epidemic is stabilising in more developed states, it continues to escalate in most other states, indicating significant implications for the nation as a whole.

Impact of this study on India:

- India is confronted with a dual challenge of both malnutrition and obesity. Despite the availability of abundant food, the influence of fast-food consumption, inadequate sleep, lack of exercise, and heightened stress levels has created an ideal environment for NCDs to take hold.
- The combination of nutritional imbalances and lifestyle factors has contributed to the vulnerability of the Indian population to NCDs.
- The Ministry of Health has recognized non-communicable diseases (NCDs) as a significant concern and identified four major categories: cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes.
- These diseases share four common behavioural risk factors, namely unhealthy diet, physical inactivity, tobacco use, and alcohol consumption.
- Therefore, it is important to promote healthier dietary choices, regular physical activity, adequate rest, and stress management techniques to mitigate the risk factors associated with these chronic conditions.

Nut Graf: Recent nationwide study on NCDs highlights the urgent need for effective preventive measures, improved healthcare infrastructure, and increased awareness campaigns to address the growing burden of chronic diseases and promote better health outcomes in the country.

8. Refugees as assets to their new countries

Syllabus: GS-2, Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes; mechanisms, laws, institutions and Bodies constituted for the protection and betterment of these vulnerable sections.

Prelims: Principle of Non-refoulement

Mains: Dealing with the refugee crisis

Context: June 20th is celebrated as International Refugee Day.

Why have there been rising incidences of refugee crises across the world?

- The ongoing crises in countries like Myanmar, Sudan and war-ridden Ukraine have led to a rise in the number of refugees across the world.
- These refugees are migrating to different parts of the world seeking a peaceful place to live and survive.
- There are **nearly 2,50,000 refugees in India and half of them are women and children**.
- Ethnic cleansing is one of the prime reasons for the rise in refugee crises across the world.
- War crimes are another reason for the rise in the number of refugees.

Challenges faced by refugees:

- Many countries are not willing to accept refugees as they perceive them to be a threat to their national security.
- They face multiple problems ranging from legal recognition, having government-backed documents, and threats to their survival.
- Various social benefits are denied to them like schools, hospital facilities and livelihood opportunities.
- Moreover, they face challenges from the native population that believes that refugees would eat up the opportunities meant for them.

Better management of refugees:

- It's essential that wealthy countries work together to share the responsibility for protecting refugees. Currently, a small number of countries take responsibility for most of the world's refugees. Most countries — including some of the world's largest economies — scarcely take in any refugees at all. As outlined in the preamble of the Refugee Convention, all countries should share responsibility.
- Wealthy nations must also increase the support and funding they provide to people in conflict-stricken countries. Humanitarian appeals around the world are severely underfunded and the gap between funds and needs is growing.
- **"Non-refoulement"** is a fundamental principle of international law that forbids a country from returning asylum seekers to a country where they would be at risk of persecution or harm. It's vital that wealthy countries protect asylum seekers by not returning them to dangerous situations.

Nut graf: The refugee crisis can be better managed with collective efforts of countries across the world, considering it a humanitarian crisis and working together to address the refugee crises in various parts of the world.

EDUCATION

1. NIRF: IIT-Madras retains number one spot

Syllabus: Education.

Mains: NIRF rankings 2023.

Prelims: NIRF rankings 2023.

Details
- The National Institutional Ranking Framework (NIRF) released the India Rankings 2023 of higher education institutions.

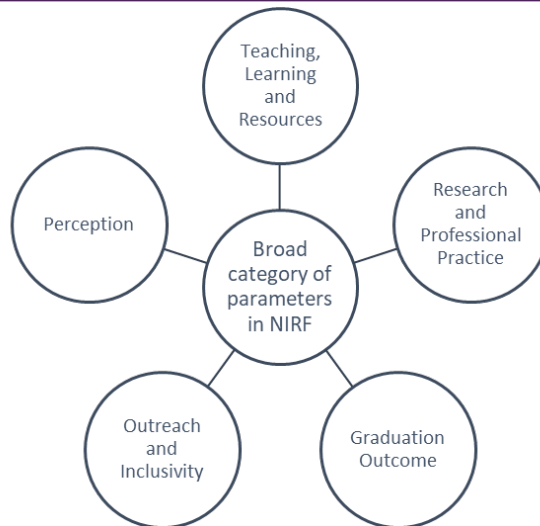| Rank	Institution	Score
1	Indian Institute of Technology, Madras	86.69
2	Indian Institute of Science, Bengaluru	83.09
3	Indian Institute of Technology, Delhi	82.16
4	Indian Institute of Technology, Bombay	81.28
5	Indian Institute of Technology, Kanpur	77.23
6	All India Institute of Medical Sciences, Delhi	72.14
7	Indian Institute of Technology, Kharagpur	71.82
8	Indian Institute of Technology, Roorkee	71.66
9	Indian Institute of Technology, Guwahati	68.78
10	Jawaharlal Nehru University, Delhi	67.44

Figure: List of Top 10 Educational Institutions as per NIRF 2023
Source: The Hindu

- IIT-M retained its first position in the overall ranking for the fifth consecutive time. While the Indian Institute of Science, Bengaluru became the best university for 8 years in a row.

Category	Institute
Best College	Miranda House
Best Management Institute	IIM-Ahmedabad
Best Institute in the Field	National Institute of Pharmaceutical Education and Research, Hyderabad
Best Medical College	All India Institute of Medical Sciences, Delhi
Top Dental College	Saveetha Institute of Medical and Technical Sciences, Chennai
Best Law College	National Law School of India University, Bengaluru
Best Engineering College	Indian Institute of Technology, Madras (8th consecutive time)
Best Research Institution	IISc-Bengaluru (3rd consecutive year)

Other Details:
- National Institute of Pharmaceutical Education and Research, Hyderabad topped the ranking in the field of pharmacy.
- The first place in architecture was given to IIT-Roorkee.
- In agriculture and allied sectors, Indian Agricultural Research Institute stood first.
- Delhi colleges maintained their dominance in the ranking with 5 of the first 10 colleges.
- NIRF rankings serve as an important tool for students in selecting colleges/universities.
- In 2023, around 5,543 unique institutions applied for NIRF rankings.

National Institutional Ranking Framework (NIRF):

- The National Institutional Ranking Framework (NIRF) is an initiative by the Ministry of Education, Government of India, to rank higher education institutions in the country based on various parameters. It aims to promote excellence in education and help students make informed choices about the institutions they wish to join.

- NIRF evaluates institutions on a set of parameters that include Teaching, Learning & Resources, Research & Professional Practice, Graduation Outcomes, Outreach & Inclusivity, and Perception. Each parameter carries a certain weightage, and institutions are ranked based on their performance in these areas.

- NIRF follows a robust evaluation methodology to ensure transparency and fairness in the ranking process. Institutions are required to submit data and information regarding various aspects of their functioning, including faculty qualifications, student admissions, research output, infrastructure, and more.

- NIRF provides rankings in different categories, including Overall Institutions, Universities, Engineering Institutions, Management Institutions, Pharmacy Institutions, and more. These rankings help candidates assess the performance of institutions in specific fields and make informed choices accordingly.

Nut Graf: The National Institutional Ranking Framework (NIRF) released India rankings for the year 2023. The Indian Institute of Technology (IIT), Madras topped the list. The ranking holds significance as it gauges the performance of higher educational institutions in the country.

2. National Exit Test

Syllabus: Education.

Prelims: About National Exit Test (NExT)

Details:
- The Union Health Ministry has officially announced that the National Exit Test (NExT) will be conducted starting in 2024.
- The NExT will replace the final-year MBBS examination and NEET-PG, serving as the registration and admission test for doctors and medical postgraduate courses.
- The combined NExT exam will also serve as the mandatory licentiate examination for undergraduate medical students to practise modern medicine in India.
- Students who received their medical degrees from National Medical Commission (NMC)-approved medical institutions and overseas students also will have to qualify in the National Exit Test.
- The All India Institute of Medical Sciences (AIIMS), Delhi, is expected to be the conducting body for the NExT, focusing on evaluating students' clinical and practical knowledge.
- Currently, the National Board of Examinations in Medical Sciences (NBEMS) is responsible for holding exams like NEET PG (National Eligibility cum Entrance Test Postgraduate), & Foreign Medical Graduate Examination (FMGE).

3. Teacher Attendance Monitoring System (TAMS) App

Syllabus: Education.

Prelims: Teacher Attendance Monitoring System (TAMS) App

Details:
- It is a monitoring app introduced as a pilot project in East Jaintia Hills district of Meghalaya to record teachers' attendance in government schools.
- It is an attendance app which utilises facial recognition, geofencing, and records the time spent in school by teachers.
  - It involves taking a selfie for registration.
- The facial recognition feature ensures that only the assigned teacher can mark attendance, while geofencing restricts attendance registration to within the school premises.
  - Geofencing utilises GPS technology to establish a virtual boundary, triggering a response when a mobile device enters or leaves a specific area.
- This system is being utilised to overcome the problems of absenteeism or proxy teaching in government schools.

4. Rankings, and the Realities of higher education

Syllabus: GS-2, Issues Relating to Development and Management of Social Sector/Services relating to Health, Education, Human Resources.

Prelims: NIRF ranking and its parameters

Mains: Challenges and issues pertaining to Indian higher education

Context: The 8th edition of the NIRF rankings has been released, showcasing the evaluation and ranking of higher education institutions in India.

About NIRF:
- NIRF is a framework developed by the Ministry of Education in India to rank higher education institutions.
- It has been conducted annually since 2016, with the 2023 edition being the eighth consecutive ranking.
- NIRF evaluates institutions in five categories: overall, universities, colleges, research institutions, and innovation.

Parameters for Evaluation:

Institutions are evaluated based on five parameters with varying weightage to access the quality of the college:
1. Teaching, learning, and resources (40 %)
2. Graduation outcome (25 %)
3. Research and professional practices (15 %)
4. Outreach and inclusivity (10 %)
5. Perception (10 %)

Issues that can be inferred from NIRF ranking:
- **Low Participation of Institutions:**
  - Only 12.3% of higher educational institutions in India actively participated in the NIRF rankings, raising concerns about the limited engagement of the majority of institutions.
  - The lack of information on ranking parameters for the remaining 87.7% of institutions is a matter of concern, as it hampers transparency and accountability in the ranking process.
  - The rankings exhibit an inherent urban bias, with a limited presence of colleges from rural areas in the top 100 list. This raises questions about the inclusivity and representation of institutions from rural regions.
- **Incongruence between Quantity and Quality:**
  - The concentration of top-ranked colleges in a few states, such as Tamil Nadu, Delhi, and Kerala, highlights the disparity between states in terms of quality higher education.
  - States with a significant number of colleges, like Uttar Pradesh, face underrepresentation in the top 100 list, indicating the need for quality improvement across all regions.
  - Private institutions generally have lower rankings compared to government institutions, indicating a quality gap between these sectors.
- **Correlation between Faculty Strength and Rankings:**
  - There are substantial differences in faculty strength between top-ranked institutions and others. The top 100 universities and colleges have a higher average number of faculty members compared to the remaining institutions.
  - Quality education cannot be solely attributed to physical infrastructure; the presence of qualified and sufficient faculty members is vital.
  - Many engineering institutions fail to adhere to the prescribed faculty-student ratios, impacting the overall educational experience and quality.

- **Scientific Publications:**
  - ○ The rankings reveal a strong correlation between faculty strength, institutional quality, and scientific publications.
  - ○ Only 12.3% of participating institutions contribute to nearly 90% of the scholarly output in the country, indicating a concentration of research productivity among a small proportion of institutions.
  - ○ Engineering institutions participating in the rankings contribute significantly to scientific publications in their field.
  - ○ The management domain displays a concerning trend, with 50% of participating institutions having zero publications, highlighting the need for research emphasis in this field.

Way forward:

- Strengthen state universities by providing increased funding and resources, improving faculty quality, and fostering research collaborations.
- Address the urban bias in rankings by revising the framework to encourage participation from rural institutions and developing parameters that consider their unique challenges.
- Bridge the quality gap between private and government institutions through initiatives that promote faculty development, research activities, and collaboration.
- Emphasize research and publications by incentivizing institutions, particularly in management, to prioritize research, establish funding programs, and support faculty development.
- Increase budgetary allocations to higher education, allocating more funds for infrastructure development, faculty recruitment, research grants, and scholarships.

Nut Graf: The NIRF India Rankings 2023 highlight issues of low participation, incongruence between quantity and quality, faculty-strength correlation, and the need for increased funding to improve higher education in India.

GOVERNANCE

1.   Railway safety- Listen to the voices from Below

Syllabus: Governance and Accountability.

Mains: Issues Relating to the Management of Social Sector/ Services.

Context: This article discusses the "Railways safety system" in India in the context of the recent major rail accident of 2nd June 2023.

Introduction:
- The recent rail accident in Odisha, which claimed the lives of many, has started a discussion in the country as to why and how it happened, who exactly is responsible for this and how it can be prevented in the future.
- An inquiry commission was set up by the Commission of Railway Safety to look into the matter but this inquiry was assigned to the CBI later on.

Commission of Railway Safety (CRS):
- The Commission of Railway Safety is a government body that deals with matters relating to the safety of rail travel and train operation and is charged with certain statutory functions as laid down in the Railway Act (1989).

Functions:
- Statutory Functions: The CRS holds various statutory responsibilities, including inspection, investigation, and advisory roles related to rail travel and operations.
- Accident Investigation: Investigating serious train accidents is a crucial aspect of the CRS's mandate, aiming to identify the causes, improve safety measures, and prevent future incidents.
- Headquarters and Jurisdiction: The CRS is headquartered in Lucknow, Uttar Pradesh, and operates across different circles, with the Commissioner of Railway Safety for the south-eastern circle leading the investigation into the recent Odisha train accident.

Independence from Railway Board:
- Administrative Control: Unlike the Ministry of Railways and the Railway Board, the CRS falls under the administrative control of the Ministry of Civil Aviation (MoCA). This arrangement aims to ensure the independence of the CRS and prevent any conflicts of interest.
- Preventing Conflicts of Interest: Separation from the Railway Board allows the CRS to maintain an objective perspective and prioritise the safety of rail passengers and personnel without being influenced by administrative or operational concerns.

What needs to be done?
- Since the railway system operates over a huge geographical area, it requires perfect coordination among all its departments.
- Regular field inspections by the concerned authorities play a crucial role in this regard.
- These types of incidents also highlight the need for trust between the higher management and lower levels. It has also been quoted in the Confidential Incident Reporting and Analysis System (CIRAS) - a system developed by a British university in the 1990s.
- We should keep in mind that in spite of a significant increase in freight load and passenger traffic in India, the number of such accidents and derailments has declined from around 350 per year to around 22 over the last two decades. It clearly shows that the overall safety performance of the railways has improved.
- It also proves that the use of advanced technology has been beneficial and we should enhance it more.

Way Forward:
- Government should work on policies and measures to take the number of such incidents to zero by enhancing safety regulations and standards for railway infrastructure, rolling stock, signalling systems, and operational procedures.
- The management needs to change the attitude from "fault-finding" to "shared-commitment" by developing better communication and coordination between different departments and levels of management within the railway system.
  - Promote a culture of reporting and sharing information on potential safety hazards.

Nut graf: The recent rail accident in Odisha has sparked discussions on accountability and prevention. Coordination, inspections, trust, and advanced technology are crucial for railway safety in future. Authorities must shift focus from fault-finding to a shared commitment to achieve zero incidents.

2. Piped potable water across India

Syllabus: Government Policies & Interventions in Various Sectors

Mains: Significance of Jal Jeevan Mission on achieving Sustainable Development Goals

Context: Modelling study by the World Health Organization (WHO) on impact of 'Har Ghar Jal' Program on Public Health and Economic Savings.

Introduction:
- The Union Jal Shakti Ministry recently commissioned a study on the possible impact of the 'Har Ghar Jal' Program.
- It was conducted by the World Health Organization (WHO).
  - WHO monitors various Sustainable Development Goal (SDG) indicators related to water and sanitation.
  - WHO has developed methods and tools to estimate the health benefits associated with improvements in water, sanitation, and hygiene, particularly in reducing diarrheal diseases and other related health outcomes.
- Investing in water and sanitation has numerous benefits, such as economic, environmental, quality of life, and health improvements.
- Safe water plays a crucial role in preventing both communicable and non-communicable diseases. Geogenic contaminants, such as Arsenic, Fluoride, and heavy metals, negatively impact individuals' productivity.

Jal Jeevan Mission:
- Jal Jeevan Mission, also known as Har Ghar Jal, is a flagship program of the Government of India aimed at providing piped water supply to every rural household by 2024.
- It was launched in 2019 with the objective of ensuring access to safe and adequate drinking water to all citizens, thereby improving their overall health and well-being.
- The main objectives of the Jal Jeevan Mission are to create a reliable and sustainable water supply infrastructure in rural areas, promote water conservation and efficient water management practices, empower and involve local communities in decision-making processes, and ensure the long-term sustainability of water supply schemes.
- The mission follows a community-centric approach, where Gram Panchayats and local communities are actively involved in the planning, implementation, operation, and maintenance of water supply systems. The decentralised model encourages community participation and ownership, leading to increased accountability and sustainability.
- The Jal Jeevan Mission emphasises the use of technology for effective planning, monitoring, and service delivery. It encourages the adoption of sensor-based IoT (Internet of Things) devices for real-time monitoring of water supply systems.
- Additionally, the mission promotes the integration of water supply with other government schemes like MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) to enhance water conservation and rejuvenation of water bodies.

