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Science Reporter

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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

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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
Avdesh 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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Monday to Friday | 6:00 AM to 9:30 AM

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YEAR LONG TIMETABLE

(Evening Batch)

Monday to Friday | 5:00 PM to 8:30 PM

[illegible]

Learn From Home

YEAR LONG TIMETABLE

(Weekend Batch)

Saturday - 12:00 PM to 8:00 PM

Sunday - 10:00 AM to 8:00 PM

Slots	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5
February (05, 06, 12, 13, 19, 20, 26 & 27) + March (05, 06 & 12)	Polity				
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
November (05, 06, 12, 13, 19, 20, 26, 27) + December (03, 04 & 10)	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	Geography
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
January '23 (28 & 29) + February '23 (04, 05, 11, 12, 18, 19, 25 & 26) + March '23 (04)	Internal Security + CSAT	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture	Ancient India + Medieval India + Art & Culture
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
April '23 (15,16,23,29 & 30) + May '23 (06,07,13,14,20 & 21)		Focus Prelims	Focus Prelims	Environment & Ecology + Science & Technology + Disaster Management	Environment & Ecology + Science & Technology + Disaster Management
May '23 (27 & 28) + June '23 (17, 18, 24 & 25) + July (01, 02, 08, 09 & 15)		Ethics + Governance	Ethics + Governance	Ethics + Governance	Ethics + Governance
31st May to 11th June, 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023	PRELIMS 2023
July '23 (16, 22, 23, 29 & 30) + Aug '23 (05, 06, 12, 13, 19 & 20)					Social Issues & Social Justice + Essay + Compulsory Language Paper
1st September to 30th September, 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023	MAIN 2023

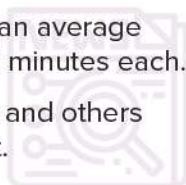


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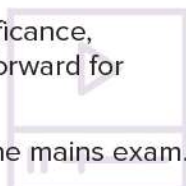
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POLITY

1. The demand for a Greater Tipraland by the TIPRA Motha

Syllabus: Centre-State relations, issues and challenges pertaining to the federal structure

Prelims: Articles 2 and 3 of the Constitution, Tripura Tribal Areas Autonomous District Council (TTAADC)

Mains: The demands for the creation of Greater Tipraland and its associated issues

Context: A new political party named Tipraha Indigenous Progressive Regional Alliance (TIPRA) Motha in Tripura has floated the demand for the creation of "Greater Tipraland".

Greater Tipraland

- The key demand of the TIPRA Motha has been the creation of "Greater Tipraland" i.e. carving out a new State for the 19 indigenous tribes of Tripura under **Articles 2 and 3** of the Indian Constitution.
- The demand for the creation of "Greater Tipraland" is said to have begun in 2009.
 - However, the earlier demand was the creation of a separate State for the tribal communities of Tripura from the existing **Tripura Tribal Areas Autonomous District Council (TTAADC)** region, whereas, the current demand is to include areas beyond the TTAADC region i.e. the inclusion of 36 more villages where the share of tribal population is around 20% to 36%.
- Several tribal communities and indigenous political parties in the State have now joined hands with TIPRA Motha in this respect.

Article 2 of the Constitution

- This Article deals with the admission or creation of new states.
- According to Article 2 of the Indian Constitution, Parliament through a law can admit or establish new States into the Union on such terms and conditions, as it deems fit.

Article 3 of the Constitution

- Article 3 deals with the formation of new States and alteration of areas, boundaries or names of existing States.
- According to the Article, Parliament through a law can:
 - Form a new State by separation of territory from any State or by uniting two or more States or parts of States or by uniting any territory to a part of any State
 - Increase the area of any State
 - Diminish the area of any State
 - Alter the boundaries of any State
 - Alter the name of any State

Tripura Tribal Areas Autonomous District Council (TTAADC)

- TTAADC was set up in 1985 based on the provisions mentioned under the Sixth Schedule of the Constitution.
- TTAADC was established to ensure the development and secure the rights and cultural heritage of the indigenous communities of the State.
- The TTAADC has been accorded both legislative as well as executive powers.
- TTAADC covers about 66% of Tripura's total geographical area.
- TTAADC further comprises 30 members out of which 28 are elected and two members are nominated by the Governor.

Key reasons for the genesis of the demand for Greater Tipraland

- As per the 1941 Census, the ratio of tribal population in the State of Tripura with respect to non-tribals population was almost 50:50.
- However, by the 1951 Census, the ratio of tribal population in the State declined to about 37% because of the huge influx of refugees from East Pakistan (erstwhile Bangladesh).
 - According to reports, close to 1.5 lakh refugees entered Tripura between 1950 and 1952.
- This large-scale influx of refugees caused changes in the demographics of the state that ultimately led to conflict between the tribal and the non-tribal populations in the State.
- This conflict between the tribals and the non-tribal groups escalated in 1980 and took the shape of an armed insurgency.
- During this time, the demand for a separate State was regarded as a movement to secure sovereignty and independence.

Nut graf: The demand for the creation of Greater Tipraland has polarised an already uneasy relationship between the tribals and the non-tribals in Tripura. This requires intervention by the Union Government, which must consider various developmental, economic and social factors rather than mere political factors while devising a solution to the conflict.

2. Ladakh's Demand for Autonomy

Syllabus: Constitution of India and issues and challenges pertaining to the federal structure

Prelims: Sixth Schedule of the Constitution

Mains: Ladakh's Demand for Autonomy

Context: People of Ladakh have been protesting to demand for constitutional autonomy and statehood.



Source: India maps

History & Status of Ladakh:

- Ladakh was an independent kingdom since the middle of 10th century.
- Post-1947, it merged with J&K and acceded to India.
- Pakistan and China illegally occupied 78,114 sq. km and 37,555 sq.km of the state, respectively while the remaining part of the state acceded to India.
- Ladakh Autonomous Hill Development Council Act, 1995 - Leh and Kargil have separate Autonomous Hill Development Councils under the act.
- **2019 - Article 370 revoked & Reorganisation of J&K. Ladakh today is a UT comprising Leh and Kargil districts.**
- Ladakh has no legislative assembly and is under the direct administration of the Centre.
- Complete loss of legislative powers - Earlier, the two districts each sent four representatives to the J&K legislature. After the changes, they were down to one legislator — their sole MP— with all powers vested in the UT bureaucracy.

Unique Developmental Needs of Ladakh:

- Cold desert ecosystems harbour rare mammals like the wild yak and the snow leopard, and diverse flora.
- Cultures and livelihoods have evolved to be sensitive to the fragility of ecosystems that cannot bear heavy human activity.
- High-altitude pastoralism, agriculture, and trade have been the mainstays of Ladakhi economy and society for centuries.

Demand of Ladakhis: Constitutional Autonomy under 6th Schedule (Article 244).

- The Sixth Schedule under Article 244 provides for the formation of Autonomous District Councils (ADCs) — that have some legislative, judicial, and administrative autonomy within a state.
- Apex Body Leh (ABL) and the Kargil Democratic Alliance (KDA) have been leading the protests.
- On January 2, the Home Ministry has set up a High Powered Committee (HPC) chaired by Minister of State for Home Nityanand Rai to discuss measures to protect the region's unique culture and language taking into consideration its geographical location and strategic importance; ensure protection of land and employment for the people of Ladakh; strategise inclusive development and discuss issues related to the empowerment of the Ladakh Autonomous Hill District Councils of Leh and Kargil.

Sixth Schedule of the Constitution

- The Sixth Schedule of the Constitution aims to safeguard the land, employment, and cultural identity of the local population.
- The Sixth Schedule under Article 244 of the Constitution safeguards the autonomy of local and tribal communities through the creation of Autonomous Development Councils (ADCs) which can formulate laws on land, public health and agriculture.
- Under the provision of the Sixth Schedule, the Governor of the State is empowered to determine the area or areas as administrative units of the Autonomous Districts and Autonomous Regions.
- At present, The tribal areas in the four states of Assam, Meghalaya, Tripura and Mizoram have been constituted as autonomous districts.
- One of the most important features of the Sixth Schedule is the empowerment of District Councils to make laws.
 - They can make laws on certain specified matters like land, forests, canal water, shifting cultivation, village administration, inheritance of property, marriage and divorce, social customs and so on.
 - However, all laws made under this provision shall have no effect until assented by the Governor of the State.
- Further, the District and Regional Councils are empowered to prepare a budget for their respective Council.
- The District and Regional Councils are also empowered to constitute Village and District Council Courts for the trial of suits and cases where all parties to the dispute belong to Scheduled Tribes within the district.
 - No other courts except the High Courts and the Supreme Court have the jurisdiction over such cases of the Council Courts.
 - However, these Council Courts are not given the power to decide cases involving offences punishable by death or imprisonment for five or more years.

Government of India's Stand:

- The 6th Schedule is for the North-East region – AMTM States.
- Not keen to give any special status to Ladakh.
- The ministry of home affairs informed a parliamentary standing committee recently that the objective for inclusion of tribal population under the sixth schedule is to ensure their overall socio-economic development, which the UT administration has already been taking care of and that sufficient funds are being provided to Ladakh to meet its overall developmental requirements.
- A report tabled in Rajya Sabha on December 13, 2022, quoted MHA officials, that the Ladakh administration recently increased the reservation for the Scheduled Tribes in direct recruitment from 10% to 45% which will significantly help the tribal population in their development.

3. Parliamentary privileges

Syllabus: Parliament — structure, functioning, conduct of business, powers & privileges and issues arising out of these.

Mains: Issues associated with Parliamentary privileges and Breach of privilege.

Prelims: Breach of Privilege.

Context: Charges of parliamentary privileges against Mr. Rahul Gandhi.

Details:

- A charge of breach of privilege of the House has been raised by a Union member and a Member of Parliament (MP) against another MP, Mr. Rahul Gandhi. However, he has stood by the statement made during his speech in the budget session.
- It is the duty of the Member of Parliament (MP) to hold the executive accountable to Parliament.
- It is argued that curtailing the rights of an MP in the name of parliamentary privileges reduces the very concept into an instrument of executive fiat.
- It is also the responsibility of the Speaker of the Lok Sabha and the Chairman of the Rajya Sabha to protect the majesty of Parliament, specifically in its interactions with other branches of the state instead of disciplining the members.
- It is argued that the parliamentary discussion on the controversy surrounding a big corporate house in India was vitiated by the unreasonable restriction on the opposition leaders. This executive imperium on the legislative branch is also emulated by various state governments.

Parliamentary privilege

- Parliamentary privileges, i.e. exceptional right or advantage, are granted to the members of legislatures worldwide
- The Indian parliament's privileges among other provisions are contained in Article 79 to Article 122 of the Indian Constitution.
- Feature of parliamentary privileges in the Indian Constitution is borrowed from the British Constitution.
- The exemptions, rights or immunities provided to the members of each house of the parliament and the parliament committees secure the independence and effectiveness of the actions taken by them.
- Further, the parliamentary privileges help maintain the dignity, authority and honour of the members of parliament.
- The Indian parliamentary privileges are categorised into two:
 - **Collective Privileges** – Those privileges which are enjoyed by the Indian Parliament as a whole.
 - **Individual Privileges** – Those privileges which are secured to the members of the parliament on an individual level.
- The Lok Sabha speaker is the guardian of the Lok Sabha members' privileges and the Committee of Privileges which is of semi-judicial nature is responsible for examining the privileges' breach.

Breach of Privileges

- A breach of privilege is a violation of any of the privileges of MPs/Parliament. Among other things, any action 'casting reflections' on MPs, parliament or its committees; could be considered a breach of privilege.
- When any person or authority disregards or attacks any of the rights, immunities and privileges, either of the Members individually or of the House in its collective capacity, the offence is called a breach of privileges and is punishable by the House
- **The House may impose one of the following punishments on a person found guilty of breach of privilege or contempt of the House:**
 - Admonition or reprimand
 - Suspension from the House
 - Expulsion from the House
- There is a motion named 'Privilege Motion' used to censure a minister for the breach of parliamentary privilege.
 - The privilege motion is moved by a member when he feels that a minister or any member has committed a breach of privilege of the House or one or more of its members by withholding facts of a case or by giving wrong or distorted facts.

Other associated concerns:

- It is observed that in many states, Chief Ministers take State Assemblies for granted.
- Assembly sittings have become fewer and even the debates are not very deep and comprehensive.
- People seek accountability from the government through their elected representatives but popular leaders bypass them by saying that they are directly answerable to the people.
- It is the duty of the executive to respond to any allegation and not erase the parliamentary authority.

Nut Graf: Parliament should remain a forum for free and fair debates and the executive should answer each and every allegation. This would maintain the authority of the parliament and ultimately the trust of the citizens in the democracy.

4. Disqualification of a Politician

Syllabus: Parliament and State legislatures—structure, functioning, conduct of business, powers & privileges and issues arising out of these.

Mains: Disqualification of an MP/MLA under the Constitution and Representation of the People Act, 1951

Context: Kerala High Court refuses to stay 10-year imprisonment against Lakshadweep Member of Parliament in an attempt to murder case.

Background:

- Earlier, the Kavaratti Sessions Court had convicted four persons, including Mohammed Faizal P.P. then sitting Member of Parliament (MP) of Lakshadweep for committing offences punishable under Indian Penal Code (IPC) and sentenced to undergo 10 years of rigorous imprisonment.
- On January 13, the Lok Sabha announced the disqualification of Faizal as an MP with effect from the date of conviction.
- On January 18, the Election Commission of India (ECI) fixed February 27 as the date for by-election to that constituency.
- An appeal in Kerala High Court suspended his conviction and sentence on January 25.
 - The High Court suspended his conviction until disposal of the appeal.
- Mr. Faizal also challenged the ECI's announcement in the Supreme Court of India due to which the ECI deferred the election.
 - The elected candidate will have just 15 months to function till the end of the term of the current Lok Sabha.

Provision for disqualification:

- In case an MP is convicted of any criminal offence, there are provisions in place for their disqualification from the parliament.
- **Article 102** of the Indian Constitution lays down the provisions for the disqualification of a Member of Parliament. According to this article, an MP can be disqualified on the following grounds:
 - If he/she holds an office of profit under the government of India or the government of any state, other than an office declared by Parliament by law not to disqualify its holder;
 - If he/she is of unsound mind and stands so declared by a competent court;
 - If he/she is an undischarged insolvent;
 - If he/she is not a citizen of India, or has voluntarily acquired the citizenship of a foreign State, or is under any acknowledgment of allegiance or adherence to a foreign State;
 - If he/she is so disqualified by or under any law made by Parliament.
 - It means that Parliament can make laws to disqualify MPs on any other ground as well.
- **Section 8 of Representation of the People Act, 1951** provides that a person will be disqualified if convicted and sentenced to imprisonment for two years or more.
 - The person is disqualified for the period of imprisonment and a further six years.

Differential Treatment:

- There is an exception for sitting members under Representation of the People Act, 1951
 - Sitting members have been provided a period of three months from the date of conviction to appeal; the disqualification will not be applicable until the appeal is decided.
- The differential treatment of candidates for elections and sitting members was challenged under Article 14.
- The Supreme Court in **K. Prabhakaran vs P. Jayarajan 2005 case**, validated the differential treatment as the consequences of disqualifying a contestant and a sitting member were different.
 - The disqualification of an MP or MLA has several implications for the functioning of the House and the political party to which the member belongs.
 - The disqualification of an MP or MLA leads to a by-election in the constituency represented by the disqualified member. This not only entails additional expenditure for the government but also affects the political balance in the House.
- The Court also held that the removal of disqualification in case of acquittal of a candidate would be prospective and for future elections and not with retrospective effect as this would require the results of the election to be cancelled.
- However, in 2013, a two-judge Bench of the Supreme Court in the Lily Thomas vs Union of India case stated that the conditions for disqualification would apply equally to candidates and sitting members. Therefore, the exception carved out for sitting members was unconstitutional.
 - The judgement cited **Article 101** that if a Member of Parliament was disqualified under Article 102, "his seat shall thereupon become vacant". Therefore, the disqualification was automatic and had immediate effect if the conditions of Article 102 were met.
 - The judgement also stated that a disqualified person may obtain a stay on his conviction, and the disqualification would be removed from the date of the stay order.

Nut Graf: The disqualification of an MP on the ground of conviction has been a subject of controversy and debate in India. One of the main reasons for this is that the provision does not apply to an MP who has been convicted but has filed an appeal against the conviction. An MP can continue to hold his/her position in the parliament until the appeal is decided by a higher court.

5. Anti-defection Law in India

Syllabus: Constitution - features, amendments, significant provisions and basic structure.

Prelims: About Anti-defection law and Tenth Schedule

Mains: Working of Anti-defection law in India

Context: Supreme Court of India is currently hearing a set of cases popularly known as the "Maharashtra political controversy cases".