Key Findings:
- The 'Har Ghar Jal' report focuses on diarrheal diseases as they contribute significantly to the overall disease burden related to water, sanitation, and hygiene (WASH) issues.
- According to a study if the Indian government successfully implements the Jal Jeevan Mission (JJM), it could prevent approximately 400,000 deaths caused by diarrhoea.
- In addition, the study suggests that implementing the JJM could avoid 14 million Disability Adjusted Life Years (DALYs) resulting from diarrhoea.
- The report also highlights the significant time and effort saved for women and girls through the provision of tap water.
  - In 2018, women in India spent an average of 45.5 minutes daily collecting water for household needs.
  - Overall, households without on-premises water spent 66.6 million hours each day collecting water, with the majority occurring in rural areas.
- It emphasises the urgent need to address these diseases and the potential for substantial improvements in public health and economic well-being.
- Currently, approximately 62% (12.3 crore rural households) have piped water connections, an increase from 16.6% (3.2 crore) in 2019 when the scheme was launched.
  - The government aims to achieve 100% coverage by 2024, with a fully functional tap water connection defined as each household receiving at least 55 litres of potable water per capita per day throughout the year.
- Several states and union territories, including Gujarat, Telangana, Goa, Haryana, Punjab, Andaman & Nicobar Islands, Daman Diu & Dadra Nagar Haveli, and Puducherry, have reported achieving 100% coverage.

Nut Graf: The Union Jal Shakti Ministry commissioned a study by WHO on the 'Har Ghar Jal' Program's impact. Successful implementation of the program could prevent lakhs of diarrhoea-related deaths. The report emphasises the need for urgent action, highlights time saved for women, and states the government's goal of achieving 100% coverage.

3. India looks at devising own standards to assess socio-economic progress

Syllabus: Government policies and intervention.

Mains: Assessing the socio-economic progress of the country.

Context: Release of a working paper titled "Re-examining the estimates of India's development indicators by international organisations" by the Economic Advisory Council to the Prime Minister.

Introduction:
- The Union Government has discarded the one-size-fits-all international data parameters used to measure the socioeconomic progress of the country. It has proposed to devise its own strategy.
- However, health activists are divided on this move of the Government.
  - One group favours international norms as aspirational standards.
  - While others support the government's decision.

Details:
- India is redrawing its assessment approach to accommodate its national diversity and local anthropometric measurements.
- In March 2023, the Union Health Ministry released its own mechanism for estimating the tuberculosis burden in India.
- India has also questioned the WHO's mathematical modelling for COVID-19 deaths estimation and called it "unscientific".
- India has dropped questions relating to anaemia and disability from the National Family Health Survey-6 (NFHS).
- It is suggested that the three widely used development indicators (child stunting, female labour force participation rate, and life expectancy at birth) often present a misleading picture of overall development.
- Experts highlight that improper adjustments using modelling procedures end up skewing data for India. For example, the United Nations Population Division sharply reduced the estimates for calculating life expectancy at birth for India from 70.19 in 2019 to 67.24 in 2021.
- It is also said that the growing use of environmental, social, and governance (ESG) norms in investment and trade decisions increases the need for accurate data.
- It is pointed out that the issue of misappropriation is well-known in the medical field and countries like the U.S., U.K., and Indonesia have developed their own growth chart for reference by medical practitioners.
- There is a growing concern about the universal applicability of these standards leading some countries to adopt their own country-specific growth benchmarks.
- It is suggested by some health experts that utilising the WHO 2006 standards results in overestimating stunting and wasting cases in India.
  - Currently, using these standards would translate into approximately 10 million and 12 million more children being classified as stunted and wasted.
  - The overall data from 21 developing countries demonstrated that the prevalence of severe wasting in infants under six months increased by 3.5 times, whereas severe child wasting increased by 1.7 times after applying the WHO standard.

Changing metrics

The Centre has sought to discard what it calls the one-size-fit-all international data parameters used to measure the socio-economic progress of the country

- In its working paper, the government discusses redrawing parameters to cater and accommodate the country's diversity and local anthropometric measurements and has used childhood stunting, female labour force participation rate and life expectancy at birth to highlight the alleged anomalies

- An examination of well-known development indicators suggests that international agencies systematically underestimate socio-economic progress, and this then feeds into wider global indices, the paper says

- The paper notes that international estimates are plagued by conceptual mistakes, inappropriate benchmarks and shoddy methodology

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Source: The Hindu

Conclusion:
- Despite WHO 2006 growth standards proving invaluable for global growth comparisons, India should exercise caution in modifying clinical protocols and formulating recommendations.
- India should also engage in transparent and informed discussion, particularly for achieving national targets of stunting and wasting.

Nut Graf:
It is found that improper adjustments using international standards like WHO 2006 Standards end up skewing data for India. Thus, the government of India is actively engaged in redrawing and devising its own standards to assess its socio-economic progress.

4. What is the contention between Coal India and CCI?

Syllabus: Important aspects of governance, transparency and accountability.

Prelims: About Competition Act, Competition Commission of India (CCI) and Coal India Ltd (CIL)

Mains: Details about Coal India Ltd v/s Competition Commission of India case and the Supreme Court's Observations

Context:
The Supreme Court of India on the 15th of June 2023, said that there was "no merit" in Coal India Ltd (CIL) being excluded from the ambit of the Competition Act.

Background of the case
- In March 2017 the Competition Commission of India (CCI) imposed a penalty of 591.01 crores on Coal India Ltd (CIL) for putting in place unfair or discriminatory terms and conditions while dealing with fuel supply agreements (FSAs) with the power producers for the supply of non-coking coal.
- The CCI had accused Coal India of supplying lower-quality essential resources at higher prices and imposing non-transparent terms and conditions in their contracts.
- The CCI had further alleged that Coal India and its subsidiaries undertook their operations independently of the market forces and enjoyed market dominance with respect to the production and supply of non-coking coal in the county.

Coal India Ltd (CIL):
- Coal India Limited (CIL) is a state-owned coal mining company that was established in November 1975.
- CIL, at present, has 8 subsidiaries namely Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Eastern Coalfields Limited (ECL), Western Coalfields Limited (WCL), South Eastern Coalfields Limited (SECL), Northern Coalfields Limited (NCL), Mahanadi Coalfields Limited (MCL) and Central Mine Planning and Design Institute (CMPDI).
- CIL and its subsidiaries are incorporated under the Companies Act, 1956 and are wholly owned by the Union Government.
- CIL works under the administrative control of the Ministry of Coal, Government of India.
- CIL is a Maharatna company, which is a privileged status conferred by Indian Government to a few state-owned enterprises with an aim to empower them to expand their operations and emerge as global giants.
- Headquarters: Kolkata, West Bengal
- At present, CIL has become one of the largest producers of coal in the world and one of the largest corporate employers.

Coal India's stand
- Coal India Ltd (CIL) had argued that the PSU had operated in line with the "principles of common good" and had also ensured equitable distribution of the key natural resource.
- With the above-mentioned objective, Coal India Ltd (CIL) was secured as a "monopoly" under the Nationalisation Act, 1973 or the Coal Mines (Nationalisation) Act, 1973.
- The PSU accepted that it might have resorted to a differential pricing mechanism. However, the key objective of adopting such a mechanism was to encourage captive coal production.
  - Differential pricing, despite being inconsistent with market principles, helped ensure the viability of the larger operating ecosystem and also pursue various welfare objectives.
- The PSU also said that it resorted to differential pricing mechanisms because the issue of coal supply has a bearing on larger national policies, for example, the government could promote growth in backward areas with the help of increased allocation.
- The entity further argued by saying that it did not operate in the commercial sphere and highlighted the fact that about 345 out of its 462 mines had suffered cumulative losses amounting 9,878 crores in 2012-13.

CCI's response
- CCI tried to broaden the scope of the argument by quoting the Raghavan Committee (2020) report which held that "state monopolies are not conducive to the best interests of the nation. Hence such state monopolies must not be allowed to operate in a state of inefficiency and should instead, operate amid competition".
- CCI also pointed out the fact that coal ceased to be an "essential commodity" in February 2007 and the Nationalisation Act was also revoked from the Ninth Schedule of the Constitution in 2017.
- Furthermore, CCI argued that Coal India Ltd (CIL) was a fully-government-owned entity until the disinvestment in 2010 after which the government's shareholding was reduced to 67% with the rest held by private hands.

- CCI also pointed out the fact that Coal India directed 80% of its supplies to power companies, who would then supply power generated using coal to distribution companies (discoms), who would further supply power to the end consumer.
  - CCI thus contended that the supply of coal, adherence to the contract, reasonableness in the prices and quality of coal also serve a common good.
- CCI also argued that coal accounts for about 60 to 70% of the costs for power generation companies and hence irregular prices and supply could have a significant impact on the end users or consumers indirectly.

Supreme Court's observations

- The apex court observed that there was "no merit" in the argument that the Competition Act would not apply to CIL as it comes under the purview of the Nationalisation Act.
- According to the court, the fundamental principle which permeates the Act would stand violated if the state monopolies, public sector entities and government companies are allowed to contravene the (competition) act.
- The court further noted that entities cannot act with caprice, treat unfairly otherwise or similarly situated entities with discrimination.

Nut graf: The Supreme Court, while hearing the CIL's appeal against the Competition Appellate Tribunal's order which had accused CIL of abusing its position, has held that there was "no merit" in CIL being excluded from the purview of the Competition Act. This judgement by the apex court has reinforced the principle of competitive neutrality.

DISASTER MANAGEMENT

1. Heatwaves

Syllabus: Disaster and disaster management

Mains: Impact of Heatwaves

Context: Heatwave deaths Amid heatwave deaths being reported in parts of the country, the Union Health minister held a meeting with senior officials of the India Meteorological Department, National Disaster Management Authority, and the Health ministry. He also asked the Indian Council of Medical Research to develop short-term and long-term plans in coordination with other agencies to prevent such deaths.

What are heat waves?
- Heat waves are periods of abnormally hot weather that can be dangerous to human health and the environment.
- Period: March and June, and in some rare cases even extend till July

Impacts of heat waves
- **Effect On Human:**
  - Heat Exhaustion
  - Heatstroke
  - Dehydration
  - Death
- **On Ecology:**
  - Forest fire
  - Loss of animals due to water scarcity
  - Reduction in biodiversity
- **On Economy**
  - Agriculture
  - Energy Demand
  - Tourism and Recreation

Management of heat waves
- Increasing of green cover
- Increasing of blue cover
- Improving access to water in public spaces
- Strengthening fire fighting facilities

GEOGRAPHY

1. Foucault Pendulum

Syllabus: GS01-Geography

Prelims: Rotation of Earth; Coriolis Force

Context: Foucault pendulum in new Parliament building

Introduction:
- The National Council of Science Museums (NCSM) in Kolkata designed and installed the Foucault Pendulum in the recently inaugurated Parliament building, specifically in the Constitutional Gallery area.
- The Foucault Pendulum is a device that demonstrates the rotation of the Earth. It consists of a long, heavy pendulum that swings back and forth in a fixed plane.
  - Over time, due to the Earth's rotation, the plane of oscillation appears to rotate, providing evidence of the Earth's rotation.
- Jean Bernard Léon Foucault, a French physicist from the 19th century, accidentally invented the pendulum while working with a metal rod on a lathe. When he plucked the rod, one end vibrated in the same plane while the other end, fixed to the lathe, rotated.
- Foucault's research revealed that it is easier to observe the Earth's rotation using the pendulum at the Poles than at lower latitudes.
  - At the Poles, the pendulum's plane completes one rotation in approximately 24 hours, corresponding to the Earth's rotation period.
  - In contrast, at the Equator, the pendulum does not rotate at all due to the faster rotation of the Earth at the wider central region.
- The pendulum swings in a plane defined by the motion of its bob (the sphere). As the Earth rotates, the pendulum's plane appears to rotate slowly. However, it is actually the Earth itself that is rotating, not the pendulum.
- This relative motion explains the Coriolis effect.
  - Coriolis force is a phenomenon that appears to act on objects in motion in a rotating reference frame, like the earth.

Applications:
- One of the main applications of the Foucault Pendulum is in educational settings and science museums. It serves as a visual and interactive tool to help explain the concept of the Earth's rotation and its effect on various phenomena.
- The Foucault Pendulum has been used to determine the latitude of a location accurately. By measuring the rate of rotation of the pendulum, one can calculate the latitude of the place where the pendulum is located.
- Another application of the Foucault Pendulum is in precision timekeeping. The pendulum's swing is affected by the rotation of the Earth, and by measuring the period of the pendulum, one can accurately measure time.
- It has been employed in experiments related to atmospheric science, geophysics, and astronomy.
- It has also found its way into the world of art and architecture. It has been incorporated into installations and exhibits to create visually captivating and thought-provoking experiences.
- It has been used in some astronomical observatories to calibrate and verify the accuracy of certain instruments. Its precise and predictable motion serves as a reference for making measurements and adjustments.

2. Evapotranspiration

Syllabus: GS01-Geography

Prelims: Water Cycle; Evaporation and transpiration

Context: This article discusses the process of Evapotranspiration.

Key Details:
- Evapotranspiration is the combined process of evaporation and transpiration that leads to the loss of water from the Earth's surface to the atmosphere.
- Term 'Evapotranspiration' was coined and later defined by climatologist Charles Warren Thornthwaite in 1944.
- Evaporation refers to the conversion of liquid water to water vapour, mainly from open water bodies, whereas transpiration is the release of water vapour by plants through their leaves.
- Several factors influence the rate of evapotranspiration, including temperature, humidity, wind speed, solar radiation, and the availability of water in the soil.
  - Higher temperatures, low humidity, and strong winds increase evapotranspiration, while cloudy conditions and limited soil moisture reduce the process.

- Various methods are used to measure evapotranspiration. These include the use of evaporation pans, lysimeters, and meteorological instruments such as atmometers and eddy covariance systems.
  - These techniques help researchers and policymakers estimate water loss from different landscapes, including agricultural fields, forests, and urban areas.
- Evapotranspiration plays a crucial role in agricultural water management. By understanding the water requirements of crops and estimating evapotranspiration rates, farmers can optimise irrigation scheduling to ensure efficient water use.
  - This knowledge helps prevent over-irrigation, which can lead to water wastage and environmental issues, and under-irrigation, which can reduce crop productivity.
- Evapotranspiration is an essential component of the Earth's water cycle and has significant environmental implications.
  - It affects regional and global climate patterns by regulating the exchange of moisture between the land surface and the atmosphere.
  - Changes in evapotranspiration rates due to land-use changes, deforestation, or climate change can impact local and regional water availability, precipitation patterns, and overall ecosystem health.
- Understanding evapotranspiration is vital for effective water resource management and sustainable development.

3.   Lightning, blamed for Canada fires, will get worse in a warming world

Syllabus: Important Geophysical Phenomenon.

Mains: Lightning activity and wildfires.

Prelims: Phenomenon of Lightning.

Introduction
- The smoke drifting from the wildfires in Canada has impacted the air quality in New York City, Washington D.C., and other parts of the North American Continent.
- As per the Canadian Interagency Forest Fire Centre, there were almost 426 active fires in Canada as on 8th June 2023.
- The wildfires in British Columbia and Alberta (Canada) began in late April and spread to Quebec, Ontario, and Nova Scotia.

Causes of Wildfires:
- Most of these fires are caused due to lightning.
- Human activities are also responsible for it.
- It was also reported that Canada's Atlantic coast received lower snowfall in the winter followed by an unusually dry spring.
- Moreover, Nova Scotia's capital, Halifax, received only 120 mm of rain between March and May 2023. This is a third of the average precipitation during this period.
- Additionally, a late-May heatwave resulted in an increased temperature.

Details about Lightning:
- It is revealed in various studies that lightning electric currents that flow for more than some tens of milliseconds are called long-continuing currents (LCC). They can potentially produce fires.
- The water droplets in warmer air and ice crystals in cooler air coalesce together to form thunderstorm clouds (especially cumulonimbus clouds). The negative and positive charges build up in clouds and over time the voltage difference becomes high.
- It then leads to a rapid discharge of electric charge and is seen as a lightning flash.
- A study published in Nature (February 2023) reveals that there will be an increase in total global lightning activity and global LCCs by the 2090s.
- It was also found in another study that an increase in global average surface temperatures by 4 degrees C results in an increase of lightning activity by 11% per K.
- It is also found that LCC lightning activity increased by around 47% over land. It implies that it would ignite more wildfires in the future.
- However, in other parts of the world like the western parts of North America, northern and southern South America, the Scandinavian peninsula, and parts of central Asia, the total lightning activity will decrease. Notably, LCC lightning activity might increase.
- It is suggested that long-term changes in lightning patterns reflect climate change.
- The World Meteorological Organisation considers lightning to be an essential climate variable.
- Moreover, lightning produces nitrogen oxides that react with oxygen in the air to form ozone. It should be noted that ozone itself is a strong greenhouse gas.

Lightning Strikes in India:
- Lightning strikes are one of the deadliest natural disasters in India.
- As per the Climate Resilient Observing Systems Promotion Council, there were approximately 18.5 million lightning strikes between April 2020 and March 2021.
- It is reported by the Indian Institute of Tropical Meteorology, Pune that there is a sharp increase in lightning strikes since 1995.
- Between 1972 and 2019, around 90632 people died by lightning.
- As per the National Crime Records Bureau, lightning caused nearly 2875 deaths in 2019.
- Odisha records the highest lightning strikes among all states (Skymet).

Nut Graf: It is reported that one of the major causes of increased wildfires in Canada is lightning. Several studies point out that lightning activities have increased due to climate change. It will further increase as the climate warms.

4.   Forecasting cyclone in Arabian Sea

Syllabus: Tropical Cyclones

Mains: Factors contributing in formation of cyclones.

Context: This article discusses the impact of ocean warming on cyclone forecasts.

Introduction:
- The Arabian Sea is experiencing increased heating due to global warming, leading to the formation of stronger cyclones like Biparjoy.
- The IMD forecast for Biparjoy initially indicated that it would not make landfall in Gujarat but later changed to predict its impact on India four days before it hit.
  - In contrast, the recent cyclone Mocha in the Bay of Bengal followed the trajectory predicted by the IMD several days in advance.
- The India Meteorological Department (IMD) has a higher accuracy in forecasting cyclones originating in the Bay of Bengal compared to those in the Arabian Sea.
  - Cyclones in the Bay of Bengal are better understood due to their higher frequency, while Arabian Sea cyclones have historically been fewer and less predictable.

India Meteorological Department (IMD):
- Formed in 1875, the India Meteorological Department (IMD) is the national meteorological service of the country and it is the chief government agency dealing in everything related to meteorology, seismology, and associated subjects.
- The administrative responsibilities of the Department are under the supervision of the Ministry of Earth Sciences of the Indian Government. The IMD is headquartered in New Delhi.
- IMD Mandate
  - The mandate and functions of the IMD are discussed below.
    1. Taking meteorological observations and providing current information and forecasting information for the most favorable operation of weather-dependent activities such as irrigation, agriculture, aviation, shipping, offshore oil exploration, and so on.
    2. Giving warnings against severe weather phenomena such as tropical cyclones, dust storms, heat waves, cold waves, heavy rains, heavy snow, etc.
    3. Providing met-related statistics needed for agriculture, industries, water resources management, oil exploration, and any other strategically important activities for the country.
    4. Engaging in research in meteorology and allied subjects.
    5. Detection and location of earthquakes and evaluation of seismicity in various parts of the country for developmental projects.

Warming Oceans and Cyclone Formation:
- Accurate forecasting of cyclones is crucial for timely and effective disaster preparedness and response. However, the warming of the oceans, primarily driven by climate change, has presented new challenges in predicting cyclones in the Arabian Sea.
- The Arabian Sea's cyclones are largely influenced by the sea surface temperatures (SSTs) in the region. Warmer ocean temperatures provide the necessary fuel for cyclone formation and intensification.
- As the oceans warm due to climate change, the energy available for cyclone development increases, leading to more frequent and potentially stronger cyclones. This phenomenon has been observed in recent years, with a notable increase in cyclone activity in the Arabian Sea.
- Ocean temperatures play a crucial role in forecasting cyclones. Accurate measurements of SSTs allow meteorologists to identify favorable conditions for cyclone development and track their path.
  - However, as the oceans warm, the existing forecasting models may struggle to accurately capture the changing dynamics. Rising temperatures can lead to the formation of unexpected cyclones, alteration in their tracks, and changes in their intensity.

- While prediction models capture the heat within ocean layers, they often fail to fully capture the wind component, known as steering winds, which influences the direction and recurving of cyclones.
- The Arabian Sea has a unique characteristic with a deeper layer of warm water, up to 40 meters, compared to the Bay of Bengal. These subsurface values are often not accounted for in prediction models, leading to inaccurate forecasts of cyclone strength and speed in advance.

Increased Variability and Uncertainty:
- The warming oceans contribute to increased variability and uncertainty in cyclone forecasting.
- Higher SSTs create an environment with greater moisture availability, which can result in rapid intensification of cyclones.
- This rapid intensification, combined with unpredictable atmospheric conditions, makes it challenging to anticipate cyclone behavior accurately.
- Consequently, the forecasting window for predicting cyclone tracks and landfall becomes narrower, reducing the lead time for effective evacuation and disaster preparedness.

Nut Graf: The warming oceans in the Arabian Sea have posed significant challenges to cyclone forecasting. As climate change continues to drive rising ocean temperatures, accurate predictions of cyclones become more elusive.

5.   Biparjoy- part of a new trend in Indian cyclones

Syllabus: Important Geophysical Phenomena-Cyclone

Mains: Significant changes in the cyclonic disturbances in North Indian Ocean and factors influencing it.

Context: Cyclone Biparjoy made landfall in Gujarat.

Key Details:
- Recent decades have witnessed significant changes in the cyclonic disturbances over the North Indian Ocean, encompassing the Arabian Sea, the Bay of Bengal, and the land in between.
- The number of cyclonic disturbances in the North Indian Ocean has notably decreased over the past 40 years.
- The decline in cyclonic disturbances can be mainly attributed to a rapid decrease in those originating from the Bay of Bengal, the primary source of past cyclones affecting Southeast and West Asia.
- Conversely, the number of disturbances from the Arabian Sea has been steadily increasing, although still relatively low.
  - Notably, while the frequency of disturbances has decreased, their intensity has risen in recent decades.
- 10-year rolling average of cyclonic disturbances from the Arabian Sea and the Bay of Bengal shows the average number of disturbances originating from the Bay of Bengal has sharply declined since the 1970s, while those originating from the Arabian Sea have significantly increased.
  - From 1891 to 1962, the Arabian Sea recorded an average of less than two disturbances per year. However, since then, the average has risen, with over three cyclones recorded in the 2020s.
- The periods of 1999-2003 and 1994-1998 also recorded significant shares of severe cyclonic storms at 34% and 52%, respectively, indicating a renewed upward trend in storm intensity in the North Indian Ocean.
- Data shows that around 34% of disturbances originating from the Arabian Sea develop into severe cyclonic storms, compared to 19% from the Bay of Bengal.
- Global warming has resulted in the Arabian Sea warming up, leading to more frequent and stronger cyclones.
- The unique oceanographic characteristics of the Arabian Sea make cyclone forecasting more challenging for the Indian Meteorological Department, requiring adjustments to existing models.

Nut Graf: Recent decades have seen significant changes in cyclonic disturbances over the North Indian Ocean. While the overall number of disturbances has declined, those originating from the Arabian Sea have increased. The unique oceanographic characteristics of the Arabian Sea pose challenges for cyclone forecasting.

6.   Monsoon Deficit

Syllabus: Monsoon

Mains: Factors contributing in Monsoon Deficit

Context: Despite the recent rains, India as a whole had a deficit of about 23 per cent till June

What is monsoon?
- The monsoon is a seasonal S-W wind system that brings rain to India.
- The monsoon season typically runs from June to September.
- The monsoon is essential for agriculture in India, as it provides the majority of the country's annual rainfall.
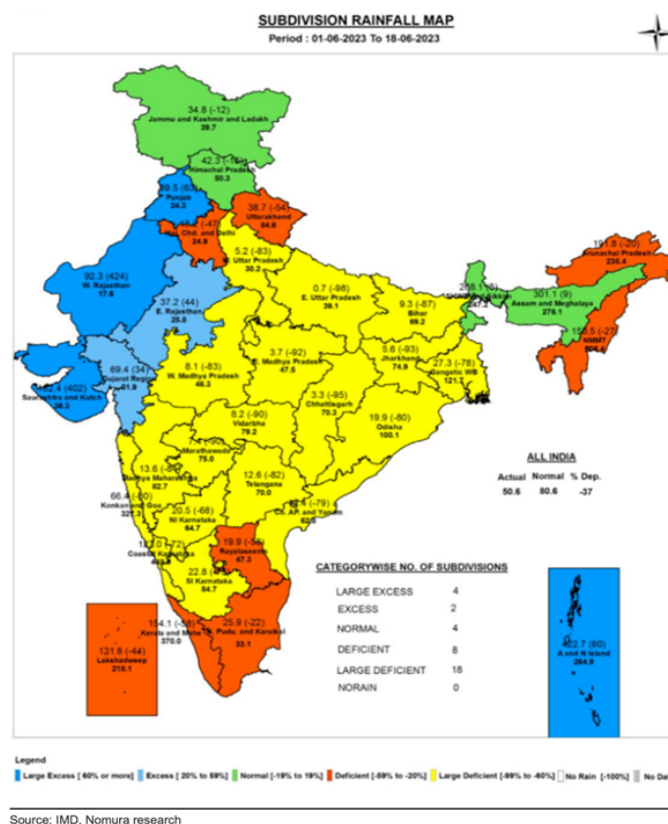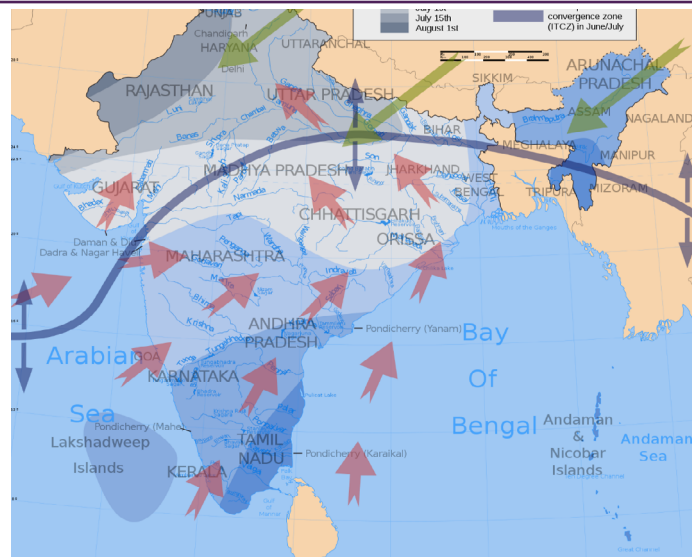
Image: Delayed monsoon and Below normal rainfall. Yellow- Large deficient and Red- Deficient
Source: IMO

Details:
- Southern India still has a shortfall of 46%
- Central India has received 35% below normal rainfall
- Eastern India has a 23% deficiency

Impact of a Deficient Monsoon
- A deficient monsoon can have a significant impact on agricultural output.
- Delays in sowing of Kharif crops
- This can lead to lower rural incomes and reduced demand for goods and services.
- Flood Inflation

Solution
- Early yield variety- Eg: Pusa Mustard 21: Approximately 10-15 days earlier than traditional varieties.
- Drought resistant crops- Eg: Pusa Basmati 1121 can tolerate up to 30% water stress
- Crop insurance

7. Kalasa Banduri Project

Syllabus: GS-1; Geography; Water bodies and resources

Prelims: About Kalasa Banduri Project and Mahadayi River

Context:
Tenders floated for implementation of the Kalasa Banduri Project by the previous Karnataka government may run into troubles as they were announced without obtaining the required forest and environment clearance.

Kalasa Banduri Project
- The Kalasa-Banduri Nala is a project undertaken by the Government of Karnataka to build barrages on the Kalasa and Banduri streams.
  - Kalasa and Banduri streams are the tributaries of River Mahadayi or Mandovi.
- The Kalasa-Banduri project aims to divert water from Mahadayi to satisfy the drinking water needs of the Belagavi, Bagalkot, Dharwad, Gadag, and Hubli districts of Karnataka.
- Through the Kalasa-Banduri Project, the Karnataka government aims to divert Mandovi River water from Kalasa and Banduri canals into the Malaprabha River in the state.
- Kalasa-Banduri Project includes the construction of a total of 11 dams on the River Mahadayi or Mandovi.
- However, the sharing of the waters of the Mahadayi River has been a cause of dispute between the states of Goa and Karnataka since the 1980s.

River Mahadayi or Mandovi
- River Mahadayi or Mandovi is a west-flowing inter-state river in the Western Ghats.
- Mahadayi or Mandovi or Mhadei River originates in the Bhimgad Wildlife Sanctuary located in the Belagavi district of Karnataka.
- Mahadayi enters Goa from Sattari taluk of the North Goa district and it finally joins the Arabian Sea at Panaji.
- The Mandovi river basin falls in the states of Goa, Karnataka and Maharashtra.
- The river is regarded as the "lifeline of Goa", as most of the rivers of the state contain salt water and Mandovi being a sweet-water source ensures water security and is important for fishing.

8. Places in News: Dodoma and Nova Kakhovka Dam

Syllabus: Important Places in news

Prelims: Location of places

Dodoma:
- Dodoma has now become a full fledged capital of Tanzania.
- **History:**
  - German colonists had Dar es Salaam as capital.
  - 1973: 1st President of Tanzania, after a public referendum, decided to declare Dodoma as capital
  - 2017: Parliament shifted to Dodoma
  - May 2023: inauguration of new Presidential offices.
- **Need for the shift:**
  - Overcrowding and strain on infrastructure
  - Uneven Development
  - Accessibility and National Unity
  - Efficiency of government operations

Source: Mappr

Nova Kakhovka Dam:
- Kakhovka Dam on Dnieper River, in the city of Nova Kakhovka, Kherson Oblast, Ukraine.
- Located in the Russian occupied region.
- It has been fully destroyed beyond saving.
- Being called an ecocide.

Damage to Ukraine's Nova Khakovka dam
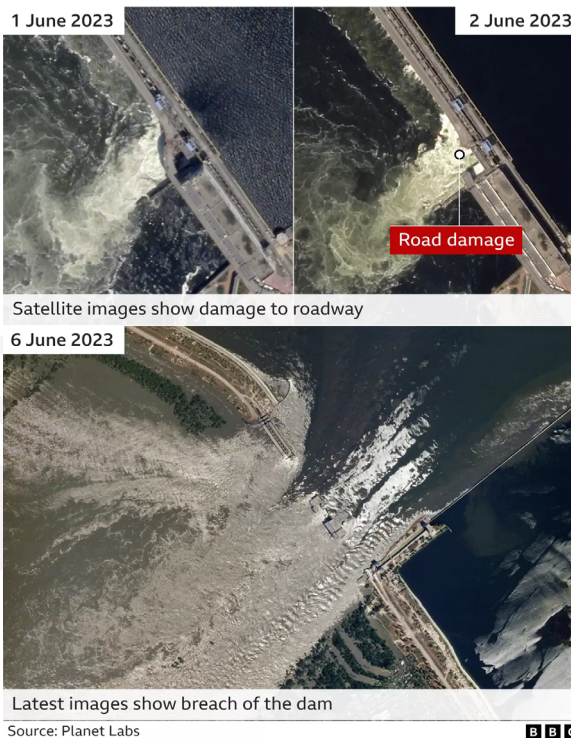
Source: BBC

Impacts:
- Flooding of towns, villages and agricultural fields.
- Water contamination due to Chemicals and dead bodies of people and animals.
- Landmines being dislodged by floodwater.
- Many tree species downstream may perish due to prolonged flooding.
- Might affect the marine ecosystem of the black sea.
- Will affect global grain supplies as 100 sq. km of farmland either flooded or left without water for irrigation.

Kakhovka dam and reservoir

Source: BBC

Source: APNews
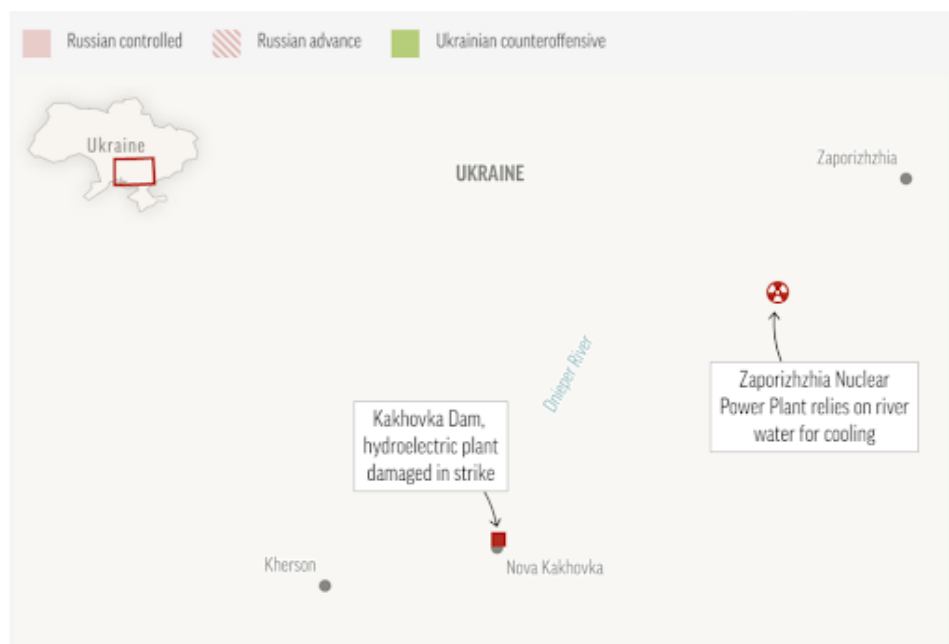
INDIAN SOCIETY & SOCIAL ISSUES

1. Global Gender Gap Report 2023

Syllabus: Gender equality

Prelims: Global Gender Gap Report 2023

Context: India climbs eight places to 127 in global gender index, says WEF report. The gender gap is the disparity in social, political, economic attainments between men and women.