Background:

- The "Maharashtra political controversy cases" refer to a set of cases related to the formation of the government in Maharashtra in June 2022.
- The controversy arose after the ruling coalition (the Shiv Sena, the Nationalist Congress Party and the Congress) lost power after an internal splintering of the Shiv Sena party.
- A faction led by Eknath Shinde then joined hands with the Bharatiya Janata Party (BJP) to form the new ruling coalition.
- The disputes between the various parties have been continuing since then, with the most recent development being an Election Commission of India (ECI) order declaring that Eknath Shinde's faction is entitled to the party name and symbol.

The Tenth Schedule:

- The Tenth Schedule to the Indian Constitution, also known as the **Anti-Defection Law**, was added by the **52nd Amendment Act in 1985**.
- It lays down the provisions for the disqualification of Members of Parliament (MPs) and Members of Legislative Assemblies (MLAs) on the grounds of defection from their political party.
- The main objective of the Tenth Schedule is to curb the practice of legislators defecting to other parties for personal gain or to bring down the duly elected governments.
- **Grounds for disqualification:**
 - If an elected member gives up his membership of a political party voluntarily.
 - If he votes or abstains from voting in the House, contrary to any direction issued by his political party.
 - If any member who is independently elected joins any party.
 - If any nominated member joins any political party after the end of 6 months.
- The decision on disqualification questions on the ground of defection is referred to the Speaker or the Chairman of the House, and his/her decision is final.
- **Exceptions:**
 - In the situation where two-thirds of the legislators of a political party decide to merge into another party, neither the members who decide to join nor the ones who stay with the original party will face disqualification.
 - Any person elected as chairman or speaker can resign from his party, and rejoin the party if he ceases to hold such office.

Critical evaluation of the working of Tenth Schedule in Indian Polity

- The working of the Tenth Schedule under the Indian Constitution has been patchy. While the law was intended to prevent defections and promote stability in the political system, it has not always been effective in achieving these objectives.
- In recent days, politicians have adopted various strategies to overcome anti-defection laws.
 - Recent examples involve mass resignations (instead of defections) to force a fresh election and partisan actions by State Governors (who are nominees of the central government) with respect to swearing-in ceremonies and the timing of floor tests.
- One of the main challenges with the Tenth Schedule has been the difficulty in implementing it effectively.
- The law requires the Speaker or Chairman of the House to decide on disqualification petitions filed against legislators, which often leads to delays and political influence.
 - There have been instances where Speakers have delayed or ignored disqualification petitions, or have given biased decisions in favour of the ruling party.
- Another issue with the Tenth Schedule is that it gives a lot of power to the party leadership.
 - The law places significant pressure on legislators to toe the party line and follow the directives of the party leadership, even if it goes against their own convictions or the interests of their constituents.
- Furthermore, there have been instances where the Tenth Schedule has been misused for political purposes. Parties have often used the threat of disqualification to coerce legislators into supporting them, or to bring down rival governments.
 - There have also been instances where the ruling party has used the law to target opposition legislators, while turning a blind eye to defections within their own party.

Role of Judiciary:

- In recent years, the judiciary has been proactive in enforcing the anti-defection law. It has struck down several decisions of the Speakers or Chairpersons of the Houses, and has also given directions to expedite the disqualification process.
- The judiciary has also clarified and interpreted the provisions of the Tenth Schedule to prevent misuse of the law and to ensure that it is applied in a fair and impartial manner.
- However, the toppling of governments remains as frequent as ever. Politicians are finding loopholes in Supreme Court judgments as well as in the Tenth Schedule.
- The Supreme Court's jurisdiction to intervene in anti-defection cases is limited by the Constitution, which gives the power to decide on disqualification petitions to the Speaker or Chairman of the House.
 - This can make it difficult for the court to intervene in such cases, as it has to balance the constitutional provisions with the need to ensure fairness and impartiality in the disqualification process.
- Delayed judicial interventions can hasten the toppling of a government and contribute to turning the Tenth Schedule into a dead letter.
- The Court's judgement in the ongoing case can act as a counterweight to political power, and infuse a dose of constitutionalism into the politics of government formation and toppling.

Nut Graf: While the Tenth Schedule was intended to promote stability in the political system and prevent defections, its implementation has been patchy and there have been several challenges in its effective functioning. The judiciary's proactive role in enforcing the anti-defection law could help to maintain the integrity and stability of the political system in India.

6. Is judicial majoritarianism justified?

Syllabus: Structure, organization and functioning of the Judiciary

Prelims: About Constitution Bench of the Supreme Court

Mains: Critical evaluation of the concerns associated with the judicial majoritarianism

Context: Against the backdrop of the recent Supreme Court judgement on demonetisation, the majority judgement of the Court on issues had been criticised while the minority judgement by Justice Nagarathna is being acclaimed.

Background

- A five-judge Constitution Bench of the Supreme Court upheld the government's process to demonetise ₹500 and ₹1000 banknotes through a gazette notification issued on the 8th of November 2016.
- A Constitutional Bench of the Supreme Court upheld the government's demonetisation process in a 4:1 majority verdict.

What is judicial majoritarianism?

- While standard matters are placed in front of Division Benches which consist of two judges, cases that mandate the interpretation of constitutional provisions would require numerical majorities in order to reach a conclusion.
- Hence to hear such cases that mandate the interpretation of the constitutional provisions, Constitutional Benches are formed which consist of at least five judges or more.
 - Constitutional Benches usually consist of five, seven, nine, 11 or even 13 judges (odd numbers) in order to facilitate decision-making via numerical majorities.
- Constitutional Benches are set up in accordance with the provisions of Article 145 (3) of the Constitution.
 - As per Article 145 (3), a minimum of five judges must sit for deciding a case involving a "substantial question of law as to the interpretation of the Constitution", or for hearing any reference under Article 143, which deals with the power of the President to consult the Supreme Court.
- Article 145 (5) of the Constitution required a majority consensus for a judicial outcome.
 - According to Article 145 (5), "no judgment in such cases can be delivered except with the concurrence of a majority of the judges but that judges are free to deliver dissenting judgments or opinions".

The core issue surrounding judicial majoritarianism

- Judges unlike the representatives of the people in the legislatures are considered to be experts in law and order and are capable of thoroughly analysing the various arguments and counter-arguments on a particular issue.
 - Thus, experts such as Jeremy Waldron have questioned the need for the use of the mechanism of head counting to reach a consensus amongst judges.
- All the judges in a particular bench give their verdict after hearing or going through the same set of arguments and submissions.
 - Therefore, the differences in the opinion of judges can be attributed mainly to the difference in the methodology/ logic they applied or their own "judicial hunches" which is usually a result of their subjective experiences, outlook, and biases.
 - Critics feel that in such cases, there are chances that the majority decision may be affected due to either methodological misconceptions or errors.
- Furthermore, reports have indicated that the rate of dissent can be influenced and impacted, and have raised concerns over the efficiency and desirability of the head-counting mechanism for deciding on issues of national importance.
 - Example: Studies have highlighted the fact that the rate of judicial dissent during the time of the National Emergency in 1976 was only 1.27% as compared to 10.52% in 1980.
 - Studies have also pointed out the fact that the rate of dissent was lower when the Chief Justice of India was a part of the Bench.

Constitutional history of meritorious dissents

- In the A.D.M. Jabalpur v. Shivkant Shukla (1976) case: the dissenting opinion of Justice H.R. Khanna in upholding the Right to Life and personal liberty even during situations of constitutional exceptionalism is regarded as a remarkable example of meritorious dissent.
- In the Kharak Singh v. State of U.P. (1962) case: the dissenting opinion of Justice Subba Rao in upholding the Right to Privacy which was later approved through the K.S. Puttaswamy Judgment is also a prime example of meritorious dissent.

Recommendation or alternate solution

- Ronald Dworkin who is a distinguished philosopher-cum-jurist has suggested the adoption of a system that either gives more weightage to the vote of senior judges considering their experience or to junior judges because they can represent popular opinion better.
- However, such alternatives can only be adopted after a thorough analysis of the rationales behind the adoption of the head-counting mechanism in judicial decision-making.

Nut graf: The judicial outcomes through the mechanism of judicial majoritarianism have raised concerns and have been often criticised as one of the most fundamental faults in the functioning of the Judiciary. Thus, there is a need to reflect upon the arguments against judicial majoritarianism in order to devise an efficient and long-term solution to the issue.

7. The Problem of Opacity in Judicial Appointments

Syllabus: Structure, Organization & Functioning of the Judiciary

Mains: Issues with the functioning of the collegium system

Context: The Madras High Court recently appointed lawyer Lekshmana Chandra Victoria Gowri as an additional judge.

Introduction:

- After the collegium recommended Victoria Gowri's name for judgeship, a petition was filed in the Supreme Court challenging this appointment, on the basis that she had, allegedly, engaged in "hate speech" against Muslims and Christians.
- However, the Supreme Court of India rejected their plea to withdraw Victoria Gowri's appointment and restrain her from taking the oath.
- Earlier, the Union Law Ministry had processed the recommendation concerning a set of candidates with extraordinary speed not displayed in other cases to avoid any possible interim order from the Court.

Supreme Court Collegium system

- The collegium is responsible for making recommendations for the appointment of judges to the SC, Chief Justices of High Courts, and the transfers of HC judges to the government.
- The Supreme Court collegium consists of the Chief Justice of India as the head and the four other senior most judges of the Supreme Court.
- The Constitution of India does not mention the collegium system and the system has evolved through the verdicts of the apex court namely the First, Second, and Third Judges Cases.

Evolution of the Collegium system

- **First Judges case, 1981**
 - This case is also known as the S.P. Gupta v/s Union of India Case.
 - In this judgment a seven-judge Bench interpreted Articles 124 and 217 of the Constitution, which deals with the appointments of judges to the SC and the HCs respectively.
 - The Supreme Court Bench ruled that the concept of primacy of the CJI was not to be found in the Constitution.
 - The Constitution Bench also held that the term "**consultation**" used in **Articles 124 and 217 was not "concurrence"**.
- **Second Judges case, 1993**
 - In the Supreme Court Advocates-on-Record Association (SCARA) v/s Union of India case, a nine-judge Constitution Bench overruled its decision in the First Judges case.
 - The Supreme Court Bench held that the word "**consultation**" actually meant "**concurrence**" of the CJI.
 - This judgement also gave rise to a "Collegium System" for the appointment and transfer of judges in the higher judiciary. This Collegium would consist of the CJI along with two senior-most judges of the court.
- **Third Judges case, 1998**
 - In 1998, a reference was made by then President K R Narayanan seeking the SC's opinion in its advisory jurisdiction on whether the primacy given to the CJI on appointments was legally sound.
 - In response, the Supreme Court held that the CJI won't be the only one as a part of the consultation process. Consultation would include a collegium of 4 senior-most judges of the Supreme Court along with the CJI.
 - Even if 2 of the judges are against the opinion, the CJI will not recommend it to the government.

The problem of opacity:

- The controversy indicates certain continuing, structural problems with the process of judicial appointments such as opacity.
- Judicial appointments by the collegium in India can be contrasted with other democratic countries, such as the United States, South Africa, or Kenya.
 - These countries follow transparent procedures where the names of the judicial candidates are publicly known before the formal commencement of the selection process.
 - By contrast, in India, the candidate's name is effectively made public after their selection by the collegium.
- The selection process is behind closed doors, where the parties involved are the collegium and the government (through the Intelligence Bureau).
- The fall-out of this opaque procedure is asymmetric.
 - When the government approves a particular candidate, it can simply withhold relevant information from the collegium to influence the materials on the basis of which the collegium determines "suitability". This effectively affects the decision-making ability of the collegium.
 - Had there been effective consultation and relevant information placed before the collegium, Lawyer Lekshmana Chandra Victoria Gowri's appointment may not have materialised.

- Government can also rush the process through (as happened in the present case). In other cases, the government can exercise a pocket veto by refusing to appoint judges as per the direction of the collegium).
- Once a collegium recommendation has been made, the only way of contesting it is through a legal challenge.

International Practices:

- **Italy:** Appointments to the Constitutional Court are made by the President, the legislature and the Supreme Court, with each entity allowed to nominate five judges.
- **USA:** Supreme Court justices are nominated (for life) by the President and then approved by the Senate via a majority vote.
- **Germany:** The German Constitutional Court is appointed by the Parliament (each House gets four appointments in each of the Court Senates) with a supermajority vote (2/3).
- **Iraq:** All judges are graduates of a Judicial Institute, with all applicants undergoing written and oral tests, along with an interview with a panel of judges.
- **Japan:** The Supreme Court Secretariat controls lower-level judicial appointments, along with their training and promotions.
- **Judicial councils:** Other countries have experimented with judicial councils (often consisting of existing judges, representatives of the Ministry of Justice, members of the bar association, laymen, etc.).

Way Forward:

- The present structure is problematic not only in principle but also because it asymmetrically benefits the political executive. Therefore it is crucial to locate the roots of the problem in the structure of our judicial appointments process and safeguard judicial independence from executive dominance.
- India can follow international best practices in this regard. For instance, in South Africa, proceedings of the judicial appointments commission have been subjected to judicial review, and the courts have directed the commission to make their deliberations public.
 - This provides a system of checks and balances and brings transparency and publicity. Therefore ensuring a higher degree of separation between the judicial appointments commission and the court.
- A process that combines an objective evaluation of the candidates' credentials with an independent mechanism that ensures public scrutiny of their suitability should be put in place to overcome any unhealthy compromises in the appointment process.

Nut Graf: Recent appointment of a controversial lawyer as an additional judge by the Madras High Court epitomises the problematic opaque nature of the system of judicial appointment. This could potentially endanger the independence of the judiciary as it asymmetrically benefits the political executive.

8. Post-retirement Political Appointment of Judges

Syllabus: Separation of powers between various organs and the Structure, organization and functioning of the Judiciary

Mains: Implications of post-retirement jobs for Judges in India

Context: Former judge of the Supreme Court of India S. Abdul Nazeer has been appointed the Governor of Andhra Pradesh.

Introduction:

- Post-retirement political appointments of judges refer to the practice of offering a position in government or other public offices to a retired judge, who has already served in the judiciary.
- These appointments are often made by the ruling government or political party and are seen as a way to reward judges who have served in the judiciary and to use their expertise in governance.
- However, the practice has been criticised as being a way to influence the judiciary, compromise its independence, and erode public trust in the justice system.
- Within a month of retiring from the Supreme Court of India, Justice S. Abdul Nazeer had been appointed Governor of Andhra Pradesh recently.

Previous instances:

- Since 1950, there have been 44 Chief Justices of India who have accepted post-retirement jobs.
- According to a study, as many as 70 of over 100 retired Supreme Court judges have taken up such assignments in organisations like NHRC, National Consumer Disputes Redressal Commission, Armed Forces Tribunal, Law Commission of India, etc.
- The former CJI Justice Ranganath Mishra was appointed chairman of the National Human Rights Commission after his retirement in 1992. He became a member of the Rajya Sabha in 1998 as a Congress member.
- Since 2014, Justice S. Abdul Nazeer is the fourth Supreme Court judge who has received a high-profile political appointment soon after retirement.
 - Justice P. Sathasivam was appointed as Governor of Kerala, and Former Chief Justice of India (CJI) Ranjan Gogoi was nominated to Rajya Sabha in 2020 just four months after his retirement.
 - Justice A.K. Sikri, who was then a sitting judge of the Supreme Court, was nominated to the Commonwealth Secretariat Arbitral Tribunal by the government, just three days before his retirement in 2019.

- These appointments were widely criticised by the legal community and the media, with many arguing that it was a clear case of quid pro quo between the government and the judges.

Issues associated with political appointments:

- The controversy surrounding these appointments highlighted the need for greater transparency in the selection process for post-retirement appointments of judges.
- The lack of clear guidelines and criteria for such appointments has led to accusations of favouritism and political patronage, and has raised questions about the impartiality and independence of the judiciary.
- The perception that judges are being rewarded for their decisions or their political affiliations can undermine the credibility of the judiciary. This can have a corrosive effect on the democratic process, as citizens lose faith in the institutions that are meant to protect their rights and ensure justice.
- Another concern with post-retirement political appointments of judges is the possibility of conflict of interest.
 - When a retired judge is appointed to a government position, they may be called upon to make decisions that could affect cases that they had previously presided over as judges.
- Post-retirement political appointments of judges can create a revolving door between the judiciary and the executive, where judges move back and forth between the two branches of government.
 - This can lead to a situation where judges are more likely to make decisions that are favourable to the government, as they know that they may be rewarded with a post-retirement appointment if they do so.

Arguments in favour of such appointments:

- Post-retirement political appointments of judges allow for the government to tap into the expertise of retired judges and to benefit from their knowledge and experience.
- Unlike abroad, higher judiciary judges in India retire at a comparatively young age and are capable of many more years of productive work.
- Most of the posts have a statutory requirement to appoint former judges. For example, the National Human Right Commission (NHRC).