About Global Gender Gap Report:
- It benchmarks countries on their progress towards gender parity in four Key dimensions with Submatrices.
  - Economic Participation and Opportunity,
  - Educational Attainment,
  - Health and Survival,
  - Political Empowerment
- Scores between 0 and 1, with 1 indicating total gender parity and 0 indicating complete imparity.
- Objective- To act as a guidepost for tracking progress on gender disparities in health, education, the economy, and politics.

Findings in the report:
- Nordic countries are in the top three
- Continent wise Europe tops the list
- **India improved in rank 135 in 2022 to 127 in 2023**
- **India - 64.3% of the overall gender gap.**
  - Gender Parity in Education- Attained parity in enrolment across all levels of education.
  - Economic Participation and Opportunity- 36.7% parity
  - Political Empowerment- 25.3% parity, with women representing 15.1% of parliamentarians
  - Health and Survival- 1.9% improvement in sex ratio at birth

2. Gender Social Norms Index

Syllabus: Gender equality

Prelims: Gender Social Norms Index

Context: UNDP released the latest GSNI 2023, an index to measure how social beliefs and biases affect gender equality in politics, work and education.

About Gender Social Norms Index (GNSI):
- First released in 2020 alongside the HDI 2019.
- Calculates biases against women across 4 dimensions

DIMENSIONS			
Political	Educational	Economic	Physical Integrity
INDICATORS			
Women having the same rights as men is essential for democracy	University is more important for men than for women	Men should have more right to a job than women	It is justifiable for a man to beat his wife
Men make better political leaders than women do		Men make better business executives than women do	Abortion is never justifiable

GENDER SOCIAL NORMS INDEX

Source: hdr.undp.org

Gender Social Norms Index 2023:
- No improvement in gender biases against women in a decade (9/10 men and women still hold these).
- Data from 80 countries and territories, in addition to data from Waves 6 or 7 (whichever is available for a target region) from World Values Survey.
- Gender biases exist across regions, cultures and income levels.

- **Politics:**
  - 50% of people think men are better political leaders.
  - Only 10% heads of states/govts across the world are women.
  - Women hold just 25% parliamentary seats globally.
  - Women face harsher judgement than their male counterparts.
- **Business:**
  - 40%: men make better executives than men
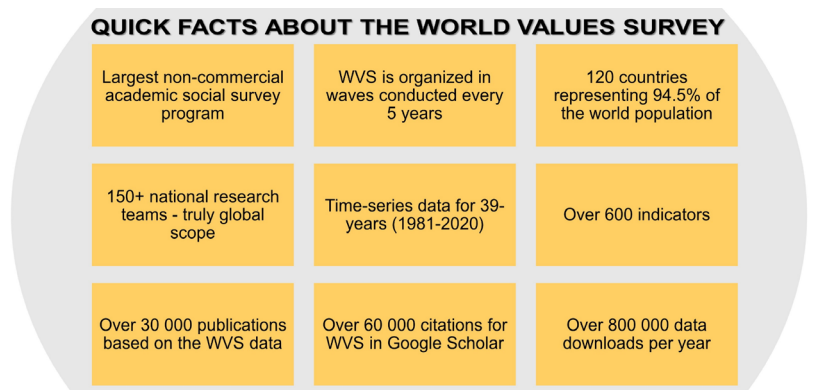 - Less than 33% of managerial positions are held by women.
  - Broken link between educational levels and economic empowerment
- **Society:**
  - Places where higher bias, women face additional burden wrt domestic chores and care work.
  - 25% believe a man beating his wife is justified.

World Values Survey:
- Started 1981 by Prof. Ronald Inglehart of University of Michigan.
- "Devoted to the scientific and academic study of social, political, economic, religious and cultural values of people in the world"- WVS Website

QUICK FACTS ABOUT THE WORLD VALUES SURVEY

Largest non-commercial academic social survey program	WVS is organized in waves conducted every 5 years	120 countries representing 94.5% of the world population
150+ national research teams - truly global scope	Time-series data for 39-years (1981-2020)	Over 600 indicators
Over 30 000 publications based on the WVS data	Over 60 000 citations for WVS in Google Scholar	Over 800 000 data downloads per year

Source: worldvaluesurvey.org

3. Global slavery index 2023

Syllabus: Population and Associated Issues

Mains: Various dimensions of Modern Slavery

Context: India tops the list of Global Slavery Index, 2023 with 11 million people working as forced laborers.

About Global Slavery Index, 2023:

Publisher	Walk Free Foundation
Purpose	Assess modern slavery conditions worldwide
Data Sources	International Labour Organization (ILO), International Organization for Migration (IOM).
Indicators	Forced labor, forced marriage, human trafficking, exploitation
Rankings	Countries ranked based on estimated number of people in modern slavery
Index Score	Reflects vulnerability and response to modern slavery
Recommendations	Calls for action to combat modern slavery and protect rights
Target Audience	Policymakers, activists, researchers, organizations
Impact	Raises awareness, informs strategies, promotes human rights

Highlights:
- The number of people living in conditions of modern slavery has increased by 25% over the last 5 years, reaching 50 million people.
- G20 nations, including India, China, Russia, Indonesia, Turkey, and the US, are contributing to this increase through their trade operations and global supply chains.

Definition and scope of modern slavery:
- Modern slavery encompasses various practices such as - Forced labor, Forced marriage, Debt bondage, Commercial sexual exploitation, Human trafficking, Slavery-like practices (ex. coercion to do certain work) and Sale and exploitation of children.
- It involves situations where threats, violence and deception prevent individuals from refusing or leaving.

Factors contributing to the increase:
- The rise of modern slavery is influenced by climate change, armed conflict, weak governance, and health emergencies like COVID-19.
- G20 nations account for over half of all people living in modern slavery.
- Imports of at-risk products worth $468 billion, including electronics, textiles, palm oil, and solar panels, worsen forced labor conditions by coming from countries with weak worker protection.

Manifestations of modern slavery in Global Supply Chains:
- The report highlights the prevalence of forced labor across different points in the global supply chain, particularly in industries such as textiles.
- Exploitative conditions, unpaid work, low wages, debt bondage, and health and safety risks are common in industries like spinning mills.
- G20 countries collectively import billions of dollars' worth of goods produced by forced labor every year.

Most prevalent

The countries estimated to have the highest prevalence of modern slavery tend to be conflict-affected, have state-imposed forced labour, and have weak governance.

	Rank	Prevalence Rate*	# of People
North Korea	1	104.6	2,696,000
Eritrea	2	90.3	320,000
Mauritania	3	32.0	149,000
Saudi Arabia	4	21.3	740,000
Türkiye	5	15.6	1,320,000
Tajikistan	6	14.0	133,000
United Arab Emirates	7	13.4	132,000
Russia	8	13.0	1,899,000
Afghanistan	9	13.0	505,000
Kuwait	10	13.0	55,000

*Estimated number of people in modern slavery per 1,000 population

Least prevalent

The countries with the lowest prevalence of modern slavery are those with strong governance and strong government responses to modern slavery.

	Rank	Prevalence Rate*	# of People
Switzerland	160	0.5	4,000
Norway	159	0.5	3,000
Germany	158	0.6	47,000
Netherlands	157	0.6	10,000
Sweden	156	0.6	6,000
Denmark	155	0.6	4,000
Belgium	154	1.0	11,000
Ireland	153	1.1	5,000
Japan	152	1.1	144,000
Finland	151	1.4	8,000

*Estimated number of people in modern slavery per 1,000 population

India's measures against on modern slavery:
- India has passed laws like the Bonded Labour Abolition Act of 1976 to address modern slavery.
- However, implementation challenges, corruption, legal loopholes, and lack of political hinder effective enforcement of these laws.
- Moreover, there are lacunas in proper identification and enumeration of people trapped in modern slavery conditions.

Way forward:
- Strengthen Measures and Legislation
- Embed Anti-Slavery Measures in Climate Change Plans
- Enhance Education and Tighten Regulations
- Prioritize Rehabilitation and Support
- Hold G20 Nations Accountable and Foster Cooperation

MISCELLANEOUS

1. Strategic Oil Reserves in Salt Cavern

Context: Government is conducting a study to develop strategic oil reserves in Salt caverns of Rajasthan.

India's Strategic Oil Reserves:
- **Need:** world's 3rd largest crude consumer; >85% import dependency.
  - The International Energy Agency recommends all countries to hold emergency stockpiles for at least 90 days.
  - Developed after the oil crisis of the 1970s.
  - Managed by an SPV of the Ministry of Petroleum: Indian Strategic Petroleum Reserve Limited (ISPRL).
  - Released after the approval from an empowered committee of the government.
- Currently we have 3 reserves with capacity: 5.33 million metric tonnes (39 million barrels)
  - Mangaluru (1.5 MMT)
  - Padur (2.5 MMT)
  - Visakhapatnam (1.33 MMT)
- 2 additional have received in principal approval for construction under PPP mode:
  - Chandikhol (4 MMT)
  - Padur (2.5 MMT)
- All of these are Rock Caverns
- Current SPR is enough to meet oil needs for 9.5 days.
- Apart from this, Oil Marketing Companies have storage facilities for 64.5 days.

Why salt caverns?
- Cheaper, less labour and cost intensive than rock caverns.
- Rock caverns developed via excavation; salt caverns via solution mining.
- Their creation is faster and simpler.
- Naturally well-sealed, and allows for rapid extraction and injection of oil.
- Possible to create and operate it with minimal involvement below the surface.
- Can also be used for storing natural gas, compressed air and hydrogen.
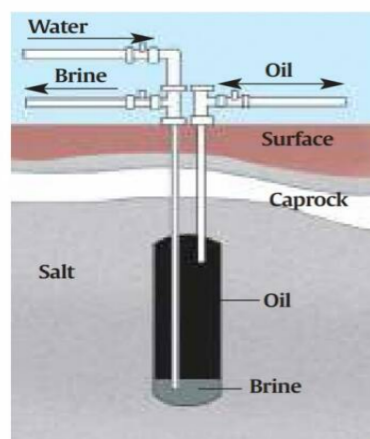

OPERATING A SALT CAVERN

CRUDE OIL, natural gas, or other petroleum substances that might be stored in the reserve are extracted by pumping brine into the cavern. The petroleum substance has a lower density, and is pushed out.

TO ADD more petroleum substance to the reserve, the requisite volume of brine is pumped out, creating the required space.

THIS OPERATION of extraction and replenishment is done from the surface, usually through two pipeline systems — one each to the residual brine at the bottom of the cavern and the stored hydrocarbon. Since their densities differ, the brine does not mix with the stored substance.

A SURFACE brine pond is usually maintained for use in operating the cavern. The brine can be reused repeatedly.

Illustration based on MIT Environmental Solutions Initiative report, August 2020

Source: The Indian Express

Potential in India:
- Rajasthan has many rock formations.
- But no Indian company has requisite knowledge for this technology.
- EIL (Engineers India Limited) has tied up with a German Company DEEP.KBB GmbH to access this technology.

2. High net worth individuals leaving India

Context: Ultra-rich individuals are projected to keep leaving India in 2023. India's likely net outflow (net of inflow and outflow) in 2023 will make it the second worst performer on losing HNWIs after China. In 2022, India saw an outflow of 7,500 such individuals.

Details
- Wealthy Indians Seek Greener Pastures as Outflow of Ultra-Rich Continues
- According to the Henley Private Wealth Migration Report (2023), released by Henley & Partners, India is projected to experience a net outflow of 6,500 High Net-Worth Individuals (HNWIs) in 2023, making it the second-worst performer in terms of losing ultra-rich individuals, trailing behind China.
- The report defines HNWIs as those with investable wealth of USD 1 million or more, equivalent to Rs 8.2 crore or more in rupee terms. This trend follows a previous outflow of 7,500 such individuals in 2022. Conversely, Australia, the UAE, Singapore, the USA, and Switzerland are expected to be the top destinations for net inflows of HNWIs in 2023.
- India ranked 10th among the wealthiest countries in the world based on HNWI population. It boasts 3,44,600 HNWIs, 1,078 centi-millionaires, and 123 billionaires. In comparison, China has 7,80,000 HNWIs and 285 billionaires, while the US, with a population of just 340 million, has 52,70,000 HNWIs and 770 billionaires.
- The W10 grouping, comprising the US, Japan, China, Germany, the UK, Switzerland, Australia, Canada, France, and India, represents the top 10 countries with the highest number of HNWIs.

Why do high net worth individuals settle in another country?
- Low taxation
- Personal freedom
- Political stability
- Children's prospects and their quality of life.
- Good healthcare facility
- What does it indicate: About the economic condition and civic facility

What should India do?
- Have a stable and rationalized taxation policy
- Promote Ease of doing business environment
- Focusing on civic facility

3. Diamond League

- The Diamond League is a yearly series of prestigious track and field athletic competitions, consisting of fourteen top-tier invitational meetings.
- These competitions are considered among the best in the world and are part of the World Athletics organisation's one-day meeting competitions.
- The Diamond League was introduced in 2010 as a replacement for the International Association of Athletics Federations (IAAF) Golden League, which had been held annually since 1998.
- While the Golden League mainly focused on elevating the prominence of European athletics competitions, the Diamond League aims to increase the international allure of the sport.
- In pursuit of this objective, the series expanded its reach beyond Europe for the first time, incorporating events in China, Qatar, Morocco, and the United States, in addition to the original Golden League members (excluding Berlin) and other traditional European competitions.
- Following the 2022 Russian invasion of Ukraine, the Diamond League made the decision to exclude athletes from Russia and Belarus from participating in all its track and field meetings.
- Paris, France is hosting the 2023 Diamond league.
- 3 Indians have received medals in the League until now:
  - Vikas Gowda: discus throw
  - Neeraj Chopra: javelin throw
  - M. Sreeshankar: long jump

4. World Cup triumph and Dronacharya award will be the crowning glory for seasoned coach Kumar

- C R Kumar was the mastermind behind the Indian junior men's team in the Asia Cup in Salalah (Oman) recently.
- He will be the head coach of the side for the junior men's World Cup that is scheduled to be held in Kuala Lumpur from December 5 to 16, 2023.
- Notably, Kumar coached the Indian senior men's and women's teams.
- The victory at the Asia Cup catapulted Kumar to the pinnacle of glory.
- Kumar has an unfulfilled dream, of winning the Dronacharya Award. Though his name was recommended in 2022, he was surprisingly left out.
- He started his coaching career in 1998 by assisting V. Baskaran at the 1998 Utrecht World Cup.

5.   Pokkali Paddy

- Pokkali Paddy is a unique and traditional rice variety cultivated in the coastal regions of Kerala, particularly in the districts of Alappuzha, Ernakulam, and Thrissur.
- It has been recognized as a Geographical Indication (GI) product, highlighting its distinctiveness and local significance.
- Pokkali Paddy is well-known for its saltwater-tolerant nature, making it suitable for cultivation in saline and marshy areas.
- This characteristic is attributed to its ability to withstand high levels of salinity, making it a valuable crop for coastal farmers facing the challenges of climate change and rising sea levels.
- The cultivation of Pokkali Paddy follows a unique and ecologically sustainable farming system known as Pokkali farming.
- This method involves the cultivation of rice during the monsoon season and fish and shrimp farming during the rest of the year. The paddy fields act as natural fish and shrimp nurseries, providing an integrated approach to agriculture and aquaculture.
- Pokkali Paddy is not only significant for its adaptive qualities but also for its nutritional value. It is rich in dietary fibre, vitamins, and minerals, and is known for its high content of micronutrients like iron and zinc.
- The conservation and promotion of Pokkali Paddy are important for preserving the unique traditional knowledge and cultural heritage associated with its cultivation.
- Efforts have been made by various organisations, including the Kerala Agricultural University and the Central Marine Fisheries Research Institute, to conserve this indigenous rice variety and promote its sustainable cultivation practices.

6.   Nehru Library

- The Nehru Memorial Museum and Library (NMML) Society, an autonomous body under the Government of India, was renamed as the Prime Ministers' Museum and Library Society.
- The decision to rename the institution was made during a meeting of the NMML Society, chaired by Defence Minister Rajnath Singh, who serves as the Vice-President of the Society.
- The society was formed in 1966 and operates under the Ministry of Culture, Government of India.
- The primary objective of the NMML Society is to maintain and manage the Nehru Memorial Museum and Library, located in Teen Murti Bhavan, New Delhi.
- It is dedicated to the objective of promoting advanced research on modern and contemporary India.
- Over the years, the NMML Society has played a crucial role in preserving India's historical legacy and continues to be an important institution for researchers, scholars, and students interested in the history and politics of modern India.