Arguments against such appointments:

- Undermines the integrity of judges
- Encourage a culture of sycophancy
- Affects the independence of the judiciary
- Makes the public have less faith in the judiciary
- Against the doctrine of separation of powers
- Undermines the constitutional values of impartiality

Way Forward:

- **Clear demarcation** - The Indian judiciary must distinguish between political favours and other post-retirement employment opportunities. There needs to be a demarcation between roles where the presence of a judicial authority is clearly valuable.
- **Role of judicial community** - The judicial community should take a concerted decision of not taking up any appointments upon retirement stemming from political patronage.
- **Cooling period** - A cooling period of about 2 years should be considered a mandatory minimum before a judge agrees to take on any post-retirement adjudicatory role.
- The judiciary needs a mechanism to regulate post-retirement government appointments.
 - A law can also be made to set up a commission of retired judges to make appointments of competent retired judges to tribunals and judicial bodies.
- There could be an increase in the retirement age of judges.
- Former Chief Justice R M Lodha had suggested that before a judge retires, the government should provide the option of either being a pensioner or continuing to draw an existing salary.
 - If they opt for a pension, government jobs are out but if they opt for a full salary, that name should be put in a panel.
 - When a vacancy arises, these persons can be considered and the process becomes devoid of allegations of appeasement, favouritism, etc.

Nut Graf: The issue of post-retirement political appointments of judges has emerged as a new concern in recent years. These appointments have implications for the judiciary, the executive, and the overall democratic process.

9. Charge sheet scrutiny

Syllabus: Judicial rulings and interventions.

Mains: Significance of making the charge sheet a public document under RTI.

Prelims: Charge sheet.

Details:

- The Supreme Court of India has agreed to live telecast some of its hearings. This move was warmly welcomed by activists clamouring for more openness and transparency in judicial proceedings.
- To make the judicial process more accessible, the Chief Justice of India said that the judgments of the Supreme Court will be translated into four languages (Hindi, Gujarati, Odia, and Tamil) as “the English language in its ‘legal avatar’ is not comprehensible to 99.9% of the citizens”.
- However, SC’s ruling on charge sheets appears to be retrograde. It is ruled that a charge sheet filed against an accused in a criminal case is not a ‘public document’ within the meaning of the Right to Information Act 2005 or the Indian Evidence Act. Thus, the demand to upload the charge sheet onto a public website as soon as it is filed in court was untenable.

What is a Charge sheet?

- As per Section 173 the Code of Criminal Procedure 1973 (CrPC), Charge sheet is the final report prepared by a police officer or investigative agencies after completing their investigation of a case.
- The Supreme Court in its judgement in K Veeraswami v/s UOI & Ors case (1991) has held that “the charge-sheet is nothing but a final report of the police officer under s. 173(2) of the CrPC.
- It is a comprehensive account of the crime in question and has crucial information like details of names, the nature of offences, a list of prosecution witnesses and documents in support of the investigating officer’s conclusions.
- Once the charge sheet is prepared, the officer-in-charge of the police station forwards it to a Magistrate, who is empowered to take notice of the offences mentioned in it.
- Further a charge sheet must be filed against the accused within a prescribed period of 60 to 90 days. Failure to file a charge sheet in the prescribed period would make the arrest illegal and the accused is entitled to bail.
- In its recent verdict, the apex court has held that charge sheets are not “public documents” under Sections 74 and 76 of the Evidence Act as making them public would violate the provisions of the CrPC as it compromises the rights of the accused, victim, and the investigation agencies.
 - Section 74 of the Evidence Act defines “public documents” as those documents which serve as records of sovereign authority, various bodies, tribunals, and of public offices in any part of India, Commonwealth or a foreign country.
 - Section 76 of the Evidence Act makes it mandatory for public officers having custody over “public documents” to provide its copy along with a certificate of attestation.

Associated Concerns:

- It is argued that this is a setback for those demanding more transparency in criminal justice administration. It will also have severe impacts on investigating officers and victims of the concerned crimes.
- The ruling contradicts the earlier judgment in Youth Bar Association of India vs Union of India (2016).
 - It was directed that the First Information Report (FIR) in any case should be made available on the relevant investigating agency’s website within 24 hours of its registration.
- However, as per this ruling, a charge sheet is different from FIR and thus cannot be shared with anyone other than the accused and the victim.
- It was further said that though information would become public during the trial, any attempt to part with details contained in these documents even before a trial begins would be detrimental to the accused and the victim.
- It was highlighted that the open publicity of the final report is not within the scheme of the Code of Criminal Procedure.

Significance of transparency of charge sheet:

- In the early days of the Constitution, confidentiality was the major aspect of all judicial activities. Judiciary was considered sacrosanct, where none of its actions was open to criticism or scrutiny.
- However, times have changed and judges, their personal life, and their judicial decisions are often debated and criticized.
- It is suggested by the author that the demand for sharing the charge sheet with the public is very much in order. It is further said that though vested interests may find loopholes and undermine the prosecution, it should not be the reason to deny access to the public.
- Instead, it will provide an opportunity to evaluate the quality of the investigation.
- Moreover, the prospect of critical analysis by an outsider will potentially enhance the soundness of an investigation and prevent tendentious prosecution against innocent individuals.
- A trial court would benefit more from the outsider scrutiny of the charge sheet.
- Better analysis by well-meaning members of the public before the trials would reduce the chances of loosely framed charge sheets being presented in the court.

Nut Graf: It is suggested that the Supreme Court's order against public scrutiny of a charge sheet before a trial begins is a setback to judicial reform and has the potential to hamper the quality of an investigation. It is thus recommended to review this decision, as increased transparency can further strengthen the efficiency of both the investigating agencies and the judiciary.

10. The 30 crore missing voters are mostly young, urban, or migrants

Syllabus: Issues and challenges pertaining to democracy

Mains: Voter turnout in India.

Details:

- There has been a four-fold increase in the number of voters in India since 1962. It reached above 94.5 crores in January 2023.
- However, nearly one-third did not exercise their franchise in the 17th Lok Sabha Election (2019). It is recognized by the Election Commission of India (ECI) that people from urban areas, young voters, and migrants formed a major chunk of the 30 crore missing voters in the 17th Lok Sabha election.
- It was found that during the State Assembly elections in Gujarat (2022), major cities in Gujarat not only recorded a decline in voting percentage (in comparison to the 2017 elections) but also voted much less than the State average.
- In order to take the voter turnout to 75%, ECI has adopted a multipronged strategy including awareness campaigns and introducing remote voting systems.
- In December 2022, ECI announced that it has developed a prototype for a Multi-Constituency Remote Electronic Voting Machine that would enable remote voting by migrant voters.

Statistical Details:

- Notably, the voter turnout has increased significantly in the past few years and has crossed the 65% mark in the last two general elections (2014 and 2019).

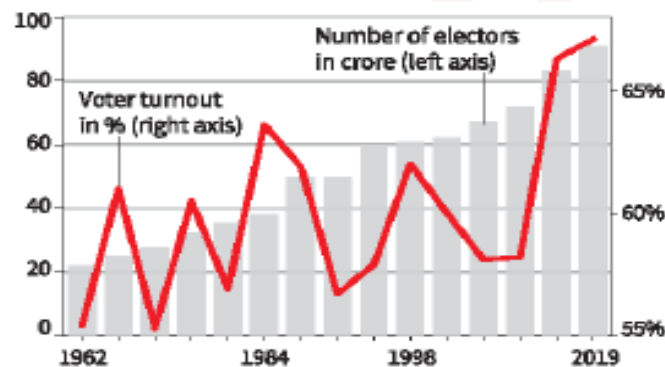


Figure: Number of electors and voter turnout in the last 15 Lok Sabha Elections

- However, still, 35% of voters remain absent from the process. ECI has highlighted urban apathy to be a major reason behind it.
- It is found that constituencies with the lowest voter turnout in the 2019 general elections are either in the capital district or the urban centres of the state. For example, in Karnataka, the constituencies recording the lowest voter turnout were Bangalore South, Bangalore Central, and Bangalore North (all three seats from the capital city of Karnataka).
- The number of voters registered in India is almost four times that of the U.S. (the second among the top 10 countries with registered electors in parliamentary/presidential elections).

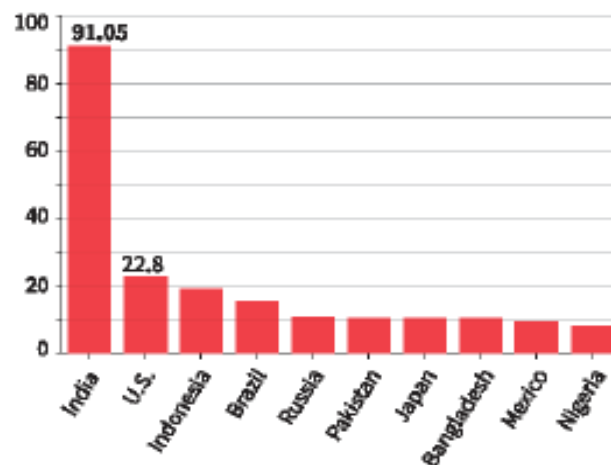


Figure: Number of registered voters (in crores) in select countries

- India, with a voter turnout of 67.1% in the Seventeenth Lok Sabha elections, was positioned 74th among the 162 countries whose data were compared.
- The vote share in India lagged behind the turnouts recorded in Bangladesh (80%), Brazil (79.2%), and Sri Lanka (75%). However, it was better than the turnouts in Pakistan (50%), Russia (51%), and Nepal (61%).

Nut Graf: Despite an increase in the voter turnout in the Lok Sabha elections, one-third of voters still remain absent from the process. The Election Commission is taking several steps to increase the share of voters to 75% through awareness campaigns and remote voting for migrants.

11. Political Party Symbols

Syllabus: Constitutional bodies - Election Commission and issues associated with Political Parties in India

Mains: Dispute Over Electoral Symbol and Resolution

Context: The Election Commission of India allotted the name 'Shiv Sena' and the party's bow and arrow symbol to the Eknath Shinde faction.

Introduction:

- The Election Commission of India (ECI) recognized the Eknath Shinde faction as the original party founded by Balasaheb Thackeray and allotted them the name 'Shiv Sena' and the party's bow and arrow symbol to it.
- The commission based its decision on a "test on majority".
- ECI also ordered the Shinde faction to amend the 2018 Constitution in line with the Representation of the People Act, 1951 and the EC's guidelines on the internal democracy of parties.
- The ECI remarked that it was "paradoxical" that the internal functioning of a party was scrutinised only in cases of dispute redressals. The Commission asked parties to follow ECI guidelines and periodically upload a copy of their constitutions and the list of the office-bearers on their websites.

Disputes over election symbols:

- Under Paragraph 15 of the Election Symbols (Reservation and Allotment) Order, 1968 Order, ECI can decide disputes among rival groups or sections of a recognised political party staking claim to its name and symbol.
- The decision of the Commission shall be binding on all such rival sections/groups.
- This applies to disputes between recognized national and state parties.
- For splits in registered but unrecognised parties, the EC usually advises the warring factions to resolve their differences internally or to approach the court.

How does the EC decide?

- The ECI primarily ascertains the support enjoyed by a claimant within a political party in its organisational wing and in its legislative wing.
- For the Organisational Wing, the Commission examines the party's constitution and its list of office-bearers submitted when the party was united. ECI identifies the apex committee(s) in the organisation and finds out how many office-bearers, members or delegates support the rival claimants.
- For the Legislative Wing, the party goes by the number of MPs and MLAs in the rival camps. ECI may consider affidavits filed by these members to ascertain where they stand.

'Test on Majority':

- While passing its decision, ECI considered and analysed three tests mentioned in the Sadiq Ali V/s ECI case 1971, which includes the Test of Aims and Objects of the Party Constitution, Test of Party Constitution, and Test of Majority.
- Of these, ECI found the Test of Aims and Objects of the Party Constitution to be inapplicable.
- ECI also concluded that using the Test of Party Constitution for determining the present dispute case will be undemocratic and catalytic in spreading such practices across parties.
 - While applying the Test of Party Constitution, the EC said the amended Constitution of 2018 of Shiv Sena is not on record of the commission.
 - ECI observed that the party had been made into a fiefdom by the undemocratic norms of its original constitution.
 - Its 2018 Constitution has conferred widespread powers of making various organisational appointments on a single person.
- ECI hence, relied upon the Test of Majority in the legislative wing, which shows qualitative superiority in the majority test of the legislative party to the Shinde faction which has the support of 40 out of 55 Sena MLAs and 13 out of 18 Sena MPs.

What happens when there is no certainty?

- Where the party is either vertically divided or it is not possible to say with certainty which group has a majority, the EC may freeze the party's symbol and allow the groups to register themselves with new names or add prefixes or suffixes to the party's existing names.

What happens when rival factions reunite in future?

- If reunited, the claimants may approach the EC again and seek to be recognised as a unified party. The EC is also empowered to recognise mergers of groups into one entity. It may restore the symbol and name of the original party.

Political parties in India

- Political parties are voluntary associations or organised groups of individuals who share the same political views and who try to gain power via constitutional means and who desire to promote national interests.
- The political party plays an essential role in democracy.
- The Election Commission registers political parties for the purpose of elections and grants them recognition as national or state parties on the basis of their poll performance.
- A political party is defined as an association or body of individual citizens of India registered with the commission as a political party under section 29A of the People's Representation Act 1951.
- However, the original text of the Indian Constitution did not mention the term "Political Parties".
 - In 1985, the introduction of the Tenth Schedule through the 52nd Constitutional Amendment Act of 1985 introduced the term "Political Party" into the Constitution.

Nut Graf: Most of the political parties in India have failed to follow their own constitutional norms due to the centralised nature of their internal structures and organisations. This is said to be a key challenge for the functioning of a democracy and hence ECI has asked parties to strictly follow the ECI guidelines.

12. PM CARES Fund and PM's National Relief Fund

Prelims: About PM CARES Fund and PM's National Relief Fund

Context: PM CARES Fund administered like PM's National Relief Fund, Prime Minister's Office (PMO) in High Court

Details:

- The Prime Minister's Office (PMO) has told the Delhi High Court that the PM CARES Fund is administered in a similar pattern as that of the Prime Minister's National Relief Fund (PMNRF) as both are chaired by the Prime Minister.
- The PMO has held that the PM CARES Fund, which was created in 2020 in the wake of the COVID pandemic, cannot be considered a government fund as the donations to it do not flow into the Consolidated Fund of India.
- The PMO has further added that the PM CARES Fund has been created as a "Public Charitable Trust," and no third-party information can be parted with irrespective of its status.
- Petitions have been filed in the courts of India seeking to declare the PM CARES Fund a "State" under the Constitution and also to declare PM CARES as a "public authority" under the Right to Information (RTI) Act.

PM CARES Fund:

- Under the chairmanship of Prime Minister Narendra Modi, the Prime Minister's Citizen Assistance and Relief in Emergency Situation Fund was created on March 28th, 2020
- This Fund was established as a result of several demands from the public to assist the administration in the wake of the COVID-19 emergency.
- The PM CARES is a dedicated national fund created to combat contingencies like the COVID-19 pandemic in India.
- The Prime Minister of India is the ex-officio Chairman of the PM CARES Fund.
- Further, the Government of India, Minister of Defence, Minister of Home Affairs and the Minister of Finance are ex-officio Trustees of the PM CARES Fund.
- The Chairperson of the Board of Trustees i.e. the Prime Minister shall have the power to nominate 3 trustees to the Board of Trustees who shall be eminent persons in the field of research, science, health, social work, public administration law, and philanthropy. Any person appointed a Trustee shall act in a pro bono capacity.

Similarities between PMNRF and PM CARES Fund:

- Spending from both the PM CARES Fund and PMNRF does not require approval from Parliament.
- Donations to both PMNRF and PM CARES Fund will be exempted from Income Tax under Section 80G.
- Funds from both PM Cares and PMNRF cannot be utilised without the directions of the Prime Minister.
- M/S SARC Associates Chartered Accountants, New Delhi are the auditors of both PMNRF and PM CARES fund.
- Both PMNRF and PM CARES do not receive budgetary support.
- Both PMNRF and PM CARES are set up as trusts.
- Both PM CARES and PMNRF can receive foreign contributions. They are exempted from the Foreign Contribution Regulation Act (FCRA).
- Both PM CARES and PMNRF are not audited by the Comptroller and Auditor General (CAG).
- PMNRF does not come under the Right to Information (RTI). Recently, when information on the PM CARES fund was sought through RTI, the information was declined.

Major differences between PMNRF and PM CARES Fund:

PMNRF	PM CARES Fund
PMNRF was established in January 1948.	PM CARES Fund was established on 27th March 2020.
PMNRF was established by the first Prime Minister of India, Jawaharlal Nehru.	The PM CARES Fund was established by the current Prime Minister of India, Narendra Modi.
The initial purpose of establishing PMNRF was to help the people displaced due to the partition of India and Pakistan.	The PM CARES fund was established with the objective of helping people affected by COVID-19 pandemic.
Chairman of the Prime Minister National Relief Fund (PMNRF) is the Prime Minister of India. Other members are from Tata Trusts, representatives of FICCI, Congress President.	Chairman of the PM-CARES fund is the Prime Minister of India. The Prime Minister has the power to nominate members. The other members of the PM CARES Fund are the Defence Minister, Home Minister and Finance Minister.
The minimum amount one can donate in the PMNRF is Rs 100.	PM CARES Fund allows the option for Micro donation, one can donate as low as Rs 10.
PMNRF has been attached with all Centre and State-run hospitals and many private hospitals as well.	With respect to the PM CARES Fund there is no clarity on its network with hospitals.
PMNRF focuses on all kinds of natural disasters and calamities like Cyclones, Earthquakes, Floods, Tsunamis etc. The PMNRF funds are also utilised for acid attack victims, cancer treatments, kidney transplants etc.	PM CARES fund is at present exclusively used for COVID-19 purposes.
As per reports, there is low liquidity of only 15% in the PMNRF, which makes it difficult to utilise it in case of emergency. As per reports, bulk of the corpus is invested in State Development Loans, Fixed Deposits etc.	There are no reports of low liquidity in PM CARES Fund, hence there won't be constraints in using the funds.
PMNRF accepts only voluntary donations by institutions and individuals. Contributions flowing out of the balance sheets of the Public Sector Undertakings or from the budgetary sources of Government are not accepted.	In the modes of fund collection mechanisms of PM CARES, the words – “contributions flowing out of budgetary sources of government or from the balance sheets of the Public Sector Undertakings are not accepted” – has been dropped in the PM CARES Fund. In other words, the PM CARES Fund can receive contributions from Public Sector Undertakings. PM-CARES Fund consists entirely of voluntary contributions from individuals or organisations and does not get any budgetary support.

13. Section 126 of Representation of the People Act of 1951

Syllabus: Powers, functions and responsibilities of various Constitutional Bodies – Election Commission

Prelims: Election Commission (EC) and Section 126 of the Representation of the People Act

Context: The Election Commission (EC) has asked social media platform Twitter to take down a video post on Meghalaya's Deputy Chief Minister as its content was found to be in violation of the provisions of the Representation of the People Act of 1951.

Section 126 of the Representation of the People Act

- Section 126 of the Representation of the People Act (RP Act), 1951, inter-alia, prohibits election campaign activities through public meetings, processions, etc.
- Section 126 of the RP Act, 1951 deals with the prohibition of public meetings during a period of 48 hours ending with an hour fixed for the conclusion of the poll.
- According to **Section 126 (1)**:
 - **Section 126(1)(a):** No person shall hold, attend, or address any public meeting or procession in connection with an election.
 - **Section 126(1)(b):** No person shall display to the public any election matter by means of cinematograph, television or other similar means.

- **Section 126(1)(c):** No person shall propagate any election matter to the public in any polling area during the period of 48 hours ending with the hour fixed for the conclusion of the poll for any election in that polling area.
- **Section 126 (2)** of the RP Act provides the provisions for punishment with imprisonment up to two years or a fine, or with both for individuals who violate the provisions of Section 126 (1) of the RP Act.

14. Article 311

Syllabus: GS-2; Polity; Constitution of India — significant provisions

Prelims: Article 311

Context: A number of government employees were removed in Jammu and Kashmir under the special provisions of Article 311(2)(c) of the Constitution.

Article 311 of the Constitution:

- Article 311 of the Indian Constitution, mentions the provisions for the dismissal, removal or reduction in rank of persons employed in civil capacities under the Union or a State.
- **Article 311 (1):** No person who is a member of a civil service of the Union or an all-India service or a civil service of a State or holds a civil post under the Union or a State shall be dismissed or removed by an authority subordinate to that by which he was appointed.
- **Article 311 (2):** No civil servant shall be dismissed or removed or reduced in rank except after an enquiry in which s/he has been informed of the charges and given a reasonable opportunity of being heard in respect of those charges. Provided further that this clause shall not apply:
 - **Article 311 (2)(a):** where a person is dismissed or removed or reduced in rank on the ground of conduct which has led to his conviction on a criminal charge.
 - **Article 311 (2)(b):** where the authority empowered to dismiss or remove a person or to reduce him in rank is satisfied that for some reason, to be recorded by that authority in writing, it is not reasonably practicable to hold such inquiry; or
 - **Article 311 (2)(c):** where the President or the Governor, as the case may be, is satisfied that in the interest of the security of the State, it is not expedient to hold such inquiry.
- The special provisions of Article 311(2)(c) do not require any inquiry to be constituted against the accused and the Lieutenant Governor could approve the termination on the basis of reports prepared by the security agencies.

15. No bar on contesting two seats in one poll

- The Supreme Court recently refused to discard a provision in the election law that permits candidates to contest polls from two constituencies simultaneously by saying that it is an issue concerning political democracy and it is for the Parliament to decide.
- **Section 33(7)** of the Representation of the People Act (RP Act) permits an individual to contest a general election or a group of by-elections or biennial elections from two constituencies.
- A petition was filed by an advocate which sought to declare Section 33(7) of the RP Act invalid as it violated the one person, one vote, one candidate, one constituency dictum of democracy.
- The government in the past has objected to the petition and had said that the one-candidate-one-constituency restriction would require a legislative amendment but the current restriction on two constituencies was reasonable enough, and there was no need for any amendments at present.

ECONOMY

1. Budget that signals growth with stability

Syllabus: Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.

Mains: Brief analysis of Budget 2023-24

Context: Union Finance Minister Nirmala Sitharaman presented the Union Budget 2023-24 in Parliament on February 01.

Background:

- The Economic Survey 2022-23 has laid emphasis on India's remarkable broad-based recovery to reach the level of income that existed before the outbreak of the coronavirus pandemic.
- The pandemic was followed by the Russia-Ukraine conflict and the accompanying sanctions that have been imposed by the West on Russia, the slowdown and the recession in major economies and the rise in inflation leading to sharp increases in interest rates, followed by capital outflow and the pressure on the exchange rate.
- Even though the economy has staged a recovery and surpassed the pre-pandemic income level, it is still 7% below the pre-pandemic GDP trend.

Union Budget 2023-24

- This budget is termed as the “**first Budget in Amrit Kaal**” by the Union Finance Minister.
- **Vision for Amrit Kaal:** The government's vision for Amrit Kaal is to create a technology-driven and knowledge-based economy with strong public finances, and a robust financial sector.
- With an eye on “**India@100**”, the Budget proposals were aimed at actualising a technology-driven and knowledge-based economy with strong public finances, and a robust financial sector.
- The Union Finance Minister has listed seven key priorities which would complement each other and act as the “**Saptarishi**” guiding the government through the Amrit Kaal. They include:
 - Inclusive Development
 - Reaching the Last Mile
 - Infrastructure and Investment
 - Unleashing the Potential
 - Green Growth
 - Youth Power
 - Financial Sector

Growth and Fiscal Deficit Dilemma:

- The fiscal deficit ratio is to come down from 6.4% in FY23 to 5.9% in FY24, to achieve the fiscal deficit target of 4.5% of GDP by 2025-26. The fiscal deficit target assumes that the economy is on a relatively strong footing, with another year of healthy tax collections.
 - However, a third of the global economy is expected to slip into recession in the calendar year 2023, as per the International Monetary Fund which may affect manufacturing and other related sectors and impact revenue collections.
 - The fiscal deficit of ₹17.8 lakh crore is to be financed using short-term borrowings and the National Social Security Fund. Given the tight liquidity condition of the banking system, this will not exert pressure on the flow of funds.
- Inflation is beyond the upper tolerance limit and aggregate fiscal deficit (Centre and States) is in the range of 9% to 10% of GDP. Therefore, ensuring macroeconomic stability requires continued fiscal consolidation.
- Thus the government is faced with the dilemma of accelerating growth by increasing public investment while containing the fiscal deficit. With interest payments accounting for 40% of the net revenues of the Centre, there is hardly any room for complacency.
- Despite a significant increase in food and fertiliser subsidies of Rs. 2 lakh crore, the government has managed to keep its goal of the fiscal deficit in the current fiscal to a maximum of 6.4% of GDP mainly due to the increase in the nominal value of GDP and also the increase in tax collections.

A balancing act:

- Union Budget 2023-24 made a greater allocation to infrastructure spending, and the capital expenditure is budgeted to increase from 2.7% of GDP to 3.3% and considering that capital expenditure has a significant ‘crowding in’ effect, it should help to increase private capital expenditures as well.
 - This comes after the 25% increase in capital expenditures in the last budget.
 - This is also supplemented by the ₹79,000 crore on affordable housing on the revenue expenditure side.
 - But the constraint is demand, as reflected in capacity utilisation, which is still around 75%. Hence, capex needs to percolate down to higher disposable incomes and increase demand.
- The Reserve Bank of India has estimated the multiplier effect of capital expenditure at 1.2 which should help revive the sluggish investment climate.
- With deleveraged balance sheets and an increase in commercial lending by banks, the investment climate is expected to further improve and arrest the declining trend in the overall investment-GDP ratio in the country.

- In addition, the continued provision of an interest-free loan to States to supplement their capital expenditures should contribute to an increase in capital spending by States.
- Expenditure on the social sector does not register a quantum jump, though there is an increase in absolute terms with some new initiatives towards skilling in both education and health.

Compression in subsidies:

- Target to achieve fiscal adjustment by mainly containing revenue expenditure will improve the quality of public spending.
- The budgeted increase in revenue expenditures for 2023-24 is just 1.2% higher than the revised estimate for the current year as there is a significant compression in subsidies.
 - The fertiliser subsidy is expected to be reduced by ₹90,000 crore from ₹2.87 lakh crore to ₹1.87 lakh crore.
 - The fertiliser subsidy is expected to be compressed by ₹50,000 mainly as fertiliser prices have come down.
- In addition, allocation to centrally sponsored schemes is expected to decrease by about ₹20,000 crore, and the overall current transfer to States is kept constant at 3.3%-3.4% of GDP.
- The Budget has provided direct tax sops for individuals and MSMEs which may not translate into higher consumption as it is an indexation of the lower tax brackets with inflation, which has been high in the recent past.

Nut Graf: The Union Budget 2023-24 aims for inclusive development that ensures prosperity for all with a focus on infrastructure and investment that serves as a multiplier for growth and employment. It also promotes policies to enable green or environmentally sustainable growth, and the rationalisation of direct taxes while staying the course on fiscal consolidation.

2. Putting Budget 2023 into perspective

Syllabus: Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.

Prelims: Facts about Union Budget

Mains: Analysis of Union Budget 2023-24 and the trends in the Indian Economy

Context: The Union Finance Minister presented the Union Budget for FY 2023-24 on February 1, 2023.

Background

- The Economic Survey 2022-23 suggests that the Indian economy is expected to post a real GDP growth of 7% in 2022-23 and further expects both the retail as well as wholesale inflation rates to come below the 6% mark in the coming months.
- The Union Budget 2023-24 which was presented against this backdrop has assumed nominal GDP growth of 10.5% in 2023-24,
 - This implies that the government has assumed a projected inflation rate of just 4%, given the economic survey's baseline real GDP growth projection of 6.5%.
- Experts believe that these projections and assumptions made by the government indicate official optimism regarding the Indian economy and the Indian economy will experience a reduction in inflation coupled with high growth even at a time when the rest of the world is witnessing a slowdown and inflation.

Key highlights of Budget 2023-24 and analysis

- The Economic Survey had expected a new cycle of investment-led growth led by the private corporate sector, aided by increasing credit from the banks.
 - However, the Union Finance Minister, rather than relying upon such predictions, has announced a significant increase in capital expenditure (capex) in the Budget.
 - This increase in the capex aims to crowd in private investment, particularly in infrastructure sectors such as highways, railways, and power plants.
- Additionally, in the Budget 2023-24, allocations for subsidies extended on food, fertilisers, petroleum and on interest were reduced along with the reduction in the allocation of welfare schemes such as the MGNREGA.
 - This can lead to higher prices of cereals, LPG cylinders and fertilisers such as urea.
- Experts say that the overall impact of such expenditure switching can lead to inflation.

Longer-term assessment of the Union Budget

- It is important to compare the current government's fiscal strategy in the post-pandemic period with the fiscal strategy of the UPA-II and NDA-I governments in order to get a clear picture of the Indian economic situation.
- **Total Expenditure:**
 - The total expenditure (annual average) by the Union government had decreased from 15% of the GDP during the UPA-II (2009-10 to 2013-14) tenure to less than 13% during the NDA-I government's tenure (2014-15 to 2018-19).
 - However, the recessionary risks on account of the COVID-19 pandemic forced the government to increase their total expenditure significantly to 17.7% and 16% of the GDP in the years 2020-21 and 2021-22 respectively.
 - Since then, the total expenditure has declined slightly to about 15% of GDP, ie. 15.3% in 2022-23 and 14.9% in 2023-24.

- **Capital expenditure (Capex):** Capex has increased significantly since 2020-21.
 - I.e. 1.8% of GDP in the UPA-II era, 2.2% in 2020-21, 2.7% in 2022-23 and 3.3% in 2023-24.
- **Subsidies:** The overall trends in the spending on subsidies on food, fertiliser and petroleum have been reduced from 2021-22.
- **Defence expenditure:** Defence expenditure which was 2% and 1.6% of GDP under the tenure of UPA-II and NDA-I governments respectively had reduced to 1.5% of GDP in 2022-23.
- **Agriculture:** The total expenditure on agriculture has witnessed an increase during the NDA-II government's tenure and this is attributed to the allocation to the PM-Kisan cash transfer scheme.
- **Education:** Education expenditure in recent years has reduced compared to the UPA-II era.
- **Rural development and health:** Expenditure on health and rural development have remained almost at the same level between UPA-II and recent years.

Tax situation

- Experts point out that the current tax situation is the reason for the reductions in government spending on subsidies and welfare schemes.
- According to experts, the government has been forced to cut expenditure on subsidies and welfare schemes in order to increase capex on infrastructure and this is mainly because of inadequate revenues, which have continued to be the key challenges to public expenditure.
- **Gross Tax Revenues:** The gross tax revenues as a share of GDP posted a slight increase from 10.2% under the UPA-II tenure to 10.8% under the NDA-I government.
 - However, the percentage of gross tax revenues then declined to about 10% of the GDP during the first two years of the NDA-II government.
 - It was only in the post-pandemic period (since 2021-22) that the gross tax revenues crossed 11% of GDP.
- **Corporate Tax:** The share of corporate taxes in the GDP has declined as compared to the UPA-II era.
- **Income Tax:** The percentage of income taxes in the GDP has increased progressively to reach 3% of the GDP in 2022-23.
 - Further, the revenues from personal income taxes have also become equal to the revenues from corporate tax and this shows a trend of a **regressive taxation regime**.
 - This has forced the government to provide a few concessions to income taxpayers in the Budget 2023-24.
- **Indirect Tax:** The share of indirect taxes has also increased under the NDA tenure and it is also considered to be a regressive shift.
 - The percentage of **customs duties** has declined from 1.6% during the UPA-II to 0.8% in 2022-23
 - However, the share of excise duties has increased from 1.7% under the UPA-II (GST was not introduced) to 2% in 2020-21 and has remained over 1.2% in 2022-23, over and above the GST collections by the central government at over 3% of the GDP.
- According to the experts, the high share of income taxes in direct taxes and the increasing share of indirect taxes in GDP have led to an increase in income and consumption inequalities.

Trends in fiscal deficit and devolution of taxes to states

- **Fiscal Deficit:** The fiscal deficit had reduced from 5.4% of the GDP under the UPA-II government to 3.7% under the NDA-I, mainly due to expenditure compression.
 - However, in the NDA-II tenure (in 2019-20) the deflationary fiscal stance was reversed and the fiscal deficit peaked at 9.2% of the GDP in 2020-21 in the backdrop of the pandemic.
 - The government has set up a plan of fiscal consolidation and aims to cut down the deficit below 4.5% by 2025-26.
 - The fiscal deficit target for FY 2023-24 in the latest Budget is 5.9%.
- **Devolution of Taxes:** The States' share of taxes in the central divisible pool of taxes was raised from 2.8% of the GDP under the UPA-II to 3.7% of the GDP under the NDA-I because of the increased devolution formula recommended by the 14th Finance Commission.
 - However, the States' share in the central divisible pool of taxes under the NDA-II government has reduced to an annual average of 3.4% of the GDP.
 - The reduction is on account of the increasing incidence of cesses and surcharges imposed by the Union government. This has reduced the size of the divisible pool thereby reducing the tax revenues to the States.