7.   Gandhi Peace Prize

Syllabus: Miscellaneous

Prelims: About Gandhi Peace Prize

Context:
The Gita Press, Gorakhpur, which is one of the largest publishers of religious texts like Bhagavad Gita, the Ramayana and the Upanishads has been awarded the Gandhi Peace Prize for 2021.

Gandhi Peace Prize
- The Gandhi Peace Prize was instituted by the Government of India in 1995 on the occasion of the 125th Birth Anniversary of Mahatma Gandhi.
- The Gandhi Peace Prize is awarded annually as a tribute to the ideals of Mahatma Gandhi.
- The Gandhi Peace Prize is open to all persons irrespective of their nationality, race, language, caste, creed or gender.
- The award is conferred to individuals, associations, institutions or organizations who have worked selflessly for peace, non-violence and amelioration of human sufferings especially of the less-privileged section of society contributing towards social justice and harmony.
- The award can also be conferred as a 'Joint Award' as may be decided by the jury.
  - The Award may be divided between two persons and/or organizations who are considered to be equally deserving of recognition in a given year by the Jury.
- The jury comprises the Prime Minister of India, Chief Justice of India, Leader of Single Largest Opposition Party in Lok Sabha, and two eminent members.
  - The Prime Minister is the head of the jury
  - The term of the jury is three years.
  - Ex-officio members of the jury (i.e. the PM, CJI & LoOp) are permanent members, while eminent members retire. Reappointment is applicable.
  - A majority of the jury is needed to make a decision.

- The Gandhi Peace Award has the following components:
  - ₹ 1 crore
  - A citation
  - A plaque
  - An exquisite traditional handicraft or a handloom item
- **Previous awardees**: Indian Space Research Organisation (ISRO), Ramakrishna Mission, Grameen Bank of Bangladesh, Vivekananda Kendra, Kanyakumari and Sulabh International, New Delhi.
- **Other individuals**: Nelson Mandela, Baba Amte, Archbishop Desmond Tutu of South Africa, environmentalist Chandi Prasad Bhatt and Bangabandhu Sheikh Mujibur Rahman.

8. IIT Kharagpur to develop tamper-proof Signaling System for Indian Railways Using Blockchain Technology

- The Indian Railways is set to benefit from the development of a tamper-proof signalling system based on blockchain technology by the Indian Institute of Technology, Kharagpur.
- The new system aims to enhance safety measures and complement the existing Data Logger, known as the 'Black Box' of rolling stock.
- **Benefits and Objectives:**
  - The system will ensure safety, communication, and control of train operations.
  - It will provide a mechanism for secure data sharing among stakeholders.
  - Automation of processes will be facilitated through smart contracts.
  - Tamper-evident audit trails will be created for enhanced data integrity, transparency, and security.
- **Blockchain Technology:**
  - Blockchain is a system of recording information that cannot be tampered with, hacked, or manipulated.
  - The technology is widely used in cryptocurrency and banking transactions.
- **Enhancements over Existing Data Logger:**
  - The new system will offer enhanced data integrity, transparency, and security.
  - Live movement of trains will be made available to Station Masters, Section Controllers, Signal Engineers, and other stakeholders with all logs.
  - Data will be stored in a distributed ledger using cryptography, addressing the limitations of centralized storage in the existing Data Logger.
  - Access control will be improved, and tamper-evident data will be ensured.

9. From Aug. 15, only digital payments in panchayats

- From August 15, all panchayats in India are required to mandatorily use digital payments for development work and revenue collection.
- Union Panchayati Raj Ministry issued a letter mandating UPI-enabled transactions.
- States are instructed to announce and inaugurate UPI-compliant panchayats.
- Implementation of UPI-Enabled Payments:
  - Nearly 98% of panchayats have already initiated UPI-based payments.
  - A total of ₹1.5 lakh crore in payments has been processed through the Public Financial Management System (PMFS).
- **Universal Coverage:**
  - UPI-enabled payments have achieved almost universal coverage, with 98% of panchayats onboarded.
- **Engagement with Service Providers and Vendors:**
  - Panchayats are instructed to hold meetings with service providers and vendors.
  - The Ministry shares a list of contact persons from UPI platforms: WhatsApp Pay, GPay, Paytm, PhonePe, Amazon Pay, BHIM, Mobikwik and Bharat Pe.
  - According to the Ministry's guidelines, the deadline for panchayats to choose appropriate service providers will be July 15 and vendors should be finalized by July 30.

YOJANA JUNE 2023
GIFTING HOLISTIC WELL-BEING TO THE WORLD

1. AYUSH

Introduction
- The Ayush system, particularly Ayurveda is often referred to as the 'Science of Life'. It is deeply rooted in the ancient Indian knowledge system.
- The Ministry of Ayush(MoA) is actively engaged in promoting the Ayush systems of healthcare.
- This has led to increased funding of research institutes and collaborations between Ayush experts and modern scientific researchers.
- The aim of the Ministry of Ayush is to bridge the gap between traditional knowledge and contemporary scientific evidence. This will ensure the integration of Ayush into evidence-based healthcare practices.

R&D initiatives of the Ministry of Ayush
- MoA has established five Research Councils as Autonomous Institute for research in Ayurveda, Unani, Homeopathy, Siddha, Yoga, and Naturopathy.
- The research activities include medicinal plant research, Drug standardization Pharmacological research, Clinical research, etc.
- MoA collaborates with various research institutes, universities, and international organizations like CSIR, CIMR, etc.
- The Ayush mark was also launched to recognize traditional medicine products to give authenticity to quality Ayush products of the country.
- The Ministry is also working in close coordination with the Bureau of Indian Standards to develop standards for Medical Value Travel.
    - So far 17 Indian standards have been formulated for Herbal materials, Panchkarma equipment, and yoga accessories.
- The Ayush research portal has been established for disseminating Evidence-based Research Data of Ayush Systems at the global level.
- The Ministry also organizes training programmes, workshops, and conferences for researchers, clinicians, and stakeholders.
- The National Health Policy(NHP) 2017 has strongly advocated mainstreaming the potential of Ayush within a pluralistic system of Integrative healthcare.
- The WHO-Global Centre for Traditional Medicine (GCTM), the first and the only global Centre for traditional medicine is being established in Jamnagar, India.
    - It aims to strengthen the scientific foundation of traditional medicine.
    - It will provide leadership on global health matters pertaining to traditional medicine and help position Ayush system across the globe.
    - One of its major responsibilities is to ensure the quality, safety, efficacy, accessibility, and rational use of traditional medicines.
    - It will involve developing norms, standards, and guidelines in various technical areas, as well as tools and methodologies for data collection, analytics, and impact assessment.

Pragmatic Model of Research in Ayush

Ayush approaches the grey areas of research and tackles healthcare challenges through:
- **Exploring Traditional Challenges:** The research aims to explore and validate traditional knowledge and tap wisdom accumulated over centuries to find innovative approaches to health and well-being.
- **Integration of Modern Scientific Methods:** An Interdisciplinary Ayush Research and Development Task Force in collaboration with national organizations of repute to formulate and develop strategies for the management of Covid.
- **Addressing Unmet Healthcare needs:** It addresses unmet healthcare needs, especially in areas where modern medicines have limitations. For example, Brahmi Ghrita and Jyotishmati Taila in the management of Cognitive Deficit.
- **Promoting Lifestyle Modification:** Ayush promotes a healthy lifestyle including Yoga, meditation, dietary guidelines, and natural remedies.
- **Predictive, Preventive, and Personalized Medicine:** Ayush recognizes that health is influenced by multiple factors like physical, mental, spiritual, and emotional aspects. It thus fosters a comprehensive and personalized approach to healthcare.

Ayush and SDGs
- Ayush diligently works towards Good health and Well-being (SDG 3).
- It also works towards Reduced inequalities (SDG 10) through National Ayush Mission (NAM) and integrated health programmes.
- Moreover, with herbal medicines Ayush supports SDG 11 'Sustainable Cities and Communuties'.
- It also promotes Partnership for the Goals (SDG 17)as it promotes partnership and exchange of Knowledge and expertise.

Conclusion
Ayush contributes to a comprehensive and patient-centered approach to healthcare aiming to achieve the goal of 'Health for All'.
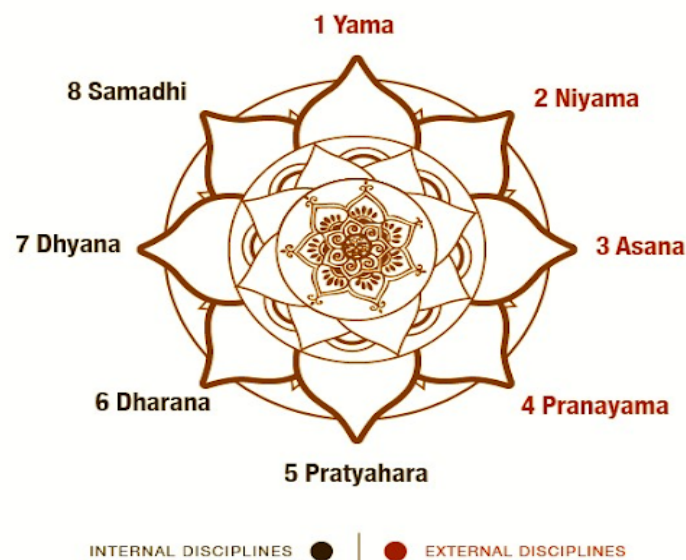
2. Yoga for Global Well-being

Introduction
- Yoga is not just a physical exercise but a lifestyle that incorporates physical, mental, and spiritual well-being.
- It helps to reduce stress and anxiety that is a cause of blood pressure, depression, and heart disease.

Concepts and Principles of Yoga
The Ashtanga Yoga of Maharishi Patanjali or Eight Limbs of Yoga

Source: The Yoga Institute

Benefits of Yoga
- It helps in the development and maintenance of physical health and mental health.
- It helps in cultivating a deeper connection with our inner selves and with the world around us.
- It also has positive impacts on social and environmental well-being.
- It can lead to a more fulfilling and purposeful life.
- It helps in promoting mindfulness and spirituality.

Other Details
- Yoga has gained widespread popularity globally. The adoption of the International Day of Yoga on 21st June by the United Nations has popularized Yoga worldwide.
- The concept of **Vasudhaiva Kutumbakam** has been a part of Indian philosophies for centuries and is also closely associated with the practice of Yoga.

Conclusion
India's presidency at G20 provides a unique platform for India to share its rich cultural heritage, including yoga. It has become increasingly significant among health-conscious people.

3.   Role of Meditational Approaches in Mental Well-Being

Introduction
- The World Health Organization defines health as a state of complete well-being and not merely the absence of disease or infirmity.
- Hippocrates' Science of Medicine sets the goal of medicine as the complete removal of the distress of the sick.

Ancient Medical Technique
- Despite significant advancements in modern science, ancient medical techniques reveal secrets unknown to medical science.
- The alternative system of medicine exists in ancient civilizations like Egypt and China.
- Some ideas in alternative systems like Ayurveda and Naturopathy are mind-boggling. For instance, the time of the day a herb is procured, treated, and consumed has significant like Tulsi leaves can become poisonous if plucked at night.

Healing and Holistic Well-being
- Holistic well-being can be ensured through procedures/therapies that involve the well-being of the whole being comprising body, mind, and soul.
- The well-being of the self or soul stands as the basis of emotional and mental well-being.

Meditation for Internal Hygiene
- Internal hygiene is important to prevent mental illnesses. If the inner hygiene is hijacked by weaknesses:
  - One cannot sleep well
  - He/she cannot attain wisdom
  - An individual loses his power of discriminating between right and wrong or good and bad
- Many health problems can be solved by natural adjustments in diet and exercise and adopting meditative and prayerful attitude.
- A simple natural meditation can be practiced easily with heartfulness.
- Moreover, natural improvement in self-discipline and lifestyle has multiple cascading benefits.

Conclusion
- Meditational approaches are known to have created significant improvements in mental health and well-being and emotional resilience.
- It reduces anxiety, calms and gives peace, and addresses the root of many problems.

4.   Basics of Healthy Lifestyle

Details
- A diet should be rich in vegetables, fruits, proteins, good fat, fibre, and phytonutrients.
- An easy approach is to follow the half-plate rule and limit grains, sugar, and salt. Moreover, trans fat should be stopped.

Half Plate Rule
- Entire food should be pre-plated before eating. It helps in controlling portions.
- The traditional Indian thali or Japanese bento box is a great representation of this.
- It is shown in research that those who plate eat 14% less instead of going for second and third servings.
- The aim of the half-plate is that half of the plate should be full of vegetables and use the grain or cereals as the side dish.
- Moreover, an adequate amount of proteins should be added in the form of pulses, dal, nuts, eggs, low-fat dairy, etc.
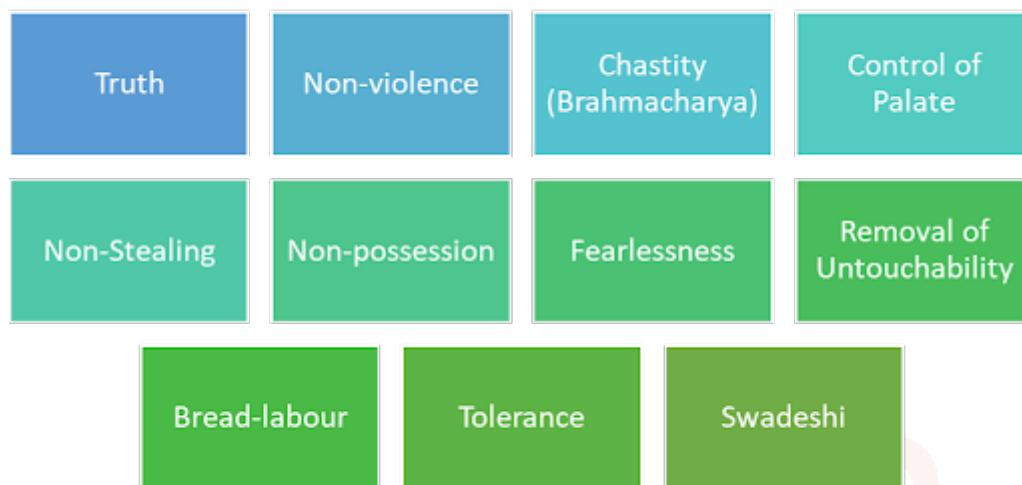
Principles of Eating
- It is important to keep up the motivation while on a diet.
- Develop negative associations with undesirable food and do not succumb to fads and or rampant/crash diets.
- Set realistic goals and plan the eating regimen.
- It is important to practice mindful eating and reduce junk and fast food consumption.
- Increase the consumption of fruits and vegetables.
- Avoid unhealthy food, alcohol, and smoking.
- It is important to stick to the body clock.
- It is also necessary to engage in regular physical activity and exercise.
- Individuals should focus on managing stress.
- There should be a thorough physical examination and regular health checkups.

Conclusion
The permanent sustainable approach to staying healthy is eating healthy and making it a way of life.

5. Non-Possession – The Gandhian Thought

Introduction
- While in Yerwada Central Prison in 1930, Gandhiji wrote weekly letters to the Satyagraha Ashram. The letters contained a cursory examination of the principal Ashram observances, popularly called Eleven vows:

Truth	Non-violence	Chastity (Brahmacharya)	Control of Palate
Non-Stealing	Non-possession	Fearlessness	Removal of Untouchability
	Bread-labour	Tolerance	Swadeshi

- The vows are signs of strength and cannot be practiced by the weak.
- Once promoted adequately, they can fetch foreign exchange earnings.
- It can give a competitive global advantage.
- It preserves India's rich culture and tradition.

Details
- Gandhiji wrote a few articles under the heading 'Guide to Health'. He mentioned that all human activities are carried out by means of the mind aided by the ten senses.
  - These are divided into five senses of action and five senses of perception.
- It is recommended that the body should be treated as the temple of God.
- Gandhi's sustainable and minimalist lifestyle was based on self-discipline.
- In the year 1928, Gandhi ji formulated rules for Ashram. They were:
  - All ashramites should attend the morning prayers at 4 a.m.
  - All should eat at the community kitchen.
  - They should spin atleast 160 threads daily.
  - No servants should be hired for household work.
  - All adult men should engage in night vigilance.
  - All young and adults should take turns in cleaning toilets.
  - All persons should work for atleast eight hours daily.
  - One should maintain a daily diary and note all work done during the day.

Conclusion
The eleven vows mentioned earlier in the article are the best formula for living a simple and happy life. It is the best representation of 'Live and Let Others Live'.

KURUKSHETRA JUNE 2023 - WATER CONSERVATION

1. Fostering Water Management for Food Security

Introduction:
The increasing pressure on natural resources, particularly land and water poses several challenges to the global food system and its sustainability. Water management will be one of the significant factors in the years to come to ensure water security and achieve SDGs.