Comparison with other G20 countries

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
General Government Expenditure (% of GDP)															
India	26.6	26.2	27.1	27.2	26.2	26.3	27.4	31.1	30.1	28.9	28.3	28.1	27.8	27.7	27.6
G-20 Emerging	30.4	30.6	31.8	32.1	31.7	31.9	32.5	34.8	32	32.6	31.9	32	31.8	31.8	31.7
General Government Revenue (% of GDP)															
India	19.6	19.1	19.9	20.1	20	20	19.9	18.3	20.2	19	19.2	19.6	19.9	20.1	20.4
G-20 Emerging	28.6	28.2	27.5	27.5	27.7	27.8	27.3	25.4	26.4	25.3	25.6	25.6	25.7	25.7	25.8
General Government Gross Debt (% of GDP)															
India	67.7	67.1	69	68.9	69.7	70.4	75.1	89.2	84.2	83.4	83.8	84.1	83.8	83.4	83
G-20 Emerging	38.5	40.9	44	48.8	51.4	53.1	55.9	66.4	67	69.4	74.2	78.2	81.6	84.5	86.8

Source: The Hindu

- The above table presents a comparison of the estimates and projections of India's public debt situation and fiscal balance with the average of other G-20 emerging economies.
- India's gross public debt peaked at 89% of the GDP in 2020 and has continued to decline.
 - However, the gross public debt of other G-20 emerging market economies has continued to increase and is expected to surpass India's gross public debt-to-GDP ratio by 2026.
- The analysis also reveals that despite India's revenue-to-GDP ratio being lower than that of other G-20 emerging economies, India's public debt-to-GDP ratio is expected to perform better than those countries' average and this is mainly because of a higher projected GDP growth of India.

Nut graf: Despite there being concerns regarding the trends in the welfare expenditure, gross tax revenues, devolution of taxes to states and the increase in the fiscal deficit of the country, the projected high GDP growth has ensured that the Indian economy would perform better than other G-20 emerging markets. However, if the projected GDP growth fails to materialise, the macroeconomic situation can become catastrophic.

3. Is Govt. on track on fiscal deficit targets?

Syllabus: Indian Economy and issues relating to planning and mobilization of resources

Mains: Achieving Fiscal Deficit target.

Prelims: Fiscal Deficit.

Details:

- The path of relative fiscal prudence is chosen by the government in the Union Budget for 2023-24.
- The Finance Minister Ms. Nirmala Sitharaman projected a decline in fiscal deficit from 6.4% in FY23 to 5.9% of gross domestic product (GDP) in FY24.
- It was further said during the budget speech that the government is planning to continue on the path of fiscal consolidation and reach a fiscal deficit below 4.5% by 2025-26.
- To finance the fiscal deficit in 2023-24 the net market borrowings from dated securities are estimated at around ₹11.8 lakh crore, and the balance financing is expected to come from small savings and other sources. The gross market borrowings are estimated at approximately ₹15.4 lakh crore.

Fiscal Deficit:

- The fiscal deficit is the difference between the government's total expenditure and its total receipts (excluding borrowing).
- Fiscal deficit is when a government's total expenditures exceed the revenue that it generates (excluding money from borrowings).
- Fiscal deficit serves as an indicator of how well the government is managing its finances.
- Fiscal Consolidation refers to the policies undertaken by governments (national and sub-national levels) to reduce their deficits and accumulation of debt stock.

Statistical Details:

- The fiscal deficit to GDP is pegged at 5.9% in FY24 in Union Budget 2023-24. This has reduced from 6.4% in 2022-23 (revised estimate) and 6.7% in 2021-22 (actual).
- **Revenue Budget:**
 - As per the Revised Estimate(RE) of 2022-23 the deficit was 4.1% of GDP.
 - Primary Deficit (Fiscal Deficit *minus* Interest payments) was 3% of GDP in 2022-23 (RE).
 - The revenue deficit is 2.9% of GDP in the Union Budget 2023-24. Moreover, the primary deficit is pegged at 2.3% of GDP.
- **Statistics associated with subsidies:**

	2022-23 Budget Estimate (BE)	2022-23 Revised Estimate (RE)	2023-24 Budget Estimate (BE)
Food Subsidy	₹2,06,831 crore	₹2,87,194 crore	₹1,97,350 crore
Fertilizers Subsidy	₹1,05,222 crore	₹2,25,220 crore	₹1,75,100 crore
Petroleum Subsidy		₹9,171 crore	₹2,257 crore

Way Ahead for Growth:

- It should be noted that the interest rate management by the Reserve Bank of India (RBI) is not enough to deal with the inflation, specifically due to supply-side shocks.
- Therefore coordination of both fiscal and monetary policy is crucial for a sustained growth recovery process.
- It should be noted that the high-interest rate regime by the RBI can hurt economic growth. Thus, the fiscal policy should adopt an accommodative stance by focussing on gross capital formation with increased capital spending, particularly infrastructure investment.
- The Budget 2023-24 has proposed to raise the capital expenditure by 3.3% of GDP. The interest-free loan of ₹1.3 lakh crore for 50 years to States would aid in boosting growth.
- The infrastructure investment has a larger multiplier effect on economic growth and employment.

Fiscal Consolidation:

- Indian Government has not deviated from the path of fiscal consolidation.
- The medium-term fiscal consolidation framework of the Budget 2023-24 states that it is important to reduce the fiscal deficit-GDP ratio to 4.5% by 2025-26 (from 6.4% currently).
- The Government of India has kept the fiscal policy “accommodative”, and has adopted capital spending to support economic growth recovery in the current scenario of revenue uncertainties (due to the pandemic, geopolitical risks, supply chain disruptions, energy price volatility, and increasing inflation).
- Notably, the primary mode of financing fiscal deficit in India is through internal market borrowings. It is also financed through securities against small savings, provident funds, and external debt.
- The Union Budget 2023 has pegged India’s external debt at ₹22,118 crore of the total fiscal deficit of ₹17,86,816 crore in 2023-24 (BE) (around 1%).
- It is also stated in the Budget that the States will have to maintain a fiscal deficit of 3.5% of GSDP of which 0.5% will be tied to power sector reforms.

Years	Budget estimates	Actual
2017-18	3.2	3.5
2018-19	3.3	3.4
2019-20	3.3	4.6
2020-21	3.5	9.2
2021-22	6.8	6.7
2022-23	6.4	-
2023-24	5.9	-

Figure: Fiscal Deficit (as a percent of GDP)
Source: The Hindu

Rating Agencies Response:

- According to Moody’s, leveraging buoyant revenues, the Indian government aims to significantly increase infrastructure investment, while cutting personal income taxes, and providing capital support for the oil sector.
- It further said that these steps are credit positive for renewable energy companies, oil marketing companies, cement and steel producers, and automobile manufacturers.
- However, Moody’s added that it is unlikely to narrow down the fiscal deficit to 4.5% of GDP by FY26.
- Fitch Ratings stated that the slow fiscal consolidation process due to the COVID-19 pandemic could leave public finances exposed in case of a further major economic shock.

Conclusion:

The government is stressing economic growth recovery through capex. The economic growth in turn would strengthen GDP. Moreover, if the denominator (GDP) expands in the fiscal deficit-GDP ratio, it will reduce the overall fiscal deficit-GDP ratio.

Nut Graf: The Budget 2023-24 has proposed to increase capital expenditure and boost economic growth. The government has thus adopted a fiscal consolidation approach to reach the fiscal deficit target of 4.5% by 2025-26.

4. The status and proceeds of disinvestment

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

Prelims: About Disinvestment, Department of Investment and Public Asset Management (DIPAM) and initial public offering (IPO)

Mains: Disinvestment – different forms, significance, associated concerns and the recent trend

Context: With the Union Budget 2023-24 the government has set a disinvestment target of ₹51,000 crores.

Background

- The disinvestment target in the Union Budget 2023-24 has declined by close to 21% from the budget estimate for the FY 2022-23 and only about ₹1,000 crores more than the revised estimate.
- The disinvestment target in the Union Budget 2023-24 is also the lowest target in about seven years.
- Furthermore, the government has also not met the disinvestment target for 2022-23.
 - To date, the government has realised ₹31,106 crores out of which ₹20,516 crores (33.33% of the budgeted estimate) have come from the initial public offering (IPO) of 3.5% of the government's shares in the Life Insurance Corporation (LIC).

Disinvestment

- Disinvestment or divestment refers to the selling of the assets or a subsidiary such as a Central or State public sector enterprise by the government.
- There are three key approaches to disinvestment which include:
 - **Minority disinvestment:** The government despite restoring to disinvestment still retains majority shares in the company usually greater than 51%.
 - With respect to minority disinvestment, the government still holds management control.
 - **Majority disinvestment:** In the case of majority disinvestment, the government transfers the control to the acquiring entity and retains only some stake.
 - **Complete privatisation:** With respect to complete privatisation, 100% of the control of a public entity is transferred to the acquiring entity.
- The **Department of Investment and Public Asset Management (DIPAM)** is a separate department working under the Union Finance Ministry which looks after disinvestment-related procedures.

Department of Investment and Public Asset Management (DIPAM)

- The earlier Department of Disinvestment was renamed as the Department of Investment and Public Asset Management (DIPAM).
 - The Department of Disinvestment was established as a separate Department in 1999 and was later renamed as the Ministry of Disinvestment in 2001.
 - However, since 27th May, 2004, the Department of Disinvestment worked as one of the Departments under the Ministry of Finance.
 - The renaming and restructuring of the Department as DIPAM was announced by the Finance Minister during the Budget speech of 2016-17.
- DIPAM works as one of the Departments under the Ministry of Finance, Government of India.
- DIPAM deals with all matters relating to management of the Union Government investments in equity including disinvestment of equity in Central Public Sector Undertakings (CPSUs).
- The four key areas of DIPAM includes Strategic Disinvestment, Minority Stake Sales, Asset Monetisation and Capital Restructuring.
- **Key functions:**
 - Advise the government in matters of financial restructuring of CPSUs.
 - Attracting investment through capital markets.
 - Addressing issues such as capital restructuring, dividend, bonus shares, etc.

Significance of disinvestment

- Disinvestment can help reduce the fiscal burden on the government and can also compensate for the revenue shortfall in a particular year.
- The disinvestment proceeds are also used to finance the fiscal deficit.
- Disinvestment also encourages private ownership of assets and trading in the open market.
- Successful disinvestments also ensure that the government need not bear the costs of the loss-making entities anymore.
- The proceeds from disinvestments can also be used to invest back in the economy, fund social sector and developmental programmes, and pay the government debt.

Trends in disinvestment in India

- As soon as the NDA government assumed power in 2014, a push for disinvestment was expected as the government had announced, “no business to be in business”.
- Since 2014, the NDA government has met its disinvestment targets twice.
 - It is to be noted that various governments over the past 30 years have been able to meet annual disinvestment targets only six times in India.
 - In 2017-18, the government earned disinvestment receipts of over ₹1 lakh crores as compared to the set target of ₹72,500 crores
 - Further in 2018-19, the government earned ₹94,700 crores as compared to the set target of ₹80,000 crores through disinvestment.
- However, PRS Legislative Research has highlighted the instances in recent years wherein the government disinvested over 51% of its shares in certain Central Public Sector Enterprises (CPSEs), along with a transfer of management control which was sold to another public sector enterprise.
 - For instance, when the government exceeded its target in 2017-18, about ₹36,915 crores were earned by selling Hindustan Petroleum Corporation Limited (HPCL) to the state-owned Oil and Natural Gas Corporation (ONGC).
 - Similarly, in 2018-19, the government raised ₹14,500 crores by selling REC Limited to Power Finance Corporation Limited which is another state-owned entity.
- In 2021-22, despite the disinvestment of Air India which was handed over to the Tata group, the Centre missed its target of ₹1.75 lakh crores by a significant margin, raising only about ₹13,534 crores through disinvestment proceeds.
- Additionally, even in FY 2022-23, about 33.33% of the budget estimate has been realised through the delayed LIC IPO, which should have taken place in the previous year if not for market volatility.
 - The government has only realised ₹31,106 crores through disinvestment proceeds to date and with less than two months remaining in the current fiscal, the government is likely to miss its target.
- **Recent trends in disinvestment:**
 - Disinvestment of the 52.8% stake in Bharat Petroleum (BPCL) was also deferred in mid-2022 as most of the bidders withdrew.
 - The strategic sale of Central Electronics was also called off because of the lapses in the bidding process.
 - The disinvestment of Pawan Hans has also been deferred.
 - The selling of Neelachal Ispat Nigam Ltd. (NINL) to a steel entity of the Tata group did not translate into any sale proceeds to the government's exchequer as it held no equity in the company.

Path ahead

- As per the new disinvestment policy announced in 2021, the government intends to maintain a minimum presence in strategic sectors such as atomic energy, defence, etc., and exit the non-strategic sectors.
- Officials of DIPAM have also said that the government has decided to stick to the already-announced and planned privatisation of state-owned companies.
- However, the government is not expected to add any new companies to the list of Central Public Sector Enterprises (CPSEs) which would be divested in 2023-24.
- Further, the aspirational divestments of two public sector banks and one general insurance firm which were announced in the Budget 2021, might also not be a part of disinvestment plans.

Nut graf: *There has been an increasing trend with respect to the dependence of the government on disinvestment proceeds to bridge the gap in the Budget. However, critics opine that disinvestments should be driven mainly by the long-term vision of the government and not by the need to raise immediate revenues to compensate for the deficit.*

5. India must avoid growing into a dystopia

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

Mains: Consequences of India's Economic Growth

Context: This article discusses the growth of the Indian economy and its consequences.

Introduction:

- The Indian economy in 2023 is predicted to be hopeful yet challenging. The World Bank has predicted economic growth at 6.6% in FY24. Hence India's march to become the third-largest economy by 2047 seems to be on track.
- As per the 2023 Economic Survey, the economy is expected to grow at 7% in real terms for 2022-23.
- Merchandise exports stood at US\$ 332.8 bn for April-December 2022. This was a growth of 16% from 2021.
- India is the 7th largest service exporter in the world.
- The share of exports of goods and services as a percent of GDP in the first half of 2022-23 has been the highest since 2016.
- The optimistic growth forecasts stem from a number of positives like the rebound of private consumption giving a boost to production activity, higher Capital Expenditure, near-universal vaccination coverage enabling, strengthening of the balance sheets of the corporates, well-capitalised public sector banks and the credit growth to the Micro, Small, and Medium Enterprises (MSME) sector.

- India is now the 5th largest world economy – leaving behind the UK.
- The Centre for Economics and Business Research (CEBR) predicted that by 2035, India's economy would reach \$10 trillion and become the world's third-largest by 2037.

The West's self-interest in India:

- India remains a key player in the Indo-Pacific in terms of foreign and economic policy.
- India has a large and growing labour force to emerge as one of the future alternative suppliers of manufacturing goods, reducing the world's reliance on China.
- India has rapidly rising energy needs and thus has to be part of any realistic solution to the global climate challenge.
- India, as the world's most populous democracy in the heart of the rising Indo-Pacific region acts as a critical stabilising actor in an increasingly fragile geopolitical system.
- Western countries see a democracy-democracy partnership for the future with India's economic growth.
- If India grows into a \$10 trillion economy in 15 years, they also see India as a great market for their products and an investment destination.
- In view of the rise of China, common strategic interests between India and the West are also expected to generate new initiatives in areas such as connectivity, digitalisation, transportation and the maritime economy, which will further deepen cooperation.
- The technology transfer afforded by western countries to India will make an important contribution to the country's economic recovery in the aftermath of the Coronavirus pandemic.

Implications of Growth in India's Economy:

On Employment:

- The growth of the national economy has not generated equal growth in employment.
- India's experience of the past decade suggests that India's economy could grow without generating sufficient employment for unemployed youth, especially in rural areas.
- Government data show that in mid-2022, unemployment among urban males was much higher than it was a decade ago.
- Data from the private sector, namely Centre for Monitoring Indian Economy Pvt. Ltd., show that the number of people employed in December 2022 was less than it was in 2016.
- One of the biggest challenges facing India today and preventing the movement towards a higher per capita GDP – is the country's big informal workforce.
 - Across this informal workforce, 550 million are below the threshold of our average per capita GDP.
- Without formal employment, the workforce does not get social security benefits like maternity leaves, ESIC, EPFO and other similar social security benefits.

On Ecology:

- The environmental impact of economic growth includes the increased consumption of non-renewable resources, higher levels of pollution, global warming and the potential loss of environmental habitats.
- Rampant destruction of natural habitats, especially due to mining and infrastructure development, continued expansion and intensification of agriculture and animal husbandry.
- Deforestation resulting from economic development damages soil and makes areas more prone to drought.
- Unrestrained consumption has disrupted nature, and increased contact between wildlife, livestock, pathogens and people, setting the stage for pandemics to take hold of our lives.
- Overcrowding and uncontrolled construction, particularly in the Himalayan states have created problems of sewage and solid waste disposal as well as increased energy consumption.
 - These States have recently witnessed landslides and flooding, causing great suffering to their people.

Road Ahead:

- For the mass of the unemployed, concentrated in agriculture, employment opportunities will arise only when there is demand for goods in the production of which they can participate.
 - Increased demand for goods of mass consumption will lead to an expansion in the demand for workers.
 - The rise in food prices must be tackled in order for this demand to increase since only then would low-income households have the money to purchase more manufactured items.
- Currently, India does not have an employment policy, either at the Centre or in the States. Concerted policy focus can create the conditions for employment generation in India.
- Policymakers shall focus on the distribution of wealth across the population, especially through the formalisation of employment.
- Governments must work on policies to make sure that economic growth will generate the social and physical infrastructure necessary for a good life.

Nut Graf: India is projected to become the third-largest economic superpower by 2037 and a \$ 10 trillion economy by 2035. Policymakers must seek to drive this economic growth to reduce economic inequality and avoid ecological insecurity with creative economic management of the growth process.

6. Vostro accounts and how they facilitate trade

Syllabus: Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.

Prelims: About Vostro account and Nostro account

Mains: Special Rupee Vostro Accounts (SRVA) arrangement between India and Russia

Context: About 20 Russian banks such as Centro Credit Bank, Credit Bank of Moscow, Rosbank, and Tinkoff Bank have opened Special Rupee Vostro Accounts (SRVA) with partner banks in India.

What is the Background?

- In July 2022, the RBI unveiled a mechanism to settle international transactions in rupee to promote global trade growth, with an emphasis on Indian exports, as well as to promote the rupee as an international currency.
- It is also expected to allow trade with sanctioned countries like Russia.
- Banks from partner countries can approach authorised dealer banks in India to open special rupee Vostro accounts, according to the mechanism finalised by the RBI. The authorised dealer bank must then seek central bank approval for the details of such an arrangement.

Special Rupee Vostro Accounts (SRVA) arrangement

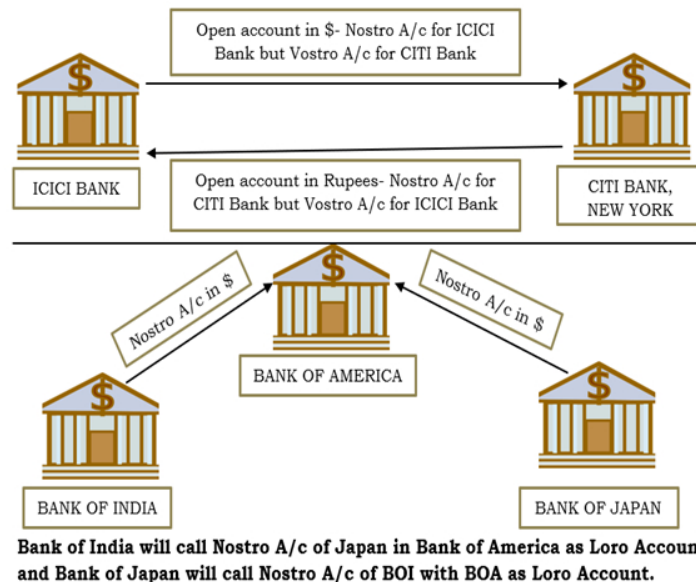
- A Vostro account refers to an account that a domestic bank holds for a foreign bank in the domestic bank's currency.
- Such accounts are used by domestic banks to facilitate international banking services to their clients with global banking requirements.
- Vostro accounts arrangement is an offshoot of correspondent banking that helps the banks to provide wire transfers, conduct business transactions, accept deposits and gather documents on behalf of the other bank.
- This arrangement further aids domestic banks to gain broader access to foreign financial markets and serve international clients without the need for being physically present in their home countries.
- The Special Rupee Vostro Accounts or the SRVA arrangement is an additional arrangement that facilitates the establishment of a complementary system by using freely convertible currencies.

Nostro account

- A Nostro Account refers to a bank account that a bank holds in a foreign currency.
- A bank, through a Nostro Account, holds the currency of the country where the funds are held. i.e Nostro accounts are denominated in foreign currencies.
- Nostro Accounts are generally used to simplify foreign exchange and trade transactions between countries.
- The word "Nostro" is derived from the Latin word that means "ours".

Vostro account

- The word "Vostro" is derived from the Latin word that means "yours".
- A Vostro account refers to an account that a correspondent bank holds on behalf of another bank.
- Vostro account helps to enable a foreign correspondent bank to act as an agent or an intermediary for a domestic bank.
- Services provided by a Vostro account include wire transfers, withdrawals, and deposits for customers in countries where the domestic bank does not have a physical presence.

Example:**Source: FINANCE CRACKER**

- If an Indian bank maintains an account in the US with dollars, such an account, maintained in a foreign currency at a foreign centre is called **Nostro Account** for that concerned Indian bank.
- The American bank which is holding dollars from the concerned Indian bank will refer to the same account as a **Vostro Account**.

Functioning of the SRVA arrangement

- The SRVA framework mainly involves three important components which are invoicing, exchange rate and settlement.
 - **Invoicing** requires all exports and imports to be denominated and invoiced in Indian Rupees.
 - The **exchange rate** between the two currencies of the partner countries will be market-determined.
 - The **final settlement** also takes place in Indian Rupees.
- To facilitate the SRVA arrangement, the authorised domestic banks are mandated to open SRVA accounts for the correspondent banks of the partner country.
- Further, domestic importers are required to make payments in Indian Rupees into the SRVA account of the correspondent bank against the invoices for the supply of goods or services from overseas suppliers.
 - Likewise, the domestic exporters must be paid for their exports in Indian Rupees from the balances in the designated account of the correspondent bank of the partner country.
- The reporting of all such cross-border transactions must be done in accordance with the existing guidelines under the Foreign Exchange Management Act (FEMA), 1999.

Eligibility criteria for banks

- Banks from the partner trading countries would approach an authorised domestic bank for opening the SRVA.
 - The domestic bank is then required to seek approval from the Reserve Bank of India (RBI) which is the apex banking regulator in India.
- It is to be noted that, it is the responsibility of the domestic banks to ensure that the correspondent bank is not from a country listed under the updated Financial Action Task Force (FATF) Public Statement on High Risk & Non-Co-operative jurisdictions.
- Furthermore, domestic banks should also put forth for perusal, financial parameters pertaining to the corresponding bank.
- Authorised banks are free to open multiple SRV accounts for different banks from the same country and the balances in the account can be recovered in freely convertible currency or the currency of the partner country depending on the transactions for which the account was credited.

What is the Purpose of the Arrangement?

- **Reduced Forex Demand:** According to the Economic Survey (2022-23), the framework could significantly reduce "net demand for foreign exchange, for the settlement of current account related trade flows."
- It will prevent the rupee from falling further as demand for forex falls.
- **Reduced Vulnerability to External Shocks:** Reducing the country's reliance on foreign currencies would make it less vulnerable to external shocks.
- **Rupee as an International Currency:** Once the rupee settlement mechanism gains traction, it will promote the rupee as an international currency in the long run.
- The US dollar accounts for 88% of all trades, according to the Bureau for International (BIS) Settlements' Triennial Central Bank Survey 2022. The INR accounted for 1.6% of the total.

- **Trade with Sanctioned Countries:** Since sanctions were imposed on Russia, trade with the country has been virtually halted due to payment issues.
- We are seeing a reduction in payment issues with Russia as a result of the RBI's trade facilitation mechanism.

Nut graf: At a time when various countries are showing interest in the Indian Rupee trade mechanism as they are facing foreign exchange problems with the US Dollar and Euro, opening up special vostro accounts with such partner countries will facilitate cross-border trade in the Indian currency which not just helps in narrowing down India's trade deficit but also popularise Indian Rupee.

7. UPI and PayNow Integration

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


Mains: Advantages of UPI over other cashless transaction methods

Context: Recently, India's Unified Payments Interface (UPI) and Singapore's PayNow have been integrated.

Key Details:

HOW S'PORE-INDIA UPI WORKS

Indian residents can transfer to and from Singapore residents using UPI with the platform's integration with PayNow. Similarly, users of PayNow in Singapore can transfer funds from India. Such partnerships are likely to be extended to other countries as well. Here's how these global UPI payments will work...

<p>1 For what purposes can the remittances be sent or received? Currently, only person-to-person (P2P) remittances for "maintenance of relatives abroad" & "gift" are allowed</p> <p>2 Who can send and receive transactions? Accountholders of ICICI Bank, Indian Bank, Indian Overseas Bank and SBI can send and receive funds. Axis and DBS customers can receive funds</p> <p>3 Which platforms or apps can be used? Customers can use Axis Pay, Digibank, ICICI iMobile, IndOasis, BHIM IOB Pay and BHIM SBI Pay apps. One can also send money through</p>	<p>net banking in ICICI Bank and IOB, while Indian Bank and SBI have integrated UPI remittances on their apps too</p> <p>4 Which are the participating entities in Singapore? DBS Bank and Liquid group customers can receive funds using their mobile number</p> 	<p>5 Will third-party UPI apps work for remittances? Just the UPI ID registered with the bank where the account is held can be used. Participating banks will be rolling out an update in their respective UPI apps in a phased manner, and customers will have to update their UPI app to enable the global remittances feature</p> <p>6 What is the current transaction limit? There is a daily transaction limit of Rs 60,000 (around 1,000 Singapore dollars) currently for undertaking cross-border remittance transactions through the UPI-PayNow linkage</p>
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Source: The Times of India

- India's Unified Payments Interface (UPI) and Singapore's PayNow have been officially connected which facilitates a "real-time payment linkage".
- Singapore became the first country with which India has launched cross-border Person to Person (P2P) payment facilities.
- This sort of payment linkage is expected to ease financial transactions for the Indian diaspora, especially the migrant workers or students and also extend the benefits of digitalisation and fintech to the common man in the form of low-cost money transfers between Singapore and India.

What are UPI and PayNow?

- UPI, or Unified Payments Interface, is a real-time payment system that helps in instant and quick transfer of funds between two bank accounts as the transfer of funds is done through a single mobile application.
 - The UPI was launched in 2016.
 - It also powers multiple bank accounts into a single mobile application.
 - The idea of UPI was developed by the National Payments Corporation of India (NPCI) and is controlled by the Reserve Bank of India (RBI).
 - UPI is based on the Two Factor Authentication with a seamless single click payment. This feature of UPI is aligned with the regulatory guidelines that make it the safest.
 - **Key benefits of the interface include:**
 - Immediate money transfer round the clock
 - Single mobile application for accessing different bank accounts
 - QR Code mode of transfer makes it swift and safe
 - Eliminates the need to visit an ATM multiple times.
 - Merchant Payment with Single Application
 - India's UPI is one of the most successful electronic payment systems globally.

- PayNow is a fast payment system accessible to retail customers through participating banks and Non-Bank Financial Institutions (NFI) in Singapore.
 - It enables peer-to-peer funds transfer service, allowing users to receive and send instant funds from an e-wallet or one bank account to another in Singapore using just their Foreign Identification Number (FIN) or Singapore National Registration Identity Card (NRIC) or mobile number.

Mechanism of the scheme:

- In India, the State Bank of India, Indian Overseas Bank, Indian Bank, and ICICI Bank will provide both inward and outward remittances, whereas Axis Bank and DBS India will facilitate only inward remittances.
- In Singapore, DBS-Singapore and Liquid Group will provide similar services to users in Singapore.
- Account holders of listed banks can transfer funds to and from India using their UPI ID, mobile number, or Virtual Payment Address (VPA).
- Initially, Indian users can remit up to ₹60,000 (equal to \$1000(Singapore)) per day through a mobile application or internet banking facilities.
- Currently, only UPI IDs registered with the bank where an account is held can be used to receive remittances in accounts of participating banks.
- It should be noted that the P2P remittances between the two countries are allowed only for purposes like “maintenance of relatives abroad” and “gifts”.

Significance of the UPI-PayNow Linkage

- The linkage will benefit the Indian diaspora in Singapore, particularly migrant workers and students, by enabling them to transfer money between Singapore and India instantly and at a low cost.
 - There are around 3.5 lakh people of Indian origin residing in Singapore which is about 9% of its population.
- The integration of UPI and PayNow will allow users of each payment system to instantly and affordably transfer funds on a reciprocal basis without requiring registration with the other payment system.
- According to the RBI Remittance Survey 2021, Singapore accounted for 5.7% of the total inward remittances to India in 2020-21.
 - The integration of the system will bring down the cost of sending remittances by about 10%.
- Cross-border retail payments are generally less transparent and more expensive than domestic transactions.
- The UPI-PayNow linkage closely aligns with the G20's financial inclusion priorities of driving faster, cheaper and more transparent cross-border payments.

Nut Graf: The UPI-PayNow link would strengthen the relationship between India and Singapore and would benefit the citizens of both countries. It is one of the many efforts to promote the UPI-based payment ecosystem.

8. Stock Market Regulation in India

Syllabus: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Prelims: About Securities and Exchange Board of India (SEBI)

Mains: Role of SEBI in promoting investor protection and market integrity.

Context: The Supreme Court asks SEBI to submit a note detailing the legal and factual aspects of the existing regulatory framework for the securities market.

Introduction:

- On February 10, the Supreme Court asked the Securities and Exchange Board of India (SEBI) and the government to produce the existing regulatory framework in place to protect investors from share market volatility.
- Indian investors have reported to have lost several lakhs of crores in two weeks after the U.S.-based short-seller firm Hindenburg Research published a report, which led to sudden market volatility following a meltdown in the Adani Group shares.
 - Hindenburg Research report accused the Adani Group of stock market manipulation and accounting fraud.
- The court also allowed the SEBI to give a “threadbare analysis” of its powers and even suggest whether it needed to grow more teeth to deal with the “new world” of seamless capital movement.
- The court also opined the Union government could even consider constituting an expert committee of domain experts in banking and securities along with a former judge to act as a “wise guiding force”.

Securities and Exchange Board of India (SEBI)

- The Securities and Exchange Board of India owned by the Government of India was established on 12th April 1992 under the Securities and Exchange Board of India Act, 1992.
 - SEBI was first established as a non-statutory body in 1988.
- SEBI aims to protect the interests of the investors in securities along with promoting and regulating the securities market.
- SEBI works under overall administrative supervision of the Union Finance Ministry and is accountable to the Parliament.
- Headquarters: Mumbai
- Regional offices: Ahmedabad, Chennai, Delhi and Kolkata

What are the laws governing the market?

- The securities market in India is regulated by four key laws:
 - **The Companies Act, 2013**
 - **The Securities and Exchange Board of India Act, 1992 (SEBI Act)**
 - **The Securities Contracts (Regulation) Act, 1956 (SCRA) and**
 - **The Depositories Act, 1996.**
- The SEBI Act empowers SEBI to protect the interests of investors and to promote the development of the capital/securities market, besides regulating it.
- SEBI was given the power to register intermediaries like stock brokers, merchant bankers, portfolio managers and regulate their functioning by prescribing eligibility criteria, conditions to carry on activities and periodic inspections.
- It also has the power to impose penalties such as monetary penalties, including suspending or cancelling the registration.
- The SCRA empowers SEBI to recognise (and derecognise) stock exchanges, prescribe rules and bye laws for their functioning, and regulate trading, clearing and settlement on stock exchanges.
- The Depositories Act introduced and legitimised the concept of dematerialised securities being held in an electronic form.
 - Today almost all the listed securities are held in dematerialised form.
- The depository regulations empower SEBI to regulate functioning of depositories and depository participants by prescribing eligibility conditions, periodic inspections and powers to impose penalties including suspending or cancelling the registration as well as monetary penalties.

Guidelines on fund-raising:

- The Companies Act has delegated the authority to enforce some of its provisions to SEBI, including the regulation of raising capital, corporate governance norms such as periodic disclosures, board composition, oversight management and resolution of investor grievances.
- In order to regulate fund-raising activities, SEBI has issued **Capital and Disclosure Requirement Regulations**.
- SEBI notified the **Listing Obligations and Disclosure Requirements Regulations in 2015** to ensure that listed companies followed corporate governance norms.
- The Collective Investment Regulations define a CIS (collective investment scheme) and provide for penal actions against those running unregistered CIS schemes.
- Entities involved in fund-raising through issues of capital such as merchant bankers are also regulated through specific regulations.