Need for Water Management & Conservation
With rising population, climate changes, changes in rainfall patterns, and desertification — water management and conservation have become global priorities.
- India is home to about 18% of the world's population and has only 4% of its water resources. India is one of the most water-stressed countries in the world.
- It is estimated that by 2030, the country's water demand will be twice the available supply which will eventually lead to a ~ 6% loss in the country's GDP.
- With the increasing population, agriculture will need to produce almost 50% more food, livestock fodder and biofuel by 2050 than in 2012 to satisfy the global demand and keep on track to achieve zero hunger.

In order to address the gap in projected demand and supply, there is a need to bring a shift in farming from intensive to resource-efficient climate-smart farming.

India's Water Conservation Strategies in Agriculture
Various initiatives have been taken by the GoI for water conservation in producing maximum yield with minimum water.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)
- It is a centrally sponsored scheme launched in 2015, with an outlay of Rs 93,068 cr for 2021-26.
- The scheme offers an end-to-end solution for irrigation through source creation, distribution, management, field application and extension activities.
- It was formulated by amalgamating the following schemes-
  - Accelerated Irrigation Benefit Programme (AIBP) — Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation.
  - Integrated Watershed Management Programme (IWMP) — Department of Land Resources (DoLR), Ministry of Rural Development.
  - On Farm Water Management (OFWM) — Department of Agriculture and Cooperation (DAC).

Per Drop More Crop (PDMC)
- PDMC was launched in 2015 as a component of PMKSY. From 2022-23 PDMC is being implemented under Rashtriya Krishi Vikas Yojana (RKVY).
- PDMC focuses on micro-irrigation technologies like drip and sprinkler irrigation systems.
- Under this scheme, GoI provides subsidies to small and marginal farmers @ 55% of the indicative unit cost and @ 45% to other farmers.

Sahi Fasal Campaign
- The Sahi Fasal campaign is a component of the National Water Mission, launched in 2019 by the Ministry of Jal Shakti.
- The "Sahi Fasal" campaign was launched to nudge farmers in the water-stressed areas to grow crops which are not water intensive, but use water very efficiently, and are economically remunerative; are healthy and nutritious; suited to the agro-climatic-hydro characteristics of the area; and are environmentally friendly.

Bhartiya Prakratik Krishi Padhati (BPKP)
- Bharatiya Prakritik Krishi Paddhati (BPKP) is a sub-mission under the Paramparagat Krishi Vikas Yojana (PKVY), which falls within the umbrella of the National Mission on Sustainable Agriculture (NMSA).
- The scheme has a total outlay of Rs 4645.69 cr. for the period of 6 years (2019-20 to 2024-25).
- BPKP promotes natural farming — a chemical-free, traditional farming-based diversified farming system that integrates crops, trees and livestock with functional biodiversity.
- The scheme aims at minimising the cost of cultivation, recreation of soil ecosystem and ensuring environmental sustainability.

The Ministry of Agriculture and Farmers' Welfare has made concerted efforts to encourage the diversification of agricultural and horticultural crops as per the local need through various ongoing schemes like — the National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), Mission for Integrated Development of Horticulture (MIDH), National Mission on Oilseeds and Oil Palm (NMOOP), National Mission for Sustainable Agriculture (NMSA) and Rainfed Area Development (RAD).

Way Forward:

- Water being a state subject, requires cooperation to harness steps for augmentation, conservation and efficient management of water resources across states.
- Ecosystem services and incentives should be considered to encourage efficient use of water resources.

2. Water Conservation through Community Planning

Introduction:

To achieve the objectives of inclusive growth with equity and social justice, the overall development of basic infrastructure is required. An important component of infrastructural needs is to arrange an adequate, timely, affordable water supply for ensuring a healthy and economically productive society and becoming a water-secure nation. The country receives 1,200 mm of rainfall water annually and only 6% of it is stored, so it is imperative to save and conserve water to meet the country's water needs.

Community Participation in Water Conservation-

As per the constitution of India, 'water' is a state subject. Therefore, steps to augment, conserve and manage water resources have remained the primary responsibility of the respective states.

- States' water conservation efforts are supported through various central government schemes with required provisions of technical and financial assistance.
- Civic participation in the management processes of any public development endeavour results in better outcomes.

Water Conservation Initiatives by the States:

1. **Neeru-Chettu**
   - Implementing State – Andhra Pradesh.
   - It is aimed at collective participation and the spread of awareness to make the state 'drought proof' through better water conservation.
   - The activity involves rejuvenating and re-vitalising water resources through the desilting of tanks and feeder channels, etc.
2. **Jal Jeevan Hariyali**
   - Implementing State – Bihar.
   - It is aimed at encouraging farmers to participate in water conservation efforts of the government and to sensitise them on the use of alternative crops, organic farming, drip irrigation and other technologies with less dependence on irrigation.
   - It involves the identification, restoration and renovation of all public storage structures- canals, ponds, etc.
3. **Sujalam Sufalam Jal Sanchay Abhiyan**
   - Implementing State – Gujarat.
   - It is a Public Private Partnership (PPP) programme and the government's contribution is 60% of the work expenditure.
   - The project involves deepening of the water bodies before the arrival of the monsoon to enhance storage.
4. **Jal Hi Jeevan Hai**
   - Implementing State – Haryana.
   - It encourages farmers to adopt crop diversification and sow crops which need less water like maize, arhar, etc.
5. **Pani Panchayat**
   - Implementing State – Odisha
   - It aims to ensure optimum utilisation of water as well as improving agriculture production.
6. **Jalyukht Shivar Abhiyan**
   - Implementing State – Maharashtra.
   - The aim is to make Maharashtra drought-free by making 5000 villages free of water scarcity every year.
   - It involves the deepening and widening of water streams, the construction of cement and earthen stop dams, etc.
7. **Mukhya Mantri Jal Swawalamban Abhiyan**
   - Implementing State – Rajasthan.
   - Through the convergence of schemes of various departments, works are executed through people's participation by motivating villagers and beneficiaries.
   - The conservation efforts include managing rainfall, run-off, groundwater and in-situ soil moisture.
8. **Mission Kakatiya**
   - Implementing State – Telangana.
   - The initiative aims at spreading minor irrigation in the state with community participation for sustainable water security.

Water Conservation Initiatives of the Union Government –

India has about 141 million hectares of net-sown area, out of which about 65 million hectares (45%) are currently covered under irrigation of any source. India highly depends on rainfall making cultivation in unirrigated areas a risk-laden, less remunerative and less productive profession. Assured irrigation encourages farmers to invest more in farming technology and inputs, leading to an increase in income and productivity.

- Pradhan Mantri Krishi Sinchayee Yojana aims to ensure sustainable access to some means of irrigation to all agricultural farms in the country through efficient management of water resources and by propagating the tagline – Per Drop More Crop.
  - The various components of PMKSY that need adequate community planning and participation during the implementation phase are:
    - Har Khet Ko Pani.
    - Watershed Development.
    - Per Drop More Crop.
    - MGNREGA.- The construction of water harvesting and conservation works is emphasised under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).
      - The MGNREGA allows watershed development activities wherein the PRI (Panchayat Raj Institutions) are mandated to plan, implement and monitor National Resource Management Works which include watershed development for rain-fed areas, command area development for irrigated areas, afforestation, plantation and horticulture.
- **Jal Shakti Abhiyan:** This mission is implemented to improve water availability, including groundwater conditions in the water-stressed blocks of 256 districts in India.
- **Atal Bhujal Yojana:** It aims at sustainable management of groundwater with community participation in identified over-exploited and water-stressed areas of Gujarat, Rajasthan, Haryana, Uttar Pradesh, Madhya Pradesh, Maharashtra and Karnataka.
- **The Ministry of Jal Shakti has also taken other important measures for water conservation through active community participation:** National Aquifer Mapping and Management (NAQUIM) Programme, Rain Area Development Programme (RADP), National Perspective Plan, Catch the Rain and Sahi Fasal campaigns.

Measures for the Success of Water Conservation Efforts –
The 73rd Constitutional Amendment empowers Gram Panchayats to plan and manage rural water supply and sanitation systems. The effective planning and implementation of water conservation-related schemes demand active community engagement through PRIs (Panchayati Raj Institutions), Self Help Groups (SHGs), Farmer's Groups and Cooperatives. The community through PRIs should take up the responsibility of being Programme Implementing Agencies (PIAs).

The community should ensure the following for the success of water conservation efforts in rural areas:
- Preparation of Water Security Plan, Irrigation Plan and Village Action Plan.
- Discuss and deliberate on the sustainability of water schemes, and explore new revenue resources for water conservation systems.
- Preparation of water reserve audit, and water safety plan to ensure recharge, storage and availability of water and to meet issues relating to water quality usage.
- Promoting timely execution of projects and utilisation of funds.
- Arrange training and capacity building programmes on water collection, storage, usage etc for grass-root workers.

Conclusion: The water conservation programmes would be successful in achieving their objectives only if the community and end beneficiaries are involved in various stages of programme implementation.

3. Educating People to Save Every Drop of Water

Introduction:
In response to the global water crisis, the United Nations has established a target under its 2030 Agenda for Sustainable Development which is to ensure that everyone has access to clean water and sanitation (SDG 6). However, the United Nations World Water Development Report, 2019 indicates that almost two-thirds of the world's population suffer from severe water scarcity for at least one month every year.
- Despite having abundant rainfall, India faces frequent droughts, floods and water scarcity due to inadequate water management practices and rapid urbanisation.
- Tackling the water crisis requires a concerted effort from various stakeholders, including government, civic bodies, administration, educational institutions, NGOs, media as well as society.
- There is a need for structured long-term campaigns to build awareness and educate people and also to incentivise and reward them to save every drop of water.

National Water Mission (NWM)
The National Water Mission is one of the eight missions under the National Action Plan on Climate Change (NAPCC).
- The main objective of NWM is the conservation of water, minimising wastage and ensuring its more equitable distribution both across and within states through integrated water resources management and development.
- One of the five goals of the National Water Mission is to promote citizen and state actions for water conservation, augmentation and preservation.
- One of the strategies of NWM under Goal IV is to incentivise organisations or companies through awards for water conservation and efficient use of water resources. The annual NWM Water Awards recognise excellence in water conservation, efficient water use and sustainable water management practices.
- **Water Talk:** The NWM organises lecture series called 'Water Talk' with an objective to facilitate the exchange of information pertaining to water-related topics. The Water Talk series takes place on the third Friday of every month and features presentations from experts and practitioners in the field.

'Catch the Rain' campaign
- The "Catch the Rain" campaign is being run by the NWM.
- This campaign was launched on 22nd March 2021 on the occasion of World Water Day.
- The campaign aims to encourage the states and stakeholders to create and maintain appropriate rainwater harvesting structures (RWHS), suitable to the soil strata and climatic conditions of the area, with people's participation with the theme 'Catch the rain, where it falls, when it falls'**.**
- The campaign involves the active participation of the local community in the implementation of measures to enhance the storage capacity of water bodies.

Strategies to Educate People:
Through education and awareness-building campaigns, individuals can be empowered to take responsibility for their water consumption and ensure that every drop of this precious resource is conserved. In the past, many mass awareness campaigns were launched on the need for the conservation of water like media campaigns, puppet shows, street theatres, jal yatras etc. Doordarshan, Akashwani and other government media platforms have been continuously utilised to create awareness amongst the masses. The other measures which could be utilised to make water conservation a mass movement include:
- Social Media – can be used to directly reach out to people in real-time and proactively engage with them.
- Conventional Media – using the mediums like TV, newspapers, and radio as these have vast footprints across the country.
- Educational Institutions.
- Engaging Communities – organising community programmes like seminars, workshops etc.
- Incentives and Rewards – to encourage people to conserve water, incentives like tax rebates, and discounts can be offered. This can be done at the local level with funding support from the Centre or State governments.
- Involving Private Sector – There are already some private organisations which are running campaigns for the conservation of water.
- Engaging with eminent personalities – Celebrity involvement can be sought to attract public attention and promote water conservation initiatives.

An effective way to send the message across could be to amplify the good work done by people to save water and educate people in this regard.

4.   Making Villages Water Sufficient

Localisation of SDGs-
Localisation of Sustainable Development Goals (LSDGs) through PRIs (Panchayati Raj Institutions) serves as a plan towards achieving Sustainable Development Goals (SDGs).
- The 17 UN- SDGs have been remapped into 9 broad themes:
  - Theme 1 – Poverty free and enhanced livelihood villages.
  - Theme 2 – Healthy village.
  - Theme 3 – Child-friendly village.
  - Theme 4 – Water sufficient village.
  - Theme 5 – Clean and green village.
  - Theme 6 – Self-sufficient infrastructure in the village.
  - Theme 7 – Socially secured village.
  - Theme 8 – Village with good governance.
  - Theme 9 – Engendered Development in village.
- The Ministry of Panchayati Raj (MoPR) has brought out LSDGs in PRIs (Panchayati Raj Institutions). The GoI has approved Rs 5911 cr. under the revamped Rashtriya Gram Swaraj Yojana (RGSY), which is aimed at empowering 2,78,000 PRIs or elected rural local governments to implement a set of social goals that the United Nations has deemed necessary for sustainable development.

Water Sufficient Village
Theme 4 of the LSDGs: Water Sufficient Village is related to many other SDGs. For example, lack of adequate water for irrigation leads to low income for marginal farmers and landless labourers dependent on agriculture and it is likely that their livelihood will fall below the poverty line (SDG 1-Zero Poverty), adequate water for irrigation will increase the agricultural productivity (SDG 2- Zero Hunger) and so on.
- Theme 4 – Water Sufficient Village is multi-dimensional and directly related to health, education, gender equality, sustainable and efficient use of natural resources etc.
- Under Theme 4, there are 9 sub-goals that have been set with 25 Modified GP (Gram Panchayat) Level Indicator to assess, analyse and monitor the progress.
  - Providing access to clean water to all village households by 2024.
  - Provide access to sanitation in the villages.
  - Achieve ODF (Open Defecation Free) sustainability.
  - Grey water management.
  - Per capita availability of water in villages.
  - Construction of rainwater harvesting and recharge works.

- ○ Safeguarding of water bodies.
- ○ Constitution of Village Water and Sanitation Committees (VWSCs) in each Gram Panchayat.
- ○ Water efficient agricultural practices.
- A robust plan is needed to ensure that resources (human, knowledge, financial and administrative) reach the endpoint (village, farmer or family). PRIs must have basic knowledge of all the ongoing schemes and the ability to develop comprehensive action plans.
- To achieve water sufficient village, the GP must explore resources from many schemes like 15th Finance Commission Funds, Jal Jeevan Mission (JJM), MGNREGA, Swachh Bharat Mission Gramin (SBM-G), National Rural Drinking Water Programme (NRDWP), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) etc.
- The GP needs to work in close association with other stakeholders in the rural landscape like SHGs, ASHA, Swachhata Doots, Water User Associations (WUAs), NGOs, functionaries of Drinking Water and Sanitation etc.

Learning from the Good Initiatives and Practices:
Many results-yielding initiatives are in operation in different parts of the country for the restoration, conservation and sustainable use of water resources. Such initiatives need to be documented and attempts should be made to replicate with any necessary customisation.
- Kerala is the first state in the country to prepare a Water Budget based on local self-government bodies by calculating water availability and consumption. The water budget puts forward scientific methods for the conservation of water resources and also aims at creating awareness among the public about the need for water conservation.
- In Telangana state, the Mission Bhagiratha scheme is implemented in all the villages for providing safe and sustainable drinking water to all households. Also, the Mission Kakatiya scheme was implemented to restore the irrigation tanks to their full capacity and a number of water conservation works like the construction of check demand, other harvesting structures, desilting of feeder and field channels etc are taken up under MGNREGA.

Conclusion: Local Institutions such as Panchayats play a major role in achieving Water Sufficient Village. Further, all water-related issues are to be mainstreamed in the Gram Panchayat Development Plan (GPDP). The participation of people, community-led management, training and capacity building of PR functionaries and officials of various line departments will bring in the desired results in terms of water-sufficient villages.

5.   Water Use Efficiency Ensuring Water Sustainability

Introduction
'Water' is at the very core of the 2030 Agenda for Sustainable Development. Sustainable Development Goals – Target 6.4 addresses water use efficiency and water stress. SDG target 6.2 is: 'By 2030, substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity'.

Water Use Efficiency:
Water Use Efficiency is the ratio between effective water use and actual water withdrawal.
- Enhancing water use efficiency in every sector of water use (agriculture, drinking, domestic etc) is very important for sustaining life faced with the challenges posed by climate change in the water sector.

Water Use Efficiency in Agriculture
India is an agrarian country and agriculture is the source of livelihood for about 58% of the country's population.
- Water Use Efficiency (WUE) in irrigation is the percentage of the irrigation water consumed by the crop of an irrigated farm, field and project to the water delivered from the source. Some water is lost due to conveyance, distribution and application in the field.
- In India, the agriculture sector is the largest consumer of water resources, therefore even a small percentage saving of water in this sector will have a large impact on the availability of water for drinking and domestic purposes.