Regulation of stock exchanges:

- The SCRA has empowered SEBI to recognise and regulate stock exchanges and commodity exchanges in India; this was earlier done by the Union government.
- The rules and regulations made by SEBI under the SCRA relate to listing of securities like equity shares, the functioning of stock exchanges including control over their management and administration.
 - These include powers to determine the manner in which a settlement is done on stock exchanges and recognising and regulating clearing corporations, which are central to the management of the trading system.
- The act also has the provision for arbitrating disputes that arise between stock brokers and investors.
- The Act also seeks to protect the interests of investors by creating an Investor Protection Fund for each stock exchange.

Safeguards against fraud:

- SEBI notified the **Prohibition of Fraudulent and Unfair Trade Practices Regulations in 1995** and the **Prohibition of Insider Trading Regulations in 1992** to address market manipulation and insider trading.
- SEBI has been given powers of a civil court to summon persons, seize documents and records, attach bank accounts and property and to carry out investigations.
- SEBI has notified the **Substantial Acquisition of Shares and Takeovers Regulations** to ensure that acquisitions and change of management are done only after giving an opportunity to public shareholders to exit the company if they want to.
- SEBI ensures protection of investors' interests by regulating the listing and trading of equity shares and other securities, and by registering and regulating institutions handling public funds.

- Appeals against orders of SEBI and the stock exchanges can be made to the Securities Appellate Tribunal (SAT) comprising three members. Appeals from the SAT can be made to the Supreme Court.

Nut Graf: Financial Fraud undermines regulation and prevents a market from being fair and transparent. The Union government and SEBI have formed numerous laws and regulations to reflect the evolution and development of the capital market in India.

9. Following Public Offering (FPO)

Syllabus: Indian Economy and issues relating to planning, mobilization of resources

Prelims: Follow-on Public Offering (FPO)

Context: Adani Enterprises recently cancelled its Rs 20,000 crore Follow-on Public Offer.

- It came after the firm's stock dropped after Hindenburg Research, a US short-seller, accused it of accounting fraud.

What is a Follow-on Public Offering (FPO)?

- A Follow-on Public Offering (FPO) is the issuance of shares to investors by a publicly traded company.
- FPOs are also referred to as secondary offerings.
- An FPO may be used by a company to reduce debt or raise additional capital for expansion.
- They usually happen after a company has completed an initial public offering (IPO) to make its shares available to the general public.

Types of FPO'S

- **Dilutive FPO:**
 - This is the process by which the company issues new shares to the public in order to raise capital.
 - It increases the company's total outstanding shares while decreasing earnings per share (EPS).
- **Non-Dilutive FPO:**
 - When the company's largest shareholders, such as the founders or board of directors, offer the shares they hold privately to the general public, this is referred to as a non-diluted FPO.
 - Unlike a diluted IPO, this method does not increase or decrease the number of shares issued by the company.

FPO vs IPO:

- An IPO is a company's first issuance of shares, whereas an FPO is a company's issuance of shares to raise additional capital after its IPO.
- **Price:** In an IPO, the price is either fixed or variable as a range, whereas in an FPO, the price is market-driven and dependent on the number of shares as they increase or decrease.
- **Issuance:** The process of executing an FPO is similar to that of an IPO.
- However, when compared to an IPO, the **FPO process is less expensive.**
- **Risk factor:** When compared to FPO, the risks associated with investing in an IPO are significantly higher.

10. Short selling

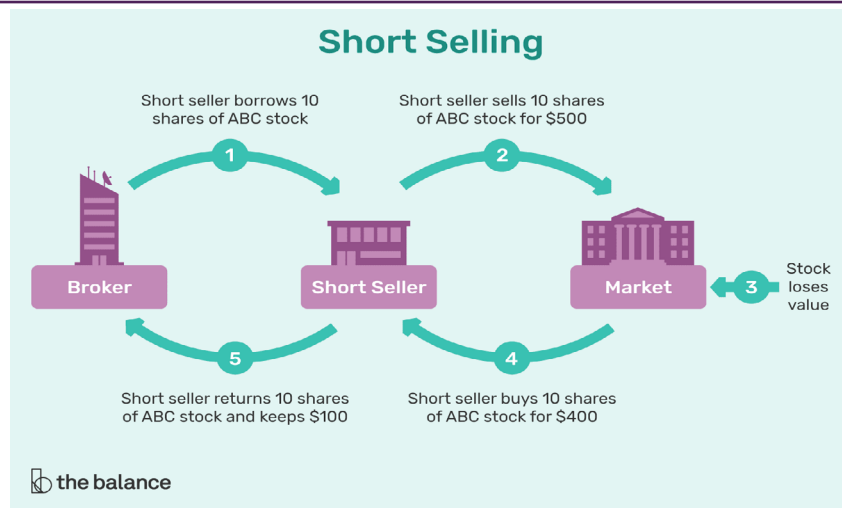
Syllabus: Indian Economy and issues relating to planning, mobilization of resources

Prelims: About Short selling in trade market

Context: Recently, short seller **Hindenburg Research** has disclosed short positions in **Adani** Group, alleging stock manipulation and accounting fraud in its latest investigative report.

About Short selling:

- **Long position - "Buy low, sell high"** is the traditional investment strategy in which one buys a stock at a particular price and then sells it when the price is higher, thereby booking a profit. It is called a long position and it is done in the belief that the price of the stock or security will grow in some time.
- **Short selling or shorting - It is a trading strategy based on the expectation that the price of the stock will fall.** It is also based on the "buy low, sell high" strategy but the sequence of transactions is reversed in short selling. In this first we sell high and later buy low.
- In short selling, the trader generally **does not own the securities he sells**, but he borrows them.
- In the stock market, traders usually short stocks by selling shares they have borrowed from others through brokerages. When the price of the shares falls to the expected levels, the trader would purchase the shares at the lower price and return them to the owner, booking a profit in the process.
- But if the **price of the shares increase instead of falling, the trader will be forced to buy shares at a higher price to return to the owner resulting in loss.**



Source: The balance money

11. Taxing windfall profits of oil companies

Syllabus: Indian Economy and issues relating to mobilization of resources

Prelims: Windfall Taxes

Mains: Reasons for windfall profit gains and the benefits of imposing windfall profit taxes

Context: The Central government has slashed the windfall profit tax levied on domestically-produced crude oil and on the export of diesel and aviation turbine fuel (ATF) after increasing it on February 3rd, 2023.

Details

- The government has now slashed the windfall tax to ₹4,350 per tonne from ₹5,050 per tonne in line with rising international oil prices.
- The government has further slashed tax on the export of diesel to ₹2.50 per litre from ₹7.50 per litre, and excise duty on ATF to ₹1.50 per litre from ₹6 per litre.
- Petrol however continues to have zero windfall tax.

What are windfall profit taxes?

- Windfall profit refers to an unanticipated increase in the profit or earnings of a company due to an extrinsic or unforeseen event and not because of a business decision.
 - According to the U.S. Congressional Research Service (CRS), a windfall is an “unearned, unanticipated gain in income through no additional effort or expense”.
 - Windfall profits cannot be attributed to something that the entity is actively involved in such as investment strategy or expansion of business.
- Windfall profit taxes are those that are designed to tax the profits (windfall profits) of a company from external or unprecedented events such as the energy price rise due to the Russia-Ukraine war.
- Usually, the governments levy windfall taxes as a one-off tax retrospectively over and above the normal rates of tax.
- Windfall taxes are reviewed on a fortnightly basis and depend on various factors such as international oil prices, exchange rates and quantity of exports.
- A report on the Financial Position of Oil Companies by **B.K. Chaturvedi committee** in 2008 noted that imposing windfall profit taxes was seen as a prerogative of governments in order to meet their fiscal needs and to pursue redistributive justice.
- The windfall tax or Special Additional Excise Duty (SAED) was first imposed by India in July 2022.
- The collection of SAED in India for the FY 2022-23 is expected to be around ₹25,000 crores from the production of crude oil and export of petrol, diesel and ATF.
- Through the levy of windfall taxes, governments across the world aim:
 - To capitalise on the heavy profits made by the companies and use them for specific domestic purposes
 - To redistribute the unexpected profits when high prices benefit producers at the expense of consumers
 - To fund social welfare schemes
 - To ensure an alternative revenue for the government which would come in handy during unforeseen geopolitical events

Windfall Tax



Benefits

- Boosts government revenues
- Provide public services and other benefits to the citizens
- Windfall gains can repay interest-bearing consumer
- Invest the windfall proceeds in gold deposits

Reasons for windfall profits

- The Russia-Ukraine war is one of the major reasons for the volatility in the oil market across the world.
- Russia being one of the largest producers is a key player in the global oil market.
- However, several Western countries undertook measures to stop or curtail their energy imports from Russia as a retaliatory move against Russia's actions in Ukraine which led to a sharp rise in the prices of fossil fuel as countries now looked towards other suppliers to meet their energy demands.
- The sudden rise in the prices of fossil fuels resulted in profits for major oil companies.
- As per Reuters, all "Big Oil" companies such as BP, Chevron, Shell, Total Energies, etc. doubled their profits in 2022.
- This sudden increase in their earnings has influenced oil companies to prioritise their investments in conventional sources to provide for energy security instead of undertaking measures towards cleaner energy.

Path ahead for oil prices

- After close to one year since the start of the geopolitical conflict, the International Energy Agency (IEA) currently feels that the global oil market is relatively calm.
- All the oil prices except that of diesel are back to pre-war levels and Russian oil production and exports have also held up relatively well despite sanctions.
- The IEA expects the global oil demand to increase by 2 mb/d in 2023 to 101.9 mb/d and the supply side also was steady in January 2023 at 100.8 mb/d.

Nut graf: Imposition of windfall profit tax at a time when there is a sudden increase in profits of entities due to unforeseen economic situations becomes extremely important as it not only spurs tax collections or ensures redistribution of wealth but also plays a key role in discouraging entities from investing in conventional sources which helps in the clean energy transition.

12. Going green

Syllabus: Infrastructure: Energy – renewable energy.

Mains: Transitioning to green energy.

Prelims: Budget 2023-24.

Context: Proposals for green energy in Budget 2023-24.

Details:

- The Budget of 2023 has emphasized the Government's commitment to move towards net-zero carbon emission by 2070.
- An article presented at the World Economic Forum's Annual Meeting in Davos highlighted that India holds the key to hitting global climate change targets because of its sizeable and increasing energy needs.
- As India's population is set to overtake China, India's energy needs to propel the economy would surge exponentially. Therefore, it is essential to transition to green energy.
- Moreover, it will provide an opportunity to catalyze new industries, generate employment, and add to overall economic output.
- It is suggested that with the take-off of the electric vehicle (EV) revolution, the availability of indigenously produced lithium-ion batteries has become a necessity. Considerably, the Budget 2023-24 has proposed to exempt customs duty on the import of capital goods and machinery required to manufacture lithium-ion cells. This would give a fillip to local companies to establish EV battery plants.

Other Proposals in Budget 2023:

- Another key proposal to transition to green energy in Budget 2023 is the establishment of a viability gap funding mechanism.
- It aims to support the development of battery energy storage systems with a capacity of 4000 MWh.
 - It should be noted that battery storage systems are important for power grid stabilization, especially at this juncture, when India is increasing its reliance on solar and wind energy.
- The Finance Minister Ms. Sitharaman has also set aside ₹8300 crores towards a ₹20700 crore project for an inter-State transmission system for the evacuation and grid integration of 13 GW of renewable energy from Ladakh.
- The transmission line will address the issue of establishing solar capacity in the region which was otherwise difficult due to its remoteness from India's main power grid.

Nut Graf: *The Budget 2023-24 has proposed various projects/schemes to transition to renewable energy and reduce the country's dependence on fossil fuels. It is a good step in the right direction. More such efforts should be made, as the energy demand in India will continue to rise.*

13. India's Just Energy Transition

Syllabus: Infrastructure-Energy

Mains: Pathway to India's Clean Energy Transition

Context: The first G20 Energy Transition Working Group (ETWG) Meeting under India's Presidency is taking place in Bengaluru.

Background:

- The first G20 Energy Transition Working Group (ETWG) Meeting under India's Presidency took place in Bengaluru.
- About 150 participants including G20 member countries participated in the meeting.
- Leading international organisations such as the World Bank, Asian Development Bank, United Nations Development Program (UNDP), International Energy Agency (IEA), Clean Energy Ministerial (CEM), United Nations Environment Program (UNEP), International Solar Alliance (ISA) etc also attended the Meeting.
- The first ETWG meeting focused on six priority areas. These include: (i) Energy transition through addressing technology gaps (ii) Low-cost financing for energy transition (iii) Energy security and diversified supply chains (iv) Energy efficiency, industrial low carbon transitions and responsible consumption, (v) Fuels for Future (3F) and (vi) Universal access to clean energy and just, affordable, and inclusive energy transition pathway.
- The Union Ministry of Power is the nodal Ministry for ETWG

Just Energy Transition Partnership (JET-P):

- JET-Ps are an emerging financing cooperation mechanism, which aims to help a selection of heavily coal-dependent emerging economies make a just energy transition.
- The goal is to support these countries' self-defined pathways as they move away from coal production and consumption while doing so in a way that addresses the social consequences involved, such as by ensuring training and alternative job creation for affected workers and new economic opportunities for affected communities.
- This has taken on particular significance following the insertion of the phrase 'phase-down' of coal in the Glasgow Pact.
- The first such JETP emerged from UNFCCC COP 26 in Glasgow, when South Africa was promised USD 8.5 billion in financing by France, Germany, the United Kingdom, the United States, and the European Union.
- The donor pool has since been expanded to include multilateral development banks, national development banks, and development finance agencies.
- As they involve a relatively small group of actors, JETPs can potentially make much faster progress on the energy transition than what would be possible in the UN climate talks themselves, where large oil and gas-producing countries could veto agreements.

JET-P and India:

- After South Africa, Indonesia, and Vietnam, India is considered the next candidate for a JET-Partnership.
- India is working towards clean energy with ambitious targets like 500GW of non-fossil, including 450 GW renewable energy (RE) capacity addition and 43% Renewable Energy (RE) purchase obligation by 2030.
- These targets are supported by various policies such as (Energy Conservation (Amendment) Act), missions (National Green Hydrogen Mission), fiscal incentives (production-linked incentives) and market mechanisms (upcoming national carbon market).
- Initial JET-P negotiations for India are said to have stalled over whether and how India should consider coal "phase-down," as well as how to operationalize India's just transition.
- The Central Electricity Authority projects a near doubling of electricity demand by 2030 which requires adequate supply from a diverse mix of sources.
- As India cannot afford to halt its development while decarbonising, it must develop a coherent domestic just energy transition (JET) strategy in order to negotiate a financing deal that addresses its unique set of socio-economic challenges.

- India's JET-P deal must consider a broader framework for financing and supporting an energy transition.
- With India holding the G-20 presidency, it has an opportunity at hand to negotiate a deal for itself while also shaping international cooperation on just energy transitions.

Concerns with JET-Ps:

- Energy transitions could give rise to intra-generational, intergenerational, and spatial equity concerns.
- Transitions have an impact on jobs that are currently dependent on fossil fuels, disrupt potential future energy access, reduce the state's ability to fund welfare programmes, and worsen already existing economic disparities between coal and other regions.
- Existing JET-P agreements give little consideration to intra-generational inequity, such as job losses brought on by a phase-down of coal.
- However, among the three JET-P deals signed so far, only South Africa's deal mentions a 'just' component — funding reskilling and alternative employment opportunities in the coal mining regions — to be financed as part of the initial \$8.5 billion mobilisation.
 - The other two JET-Ps (Indonesia and Vietnam) are focused on mitigation finance for sector-specific transitions.
- Without paying enough attention to national context, developed countries' emphasis on the phase-down of coal ignores the significant distinction in the energy transition between industrialised and emerging economies.

Road Ahead Towards Clean Energy:

- These sets of actions could further expedite India's energy transition while also addressing domestic developmental priorities, and justice and equity concerns.
- First, acceleration in RE deployment rates to match the pace of demand growth is critical to India's JET.
 - Solarisation of agricultural electricity demand, electrification of diesel-powered Micro, Small and Medium Enterprises (MSMEs) and decentralised RE for residential cooking and heating can shift energy demand patterns along with significant developmental co-benefits.
 - In addition to accelerating RE, stimulating energy demand through increased rural output will also assist to close the rural-urban economic gap, create rural jobs, thereby address intergenerational and spatial imbalances.
- Second, domestic manufacturing of clean energy components is critical to sustain a JET, build energy self-sufficiency.
 - While India must recognise the importance of achieving cost competitiveness — (Indian components are 20% costlier than Chinese components) to improve the pace of deployment.
- Third, the current use of coal resources must be optimised to enhance efficiencies until the period of phase-down.
 - Coal-fired power plants must be placed closer to coal mines rather than based on energy demand in States for efficient transportation which leads to fewer emissions and cheaper power, as transportation accounts for one-third of the cost of coal for power plants.
 - The resultant savings could also help finance much needed emission control retrofits.
- These measures will create new job opportunities, achieve emissions reduction and prepare the country for deeper decarbonisation through a future coal phase-down.