Methods for Improving Water Use Efficiency in Agriculture:
1. **Micro Irrigation:**
   - The WUE in micro-irrigation including drip irrigation is as high as 80-95% in comparison to only 30-50% in conventional flood irrigation.
   - The micro-irrigation techniques also help in reducing water logging, fertiliser usage, labour expenses and other input costs and in enhancing agricultural productivity and farmers' income besides sustaining soil health.
2. **Mulching:**
   - Mulching helps in increasing WUE by controlling water losses by evaporation from the plant root zone.
   - A mulch is a material spread on the top of the soil – plastic sheets, organic material.
   - There is about 10% water saving from the use of mulch materials in agriculture.
3. **Drought- Tolerant Crops:**
   - Growing crops that are appropriate to the climate of the region also helps in getting more crops per drop.
   - The ICAR has developed several drought-tolerant short-duration crop varieties that suit different agro-climatic regions of the country for judicious use of water.

Other measures to increase water use efficiency include:
- Reduce conveyance losses by lining channels or preferably, by using closed conduits.
- Avoiding mid-day sprinkling reduces evaporation.
- Reduce run-off and percolation losses due to over-irrigation.
- Select the most suitable and marketable crops for the region.
- Use appropriate insect, disease and parasite control.
- Apply manures and green manures where possible and fertilise effectively.
- Apply weed control measures.
- Practice soil conservation for long-term sustainability.
- Irrigate in the exact amounts to prevent water deficits, taking into account weather conditions and crop growth stages.

Initiatives to increase WUE in the Agriculture Sector:

The GoI through various ministries and departments have taken many steps to enhance WUE in agriculture:
- **PMKSY** (Pradhan Mantri Krishi Sinchayee Yojana)
- **AIBP (Accelerated Irrigation Benefit Programme):** The GoI launched AIBP during 1996-97 to provide Central Loan Assistance (CLA) to major and medium irrigation projects that were in an advanced stage of completion to achieve the targeted potential, ultimately resulting in saving water and improving efficiency.
  - During 2015-16 AIBP was integrated with PMKSY.
- **Command Area Development and Water Management (CADWM)**: The GoI launched CADWM during 1974-75 to bridge the gap between IPC (Irrigation Potential Created) and IPU (Irrigation Potential Utilised).
  - With the launch of PMKSY, CADWM was included under the Har Khet Ko Pani component of the PMKSY.
- **Har Khet Ko Pani (HKKP)**: HKKP is a component under PMKSY and aims at ensuring water to every farm through assured irrigation.
- **Per Drop More Crop**: ensures more productivity through micro-irrigation (also a component of PMKSY).
- **National Water Mission (NWM)**: National Water Mission was launched in June 2008 with five goals. One of the most important goals of NWM is to improve the WUE by at least 20%. To realise this goal, research in the area of increasing WUE in agriculture, industry and domestic usage is one of the important strategies.
- **Bureau of Water Use Efficiency (BWUE)-** The BWUE was established under the National Water Mission in October 2022 to achieve the target of improvement in WUE by 20%.
  - BWUE is a facilitator for the promotion of improving WUE across various sectors- agriculture, industry, power generation etc.

Water Use Efficiency (WUE) in Industrial Sector –
Recent studies have revealed that industrial water demand will quadruple between 2005 and 2030, putting further pressure on the already over-allocated water resources of the country.
- The water scarcity has led to shut down of at least India's 20 largest thermal utilities between 2013 & 2016, taking a total financial toll of USD 1.4 billion. It is therefore important for companies to elevate water resource management above the realm of corporate social responsibilities.

Initiatives to increase WUE in Industrial Sector
- The National Water Mission has awarded a benchmarking study to TERI regarding 'Benchmarking Industrial Water Use to Assist Policy for Enhancing Industrial WUE in India'.
- In phase 1, the study would focus on two industrial sectors – thermal power plants and textile industries.
- In phase 2, water audit in pulp and paper, and steel industries would be taken up.

Initiatives to increase WUE in the domestic sector –
- The National Water Mission has recommended to BIS take steps to issue standards for water-efficient plumbing products.
- AMRUT Mission- It aims at sustainable management of water in urban areas.

6.   2023: Year of International Water Commitments and What it Means for Rural India

Introduction:
The year 2023 is an important year nationally and internationally for the water-related goals of the world.
- In 2017, the United Nations adopted a resolution declaring 2018 – 2028 as the International Decade for Action on Water for Sustainable Development. The year 2023 is the mid-year of the decade for action on water and also for SDGs.
- The IPCC Sixth Assessment Report, IPCC Report 2021, highlights that the water cycle is more sensitive to global warming, causing an increase in droughts, floods and cyclones with a one-degree temperature rise. These issues impact nearly 40% of the global population.
- As per the United Nations Office for Disaster Risk Reduction estimates in 2019, India suffered losses of Rs 5.61 lakh cr. due to extreme climate events in the past two decades.

- As per the report by the Council on Energy, Environment and Water (CEEW) in 2021, more than 75% of India's districts are extreme event hotspots, and more than 80% of India's population resides in districts highly vulnerable to extreme hydromet disasters like droughts, floods and cyclones.

Water scarcity, water quality degradation, infrastructure damage and increased spread of waterborne diseases are some of the consequences of climate change.

Water Matters for Rural India

53% of districts in India are rural (Census 2011), out of which 37% are vulnerable to the impacts of extreme hydromet disasters. Thus, it is important to ensure water security in rural areas to mitigate the impacts of droughts, floods and cyclones.

- Agriculture and WASH (water, sanitation and hygiene) are the two sectors where the demand for water is highest. Agriculture accounts for a larger share of water demand (almost 80%), however, WASH is also important from the perspective of public health.
- There is an increased dependence on groundwater for meeting water demands. As per Central Ground Water Board (CGWB) Analysis 2022, about 30% of the assessment units in the country are semi-critical, critical or over-exploited. Considering more than 80%of the rural water supply schemes are based on groundwater sources, non-regulation of groundwater can be a matter of concern in future.

Major International Commitments and Outcomes

G20 (Group of Twenty)

- Under India's G20 Presidency, a dedicated global water dialogue is being held as a part of the Environment and Climate Sustainability Working Group (ECSWG). It focuses on achieving sustainable water resources management in alignment with SDG-6 by 2030.
- During the second G20 ECSWG meeting, the Ministry of Jal Shakti emphasised the importance of climate-sensitive development for ensuring water security, while highlighting India's two flagship missions – Jal Jeevan Mission and Swachh Bharat Mission.
- The intended outcomes of these dialogues include –
  - Universal access to safe drinking water and sanitation services.
  - Groundwater management involves local stakeholders in groundwater recharge and its efficient use.
  - Climate resilient water infrastructure with improved disaster risk reduction.

United Nations Water Conference (UNWC)

- The UNWC, 2023 was co-hosted by Tajikistan and Netherlands in March 2023 at Un Headquarters in New York.
- The main outcome of the conference is a document on voluntary and non-binding commitments to accelerate progress to meet the global water and sanitation-related goals and targets in the second half of the Water Action Decade and 2030 Agenda. About 700 commitments were made towards a water-secure world.
- India under the action agenda has allocated USD 50 billion to provide safe and adequate drinking water to all rural households by 2024, which is much before 2030.

Conference of Parties (COP)-

The COP is an annual meeting organised by the UNFCCC (United Nations Framework Convention on Climate Change) where countries come together and discuss and address climate change issues.

- The Water Action Track was launched at COP25 in 2019 to increase action on climate change adaptation and mitigation, with a particular focus on SDG 6.
- At COP26, the Water Pavilion was established which provided a platform for stakeholders to share knowledge and experiences on water management in the face of climate change.
- In 2022, water and sanitation were also introduced for the first time in agendas

Way Forward:

The way forward for India to meet SDG 6 targets should be to synergise and leverage its existing programmes and commitments. India can leverage the collective knowledge and experiences gained at international forums like COP, UN Summits, G20 etc to strengthen the existing strategies to address climate change and build resilience in the water sector.

SCIENCE REPORTER - JUNE 2023

1.　Computational Gastronomy

Context: To every house, one of the questions everyday is, "what to cook?". The answer is becoming trickier day by day when people have various conditions, such as time constraints, nutrition specifications and craving for something new. To make it simpler, we can turn towards technological integration in gastronomy. The answer is computational gastronomy.

What is gastronomy?
Gastronomy is the art and science of cooking and eating food. This is also a study of intertwined food and culture.

What is Computation?
Computation relates to 'an act or the process of calculating something'.

What is Computational gastronomy?
- Computational gastronomy is a field that combines technology and food.
- When we integrate these two areas, we get unique and innovative culinary experiences. Computational gastronomy uses mathematical models, algorithms, and software to create new recipes, analyze taste preferences and improve food preparation techniques and much more.

How can computation provide diverse culinary experience and use?
- Food is not just something we eat, it is a library and reflection of culture which has evolved over centuries.
- Food carries traditional,emotional, nutritional features. The ratio of ingredients, the process of making food etc is scientific.It has ingrained into our culture and day to day life in such a way that we don't consider it from scientific and mathematical point of view but a casual habit.
- Computational gastronomy is not a new concept but its usage in day to day life is still limited.
- Through application of Computational gastronomy, using data-driven approaches, it is possible to create new recipes, improve cooking techniques, personalize nutrition, and enhance food safety.
- As computational gastronomy continues to evolve, it has the potential to revolutionize the way we approach food and cooking.

Its application can revolutionize the way we cook and eat:
1. **Optimisation of recipes:** Using computational gastronomy food scientists can come up with an optimum ratio of ingredients and method of cooking to improve texture, nutritional value and taste.tailored dietary needs can be met.
2. **Adherence to food safety and quality**: It can also be used to monitor food safety and quality control. For example, sensors and processors can help measure and maintain the quality of the food. It can also be an alarm in case of spoil or low quality food. It has the potential to prevent foodborne disease.
3. **Customized nutrition:** Food is the fuel of living beings. It sustains and heals.With rising issues of obesity, diabetes and other lifestyle diseases, computational gastronomy can help increase tailored recipes for individuals. It can be done with analyzing genetic makeup, lifestyle routine, eating pattern etc, to achieve specific health goals.This will also help in addressing hidden hunger issue which is widely prevalent in India.
4. **New recipes and Flavor profiling:** chefs are using molecular gastronomy to create dishes that are visually stunning and also offer unique flavor combinations. unique flavor profiles, new dishes and processes can be created.In India, computational gastronomy is being used by chefs to create fusion dishes that combine traditional Indian flavors with modern techniques.
5. **Food Pairing** options can also be made diverse to create a unique food experience.
6. **Food waste management:** Computational gastronomy can help with analyzing food waste reasons and give insights about the potential solutions.This will help in addressing poverty, hunger, sustainable water management.
7. **Personalized food experiences:** Unique culinary experiences can be created based on individual preference.
8. **Documentation of existing food profiles and recipes:** this can also help in documenting the existing recipes, find linkages between food and culture, trace evolution and dynamics of human taste and choices.
9. **Wide use:** The benefits of computational gastronomy are not limited. They can be used in home cooking, food industry, historians, agriculturist and many more. The possibilities are limitless.

2.　Emerging threat of Nanoplastic Pollution to Terrestrial Ecosystems

Context: Nanoplastic pollution has emerged as a global environmental concern, with greater amounts of nanoplastics found on land than in aquatic ecosystems.
- This finding highlights the urgent need to address potential repercussions such as the harmful effects of nanoplastic pollution on soil fertility, crop productivity, and human health.

The Scale of Plastic Pollution:
- Plastic pollution has become a persistent problem worldwide, with an approximate 400 million tons of plastic waste generated annually.
- Unfortunately, approximately 85 percent of this waste ends up in landfills or plastic litter, particularly in developing Asian and African nations lacking effective waste management systems.

Nano plastic: Nano plastics are plastic particles of size varying 1 nm to 1000 nm. These are either produced or decomposed over years. Plastic takes around 20 to 500 years to decompose depending upon the varieties. With this long life cycle as it stays in environment, it fragments and breaks down into small pieces of nanoscale

Nanoplastics in Terrestrial Ecosystems:
- The prevalence of plastic pollution in aquatic systems is widely discussed but contrary to this belief, nanoplastics pose a greater risk to terrestrial ecosystems than to aquatic environments.
- Agricultural lands, in particular, are heavily contaminated, surpassing even the levels found in oceans.
- However, the adverse effects of nanoplastics on soil systems, agriculture and surrounding biodiversity have received limited attention compared to their impact on marine life.

Pathways of Nanoplastic Contamination:

Nanoplastics enter soil and terrestrial ecosystems through various anthropogenic activities:
- Agricultural practices;
- Industrial effluents,;
- The application of compost or fertilizers derived from waste materials;
- Rain and atmospheric deposition also contribute to nanoplastic settlement in soil.

Repercussions of nanoplastic pollution on terrestrial ecosystems and agricultural systems:
- Research has shown that nanoplastics have detrimental effects on soil microbes, soil animals, and plants.
- Earthworms and filter feeders are particularly vulnerable, suffering from internalization of nanoplastics in their intestinal tracts.
- Nanoplastics can act as vectors for harmful chemicals, disrupting the rhizosphere and hindering root absorption of water and nutrients.
- Nanoplastics significantly alter plant biomass, elemental tissue composition, and root traits, posing risks to food yield, quality, and safety.
- Recent studies have shown the uptake of nanoplastics by lettuce, highlighting the potential health hazards for herbivores and humans as these particles enter the terrestrial food chain.

Conclusion:
Nanoplastic pollution poses a grave threat to terrestrial ecosystems and agriculture. Understanding the implications of nanoplastics with research, bringing policies, efficient waste management, spreading awareness etc. we can make a cleaner and safer environment.

3.   Soil to soil

Context: Rice husk which is a waste product of rice poses a major challenge in terms of its management.

About the issue:
- Rice, the second-largest crop in India and a staple food for millions, not only sustains livelihoods but also contributes to valuable foreign exchange earnings.
- However, along with the edible rice crop, there is a significant challenge of managing the inedible waste generated i.e. rice husk.
- With approximately 20% of India's rice production accounting for rice husk, it becomes crucial to find effective ways to handle this waste and utilize it productively.

Current use of rice husk:
- Currently, rice husk finds applications in various sectors in India.
- It is used for cattle feeding, manufacturing partition boards, fueling brick kilns and furnaces, and even as a raw material for the production of chemicals.
- But, unsustainable practices like landfilling and open burning of rice husk prevail, calling for more responsible and environmentally friendly alternatives.

Potential use:
- One potential solution lies in harnessing the energy potential of rice husk. Through gasification or combustion, the solid mass of rice husk can be converted into a gaseous form, releasing energy.
- Approximately 20% of the mass is converted to ash, which can be utilized as a concrete additive, insulating powder, or in the production of refractory bricks. This approach not only provides a renewable energy source but also promotes resource conservation and sustainable waste management.

- Another use is the production of biochar from rice husk. Biochar is a carbon-rich material obtained by pyrolysis of biomass sources. It has been found to improve soil functions, reduce the need for fertilizers and water, and enhance crop productivity. However, the success of biochar application depends on factors such as soil type, biomass feedstock, climate, and pyrolysis conditions.
- Introducing biochar technologies in India can bring about numerous benefits for sustainable agriculture.
- By efficiently utilizing rice husk, we can reduce greenhouse gas emissions, decrease reliance on synthetic fertilizers, and enhance crop productivity.
- Economic analysis suggests that biochar addition can improve the net present value of rice production, making it an economically viable option for farmers.

Conclusion:
Challenges posed by rice husk waste can be used as an opportunity for sustainable agriculture. By using it in renewable energy generation and biochar production, we can transform rice husk from a waste product into a valuable resource, contributing to both, environment and farmers.

4.   Waterbirds

Context: Waterbirds are crucial for the ecosystem. These birds have shown sharp decline in their population which is a matter of concern.

About Waterbirds:
- Waterbirds include shorebirds and wading birds, which inhabit various aquatic habitats such as saltwater, freshwater, and brackish environments.
- Factors such as the loss of inter-tidal habitats pose a significant threat to their distribution and abundance.

Significance of waterbirds:
1. Waterbirds have proven to be effective **bio-indicators** due to their observable responses to changes in wetland habitats. These responses serve as signs of contamination and ecosystem deterioration.
2. Monitoring the presence and activities of waterbirds in specific habitats can offer valuable insights into habitat health and quality.
3. Their long lifespan, position as top predators, ability to accumulate pollutants, diverse diet selection, and habitat utilization make them suitable indicators.
4. Waterbirds' reliance on local resources during migration and breeding makes them valuable tools for monitoring habitat quality worldwide.
5. In addition to their role in local food webs, migratory waterbirds can be used to compare environmental exposure in different regions.
6. The availability of extensive data on waterbird populations has facilitated environmental monitoring efforts.
7. Coastal birds, including egrets, herons, storks, and pelicans, are particularly valuable as bio-indicators due to their rapid response to contamination and their reliance on mangroves for nesting.
8. Wetlands, both coastal and inland, play a vital role in supporting waterbirds. These transitional areas between aquatic and terrestrial zones are characterized by diverse flora and fauna, making them highly productive ecosystems.
9. They are an important link in the food web.
10. They form an important part of the culture of the area.

Threat:
- Waterbird abundance is influenced by both local and regional factors.
- Population processes, migration patterns, and habitat characteristics such as water depth and quality affect their numbers on different scales.
- wetlands face numerous challenges, including habitat loss and salinity fluctuations. Changes in wetland conditions directly and indirectly impact waterbird populations, making them crucial indicators of seasonal and climatic changes.

Conclusion:
Waterbirds are important from an environmental and socio-cultural point of view. By monitoring waterbird populations, we can gain valuable insights into the overall health and quality of ecosystems, enabling us to take proactive measures for environmental conservation and sustainable management. Encouraging young scientists to explore this field, along with proper planning, funding, and government support, will maximize the impact of conservation efforts in India.

DOWN TO EARTH - JUNE 2023

1. Seed Saviours

Context:
- **Lakshmiamma as seed saviour:** She had been cultivating pulses and millets for over 45 years and worked to preserve more than 90 indigenous grains, pulses, oilseeds and millets in farmland in **Humnapur village of Telangana.**.
- **Seed-saving Village:** "Historically, Humnapur has been known for seed-saving." This has been made possible by the village's female farmers.
- **To preserve seeds, they adopt a 1:2 ratio system:** one seed is kept for the following year, while two seeds are given away, either to other families or sold in the market.

Significance:
- **Nutritional security:** It has assisted other households, primarily Dalit families, in maintaining the traditional mixed cropping system and, as a result, nutritional security.
- Men prefer cash crops to mixed cropping in integrated farming. However, the needs of their children, cattle, and the soil remained a top priority for the women.
- **Environment**: Non-governmental organizations (NGOs) have assisted people in learning how to store seeds, negotiate changes in soil and weather conditions, and improve local ecology and food security.
- **Water Conservation:** Unlike income crops such as paddy and sugarcane, millets can grow in red and black soils without extensive watering. This enables us to plant a variety of crops during both the kharif and rabi seasons.
- **Land Fertility:** Native crops have improved the health and fertility of the land.
- **Extreme Crops:** Species of "uncultivated greens", considered as weeds consumed by indigenous communities, grow well in the extreme event.

Way Forward:
- **"Mother-in-law and daughter-in-law" sangham:** To secure the continuation of the system of indigenous seed preservation and knowledge, in which older women give agricultural workshops for the younger generations.
- **Mobile Biodiversity Festival:** Seed caravans travel across Telangana and Andhra Pradesh to rediscover, restore, and maintain indigenous crop types.

2. AGRICULTURE/NANOTECHNOLOGY

Context:
- India is the first country to develop and commercialize nano-fertilizers. Since 2021, it has released nano-variants of two frequently used fertilizers in the country: urea and di-ammonia phosphate (DAP).

About nano-fertilizers:
- **Developed by:** The Indian Farmers Fertiliser Cooperative Limit- ed (IFFCO), using a proprietary technology.
- Both nano-urea and nano-dap come in **liquid forms**.
- A 500 ml bottle of nano-urea can replace a 45-kg bag of granular urea, while a 500 ml bottle of nano-dap can replace a 50-kg bag of granular dap.
- The country produced 63 million bottles of nano-urea as of March 2023. As a result, urea imports will be cut by 0.7 million tonnes in 2021-22.

Advantages of Nano fertilisers:
- It has the potential to improve soil health and increase agricultural income.
- **Reduce Import bill:** It is an attempt to lower the skyrocketing import fertilizer expenditures that have resulted from Russia's assault on Ukraine.
- **Self-sufficiency**: It will aid in achieving self-sufficiency in fertiliser production while also reducing pollution and farm input prices.
- **Parliamentary Standing Committee on Chemicals and Fertilizers (2022-23)**: Nano-fertilisers will address the imbalance and excessive use of conventional urea in the country.
- **Low cost and high output:** Nano fertilizers are less expensive, resulting in lower input costs as well as increased productivity and income for farmers.
- **Yield:** According to an iffco report, the use of nano urea increased agricultural yield by an average of 8%.

Concerns:
- Spraying the liquid on the field 20 to 25 days after sowing wheat yielded no benefit in the crop. As a result, many farmers turned to traditional granulated urea.
- **Similar Yield:** Some farmers claimed that there was no change in yield whether nano urea or traditional urea was used.
- **Easiness to apply:** Granular urea is simple to apply and can be distributed by farmers themselves within a few hours. However, nano-urea must be combined with water before being sprayed on the leaves.

- **Compulsory purchasing:** According to the cooperatives that offer the subsidized urea, a farmer must purchase at least one bottle of nano urea in addition to a bag of granular urea.
- **Input Cost:** Farmers also say that unlike the government's claim, their input costs increase with the use of nano- urea as it includes the cost of spraying also.

Way Forward:
- For approving any new fertiliser, the Indian Council of Agricultural Research (icar) must have data for at least three seasons.

Conclusion:
- The introduction of nano-urea as a new technology is a welcome step. However, to allow this, it would have been much better if crop trial data was available for three years and six seasons.

3. INDUSTRIAL EFFLUENTS

Context: Many people died as a result of industrial hazardous spills in the heavily industrialised city of Ludhiana. According to preliminary data, the cause of death was hypoxia (lack of oxygen) caused by inhalation of a deadly gas (hydrogen sulphide). The Ludhiana gas leak shows a persistent issue that affects the entire country: unauthorised disposal of industrial effluents.

Legal Requirements:
- The Environment (Protection) Act, 1986 and the Water (Prevention & Control of Pollution), Act 1974, require industries to have
  - Effluent treatment plants (ETPSs) or
  - Common effluent treatment plants (CETPs) as well as
  - Sewage treatment plants (STPs), and
- To treat their effluents/sewage to meet the stipulated environmental standards before discharging into water bodies.

Punishment:
The authorities do punish industries that flout environmental norms. The actions include closure of the unit, fines, disconnection of the sewer line, closure of the unit and filing of fir with the police.

Pan India Story:
- Ramal Industries, a dyeing business in Ludhiana, was shut down by the Punjab Pollution Control Board after it was discovered leaking effluents into the municipal sewer.
- In Vapi (Gujarat), a 500-unit industrial cluster is located between two rivers, the Damanganga and the Narmada. Both treated industrial effluents and sewage have generated issues in the two rivers.

Legal Framework to deal with Industrial wastes:
- India has a robust framework to arrest the discharge of untreated industrial effluents.
- **Water Act:** The country enacted the Water (Prevention & Control of Pollution) Act way back in 1974, which deems polluting water bodies a criminal offence.
- **Environmental Act:** In 1986, the country came up with the Environmental (Protection) Act, which provides the standards for effluent discharge.
- **Central Pollution Control Board:** It has from time to time issued several guidelines to update the mechanisms to arrest water pollution.
- **Need of Consent:** All industries need to get the consent for establishing and operating units from SPCBs. The consent to operate also needs to be revised every three years.
- **Inspections:** SPCBs/CPCBs need to regularly carry out inspections: quarterly for grossly polluting industries, bi-yearly for high-polluting red category industries and annually for orange category industries.

Challenges:
- **No consolidated data:** Even 50 years after the Water Act was passed, the government lacks integrated data on two critical criteria relating to industrial effluents: how much is created and how much is handled.
  - Only 13 states are represented in the National Green Tribunal's (NGT) 3rd Quarterly Report of the Central Monitoring Committee to combat river pollution.
- **Mandatory duty:** Under the Water Act, CPCBs and SPCBs are required to communicate unified information on wastewater generation, treatment, and disposal. Nonetheless, many CPCBs do not provide data.
- **Quality of Inspection:** Inspections are conducted regularly. The problem, though, lies in the quality of the inspections.
- **Continuous effluent quality monitoring system:** Gross violations can also be found in the continuous effluent quality monitoring system (CEQMS), which is used to monitor real-time water contamination.
  - The cpcb made it mandatory for all excessively polluting industries in 2014. The Supreme Court ruled in 2017 that ceqms data must be made public online in order to boost openness in pollution reporting and improve industrial compliance. Only 23 of the 35 spcbs/pccs were discovered to be displaying data on their websites.
- **Staff crunch:** Staff crunch is a chronic problem across pollution control boards and this has a direct impact on their ability to penalise defaulting industries.
  - 33 percent of CPCB and over 49 percent of SPCBs sanctioned posts are vacant.

- **Old Acts:** According to experts, the Water Pollution Act has to be revised to increase openness. The Act does not state specifically that data must be made public. As a result, the effluent data is only available through court orders and Parliamentary queries.
- **Poor Compliance:** The poor performance and non-compliance of common effluent treatment plants(CETPs) has been a recurring problem that has been highlighted in several NGT cases.
- **No implementing Body:** All the Acts were wonderful. The problem is implementation. Thirty-seven years after the Environment Protection Act, we still do not have a body to implement it. This is due to the lobbying of industrial and corporate groups.

Environment in Agenda:

Globally:
- The topic of "environment" and its protection arose around 60 years ago, following the publication of **Rachel Carson's Silent Spring**. It sparked global action, beginning with the **United States**, which founded the **Environment Protection Agency** in 1970.
- The United Nations then decided to organize the first ever **conference on the human environment in Stockholm**. **Indira Gandhi**, the then-prime minister, was the only elected head of government to attend.

India:
- Following this, India embraced the **Water Act in 1974,** which was to be administered by the Central and state pollution control boards established in 1976.
- India passed the **Air Act in 1981.**
- Three years later, in Bhopal, the world's worst industrial tragedy happened, necessitating the **Environment Protection Act of 1986.**

Time to Change:
- The country would be unable to clean its rivers and aquatic bodies until it stops the untreated discharge of industrial waste. Indeed, treated wastewater has a wide range of industrial and agricultural applications.
- **Actionable data:** India requires integrated data on effluent generation, treatment, and discharge quality (through CPCBs and SPCBs) to inform improved policymaking.
- **Industry grading:** Industries should be classified based on their water consumption and wastewater emission, and then their location should be indicated on a map.
- **Localized insights:** The dispersed dispersion of small and medium-sized companies makes monitoring and inspection difficult, leading to unlawful wastewater disposal. State governments should map suitable areas for these industries in collaboration with SPCBs.
- **Widen the net:** SPCBs should be allowed to engage various stakeholders in developing a comprehensive program for water pollution prevention, control, and abatement, as well as enhanced compliance.
- **Advisory role:** SPCBs are exclusively concerned with industry licensing and source inspection, ignoring their advising role as envisioned by the Water Act of 1974.
- **Improve compliance:** According to the 2021 Central Monitoring Committee report, 30% of CETPs are non-compliant.
- **Pretreatment facility:** Every industry should adopt some effluent pretreatment facility before discharging the wastewater into CETP to prevent shock loads.

Conclusion:
What is needed is a mechanism put in place by the Government to ensure compliance orders are implemented and to impose penalties in case they are not. It is only then that change will be seen.

Climate counsel

Context: The article discusses a group, "The Maharashtra Onion Farmers Group",that has been playing a crucial role in helping farmers in northern and western Maharashtra adapt to the challenges posed by climate change, acting as a climate counsel.

About the group: "The Maharashtra Onion Farmers Group" was established in 2019.
- It has a network of 2,000 farmer-members.
- The group utilizes social media platforms, in-person gatherings, and expert advice to provide localized weather warnings and promote climate-resilient farming techniques.

Role of the group:
1. **Anticipating Extreme Weather:** The group relies on observation-based weather warnings shared through platforms like Facebook, WhatsApp, and YouTube.
   Vijay Jaybhaye, a farmer and weather enthusiast, assists the group by interpreting weather reports and scientific predictions to offer taluka-wise forecasts.
2. **Sharing Farming Techniques:** Recognizing climate change as a significant threat to small and marginal farmers, the group shares traditional and innovative cultivation methods to enhance climate resilience.
   Members exchange knowledge on more than 30 crops, providing guidance on crop diversification and water-efficient practices.

3. **Adapting to Changing Conditions:** Farmers respond to declining water levels and altered rainfall patterns by shifting from water-intensive horticulture to less demanding crops. By cultivating crops like green gram, pearl millet, soya, and French beans, farmers mitigate the impact of water scarcity and ensure sustainable farming practices.

4. **Diversification for Economic Stability:** Through the guidance of the group, farmers like Deepak Patil have diversified their crops, reducing dependence on a single crop and enhancing economic stability. Deepak's success in growing ginger, tomatoes, and onions alongside bananas has allowed him to earn substantial profits and secure his livelihood.

5. **Market Insights and Seed Development:** The group facilitates discussions on market prices, enabling farmers to make informed decisions regarding crop selection and selling strategies. Farmers with expertise in seed development, such as Manish Kumbhekar, share their knowledge and provide fellow members with quality seeds for various crops.

Significance:

● Climate counsel groups such as The Maharashtra Onion Farmers Group have emerged as a powerful resource for farmers in Maharashtra, empowering them to tackle the challenges of climate change.

● Such organizations can help the farmers of other regions as well to deal with climate change impact on agriculture.

● By sharing localized weather warnings, promoting climate-resilient farming techniques, and facilitating knowledge exchange, such groups can play a vital role in building the resilience and economic stability of small and marginal farmers.

● With their collective efforts, farmers are better equipped to adapt to changing environmental conditions, ensuring sustainable livelihoods in the face of a warming world.

5. Delay tactics

Context: Recently, members of the UN met in Paris to prepare a zero draft of a legally binding treaty to end plastic pollution. The meeting ended with no solid outcome or progress. The UN Environment Programme's Secretariat will prepare the zero draft by November this year, when the world meets at Nairobi.

● The negotiation process for a legally binding treaty to combat global plastic pollution has shown significant obstacles, resulting in delays and impeding progress towards a comprehensive solution.

Challenges in Negotiating a Global Plastic Pollution Treaty: There are many challenges which are resulting in slow progress on the treaty to end plastic pollution. Some of them are:

1. **Procedural objections:** The procedural objections witnessed during the negotiation process highlight the complexities involved in consensus-building and decision-making within international forums.

2. **Contentious issues and diverging viewpoints:** The divergence of viewpoints on key issues such as objectives, core obligations, and phasing out specific plastics, phasing out timelines etc. are roadblocks in reaching a comprehensive treaty.

3. **Contrasting positions among countries:** The emergence of the so-called No Ambition Coalition, comprising countries with economic interests in plastic production, underscores the challenges of achieving consensus on environmental issues. Various geopolitical interests shape countries' positions, such as economic dependence on plastic-related industries and differing priorities in sustainable development.

POSITION OF INDIA AND OTHER COUNTRIES:

● **India's position:** India has advocated for plastic waste management. India has put forth the point that the main problem is plastic litter or plastic waster and not plastic as a material. I countries should focus on plastic waste management.

● But this does not go in alignment of waste management which starts with prevention, minimisation and reduction.

● **Role of regional cooperation and progressive voices:** The progressive stance of African states and their advocacy for strict interventions on plastic production and use demonstrate the potential for regional leadership in combating plastic pollution.

Significance of addressing the full lifecycle of plastic: It is important to address the full lifecycle of plastic to tackle its menace.

● The Upstream phase: The first phase is extraction and refining of raw materials, and industrial production of plastic. The treaty must scrutinize pollution potential and carbon footprint of the production process.

● The midstream phase: This phase includes distribution of plastic through businesses, street vendors and retailers. Phasing out "non-recyclable" plastics should be the focus here.

● The downstream phase: This stage includes the waste management of plastic. Scientific method of waste management with collection, recycling, reusing and disposal is a crucial part.

6. Act of faith

Context: Gramdan villages, characterized by community ownership of land, have been a topic of discussion in recent years. While some villages are fighting to establish themselves as gramdan villages under relevant state laws, others are seeking to relinquish their gramdan status.
- The article explores the significance, challenges, and implications of gramdan villages focusing on the case of Mendha village in Maharashtra.

Gramdan and its Relevance:
- Gramdan villages, where all land is collectively owned by the residents, emerged as an extension of the Bhoodan movement initiated by Vinoba Bhave.
- The concept aimed to redistribute land from large landowners to the landless and empower communities.

Challenges Faced by Gramdan Villages:
- There are many challenges faced by gramdan villages, including limited access to financial resources, denial of crop insurance, and the inability to sell land due to ownership complexities. These challenges hinder the development and sustainability of gramdan communities.
- Dilution of Gramdan Laws:dilution of gramdan laws by various state governments over the years. Amendments to these laws have curtailed the autonomy and development potential of gramdan villages.
- Mendha village's fight for gramdan status reflects the concerns regarding land acquisition and the need for resource protection. The concept of collective ownership in gramdan villages aims to safeguard land and forests from acquisition under other laws.
- Role of State Governments and Gramdan Boards:The disinterest of state governments in supporting gramdan villages has led to a reduction in grants allocated to gramdan boards responsible for their development. This lack of financial support hampers the progress of gramdan villages.

Conclusion:
Gramdan villages present a unique socio-economic and governance model. Understanding the challenges, dilution of laws, and resource protection concerns associated with gramdan villages can help in reviving and utilizing such models for sustainable rural development. community-driven governance and empowering marginalized communities, can contribute meaningfully to the upliftment of villages and the overall progress of the nation.

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