Nut Graf: Under India's Presidency, four ETWG meetings, various side events and a Ministerial Meeting have been planned. With India holding the G-20 presidency, it has an opportunity at hand to negotiate a deal for itself while also shaping international cooperation on just energy transitions.

14. Solar energy is not the best option for India

Syllabus: Infrastructure: Energy – renewable energy.

Mains: Solar energy and associated concerns.

Prelims: Solar energy.

Details:

- As a consequence of external pressure for carbon limiting and the growing enthusiasm to adopt renewable energy, too much pressure has been laid on Solar Energy in India.
- However, it is argued by the author that solar energy is not the best option and has some associated misconceptions.

National Solar Mission

- Jawaharlal Nehru National Solar Mission also known as the National Solar Mission was launched in January 2010 by the Government of India.
- National Solar Mission is a major initiative of the Government to promote ecological sustainable growth while addressing India's energy security challenges.
- The Mission will also facilitate a major contribution by India to the global effort to meet the challenges of climate change.
- The key objective of the Mission is to establish India as a global leader in solar energy by creating the policy conditions for solar technology diffusion across the country as quickly as possible.
- The Mission targets installing 100 GW grid-connected solar power plants by the year 2022 which is in line with India's Intended Nationally Determined Contributions (INDCs) target to achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources and to reduce the emission intensity of its GDP by 33 to 35% from 2005 level by 2030.

List of Solar Power Plants In India

- There are over 40 Major Solar power plants in India, which generate at least 10 MW of power.
- **10 major solar power parks in India include:**

Sl.No	Solar Power Park in India
1	Bhadla Solar Park, Rajasthan
2	Pavagada Solar Park, Karnataka
3	Kurnool Ultra Mega Solar Park, Andhra Pradesh
4	NP Kunta, Andhra Pradesh
5	Rewa Ultra Mega Solar, Madhya Pradesh
6	Charanka Solar Park, Gujarat
7	Kamuthi Solar Power Project, Tamil Nadu
8	Ananthapuramu – II, Andhra Pradesh
9	Galiveedu solar park, Andhra Pradesh
10	Mandsaur Solar Farm, Madhya Pradesh

Misconception associated with Solar Energy:

- It is suggested that the levelised cost of solar power is coming down and is close to that of coal.
 - However, it is a flawed calculation as the comparison is made at the load centre, instead of at the pithed, which costs about half that of the load centre.
 - Another flaw is not comparing the like with like, as coal electricity is continuous and solar electricity is intermittent. Moreover, the cost of battery storage should also be added for solar energy.
 - It is also suggested that the shadow price (or true economic value) of coal is lower than its market price because the cost of labour in mining carries a shadow price of zero (as they are unskilled workers who would be otherwise unemployed).
- Some researchers have devised certain methods that categorically make coal-based electricity unviable. For instance, quantifying the cost of carbon emission in terms of deaths due to particle (PM2.5) pollution. The number of deaths is then multiplied by a figure to arrive at the value of statistical life, which is later added to the cost of carbon.
- On the other hand, solar energy is made financially viable by leaving out storage battery cost, providing subsidies and concessions, and forcing it on industry and discoms through state policies.

Way Ahead:

- Large hydro is a better option for renewable energy as it has both low carbon and the least cost.
- Notably, the U.S. and Europe have utilized 90% and 98% of their potential, respectively. On the other hand, India has used only 15% of its hydro potential.
- Though China relies on renewable energy, it focuses more on coal and hydro. For instance, the Three Gorges project on the Yangtze is the world's largest hydroelectric project.
- However, there are some challenges in India like the following:
 - Large hydro projects in India are resisted by environmentalists.
 - The National Thermal Power Corporation Limited (NTPC Limited) has been diversified to renewables, which is not its core competence.
- These issues need to be rectified at the earliest by the policymakers.

Nut Graf: *There is too much pressure on solar energy in the renewable energy basket. However, many aspects are overlooked while calculating its financial viability. It is suggested that India should not give up on large hydropower and coal projects and strengthen its energy basket.*

15. Public Sector Enterprises of Kerala

Syllabus: Industrial Policy & their Effects on Industrial Growth

Mains: Role of Public sector enterprises in the evolution of the Indian economy

Context: This article discusses the status of public sector enterprises (PSEs) in Kerala.

Introduction:

- A study of fiscal parameters of states by the Reserve Bank of India (RBI) identified Bihar, Kerala, Punjab, Rajasthan and West Bengal as highly stressed due to their high debt levels, the quality of expenditure and the level of fiscal deficit.
- As per the study, these states could face a crisis if they fail to curb non-merit expenditure.
- The study also noted that the share of revenue expenditure in total expenditure in these states was 80-90 percent, which leaves them with little resources for capital expenditure or asset creation.

PSE's in Kerala:

- The State Level Public Enterprises (SLPEs) play an important role in the economic growth of the State.
- Kerala has 153 PSE's of them, 31 have been transferred, closed, merged, or remain inactive. The effective number in 2020-2021 was only 116.
- Fifty two (44.83%) of the 116 working enterprises are fully owned by the Government of Kerala while 27 (23.27%) are jointly owned by the Government of Kerala and Others. Nine enterprises (7.76%) are jointly owned by the State and Central Governments.
- As per the important financial parameters based on the report, 'A Review of Public Enterprises in Kerala 2020-21', in 2020-21, the turnover of all the working PSEs was ₹34,365 crore (4.3% of the GSDP). This was ₹2,199 crore lower than the previous year.
 - This is a drastic fall because employment increased from 1.29 lakh in 2019-20 to 1.33 lakh in 2020-21; and investment by 10.05%.
- The average investment per employee increased, while the average profitability per employee registered a loss.
- For the three public utilities alone — Kerala State Electricity Board (KSEB), Kerala State Road Transport Corporation (KSRTC) and Kerala Water Authority (KWA) — the loss was ₹1.67 lakh per employee.
- The return on investment in 2020-21 was -15.8% per annum.
- This is an unsustainable loss for Kerala as it invested 8.5% of GSDP in PSEs.
 - The State government gave grants and subsidies of ₹4,697 crore (an increase of 1,471%) besides a Central government grant of ₹1,655 crore.
- The net worth loss of PSEs was ₹5,696 crore in 2018-19 which more than doubled to ₹11,630 crore in 2020-21. These numbers are net for all the PSEs.
- The PSEs contributed ₹13,328 crore to the State exchequer by way of taxes and duties in 2020-21, which accounts for 28% of the own tax revenue of the State.

Types of Economy

(1) Private Sector Enterprises

- It refers to the business enterprises which are owned, managed and controlled by an individual or a group of individuals.
- The government cannot interfere in the functions of private enterprises as it has no control over it.
- It is that type of business units which are carried on with the motive of earning profits.
- It can be small in size or large in size.
- **Example:** ICICI Bank Limited, ITC Limited, HDFC Bank Limited, Wipro etc.

(2) Public Sector Enterprises

- The public sector consists of various organizations owned and managed by the government.
- These organizations may be either partly or wholly owned by the central or state government.
- The government can participate in economic activities through these enterprises of the country.
- The forms of organization which a public enterprise may take are as follows:
 - Departmental undertaking
 - Statutory corporation
 - Government company

Analysis:

- Above data shows a clear mismatch between the massive financial and physical investment made and the actual performance on the ground.
- The size structure and output composition of the PSEs are uneven and do not display a rational mix. Nearly 70% of the enterprises had a turnover below ₹50 crore.
 - Along with the KSEB, which accounted for 42% of the total turnover, the Civil Supplies Corporation, Financial Enterprises and the Beverages Corporation made a total of 73%.
- Kerala's youth look to the public sector as a reliable source of employment due to poor investment by the private sector, particularly in manufacturing.
 - 52% of employment is solely accounted for by KSEB, KSRTC, and KWA.
 - Cashew nut processing was once the leading employment provider in the private sector. Besides the public utilities, the Cashew Development Corporation was the largest loss maker which resulted in poor job creation.
- Nearly 78% of the total investments were also accounted for by the three public utilities.
- Government should step into areas that promote common good, spread effects, and other strategic needs such as power supply and provisioning of essential commodities
- PSE's must work on delivering common goods, including triggering a multiplier effect to catalyse more investment and employment. Therefore this sector demands rigorous scrutiny and radical reforms.

Nut Graf: The role of public sector enterprises (PSEs) has been strategic and ideological. Although they have played a strategic role in the evolution of the Indian economy, of late they have lost significance as they have failed to observe the rule that public funds should be used efficiently, wisely, and prudently, which led to the losses.

16. NDP and circular economy

Syllabus: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Prelims: Circular economy

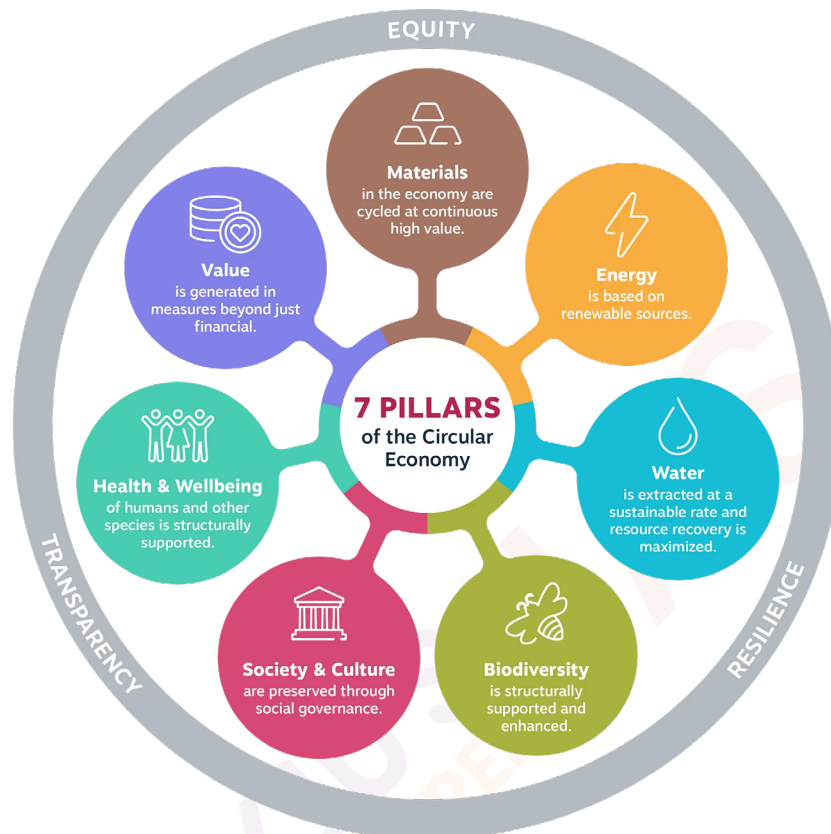
Mains: Details about Circular economy

Context: The United Nations Development Programme (UNDP)- India recently launched a campaign to promote a more inclusive circular economy.

Key features of the campaign:

- The project is an expansion of an existing collaboration under UNDP's flagship Plastic Waste Management Programme to create a sustainable model for plastic waste management in India.

- **End-to-end management of plastic waste by promoting:**
 - Segregation of waste at the source
 - Collection of the segregated waste
 - Setting up **Material Recovery Facilities (MRFs)** for recycling all kinds of plastic waste
- **Collaboration with the private sector:** Hindustan Unilever Limited (HUL) will also assist in the capacity building of Urban Local Bodies for the adoption of MRFs or Swachhata Kendras.
- **Collaborations:** The project is a collaboration between municipal corporations, corporations, Safai Saathis, and individuals to work together to make cities cleaner and greener.
- **Reach out:** The project will target 100,000 households for source segregation.



Source: metabolic.nl

Initiatives to Promote the Circular Economy:

Global:

- Germany and Japan have incorporated the 'Circular Economy' into their economic plans.
- China's Circular Economy Promotion Law

India:

- Circular economy concept recognition in 2022-23 Budget
- **Vehicle Scrappage Policy 2022:** Private vehicles older than 20 years will be deregistered on June 1, 2024, if they fail a fitness test or do not have their registration certificate renewed.
- Niti Aayog and the EU have collaborated on a strategy paper on 'Resource Efficiency'
- Extended Producer Responsibility (EPR) certificates 2022
- Battery Waste Management Rules 2022
- Plastic Waste Management (Amendment) Rules 2022
- E-Waste Management Rules 2022

17. Primary Agriculture credit society

Syllabus: Marketing of agricultural produce

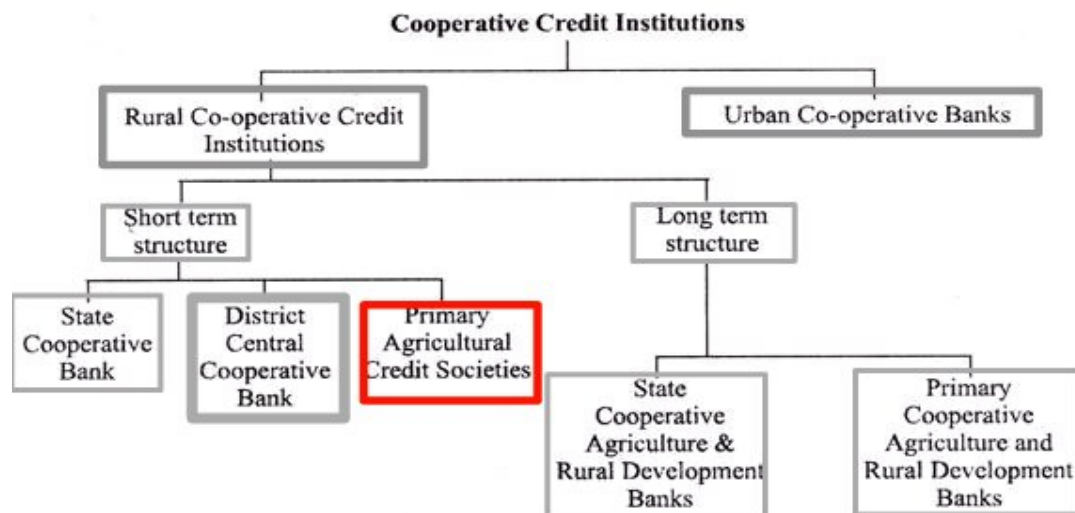
Prelims: Primary Agricultural Credit Societies (PACS)

Mains: Significance of PACS and its association issues

Context: Union Budget 2023 has announced Rs 2,516 crore for digitization of 63,000 Primary Agricultural Credit Societies (PACS) over the next five years.

- It aims at bringing greater transparency and accountability in their operations and enabling them to diversify their business and undertake more activities.

- It aims to help PACS become a nodal centre for providing various services such as Direct Benefit Transfer, Interest Subvention Scheme, Crop Insurance Scheme (PMFBY), and inputs like fertilizers and seeds.



Origin of PACS:

- PACS are village level cooperative credit societies that serve as the last link in a three-tier cooperative credit structure headed by the State Cooperative Banks (SCB) at the state level.
 - Credit from the SCBs is transferred to the District Central Cooperative Bank (DCCBs), which operate at the district level. The DCCBs work with PACS, which deal directly with farmers.
- PACS provide short-term, and medium-term Agriculture loans to the farmers for the various agricultural and farming activities.
- The first PACS was formed in 1904.
- A report published by the Reserve Bank of India on December 27, 2022 put the number of PACS at 1.02 lakh. At the end of March 2021, only 47,297 of them were in profit.

Significance:

- **Access to Credit:** PACS provide small farmers with access to credit, which they can use to purchase seeds, fertilizers, and other inputs for their farms. This helps them to improve their production and increase their income.
- **Financial Inclusion:** PACS help to increase financial inclusion in rural areas, where access to formal financial services is limited. They provide basic banking services, such as savings and loan accounts, to farmers who may not have access to formal banking services.
- **Convenient Services:** PACS are often located in rural areas, which makes it convenient for farmers to access their services. This is important because many farmers are unable to travel to banks in urban areas to access financial services. PACS may even extend credit with minimal paperwork within a short time.
- **Promoting Savings Culture:** PACS encourage farmers to save money, which can be used to improve their livelihoods and invest in their farms.
- **Enhancing Credit Discipline:** PACS promote credit discipline among farmers by requiring them to repay their loans on time. This helps to reduce the risk of default, which can be a major challenge in the rural financial sector.

Issues related to PACS:

- **Inadequate Coverage:** Though geographically active PACS cover about 90% of 5.8 villages, there are parts of the country, especially in the north-east, where this coverage is very low. Further, the rural population covered as members is only 50% of all the rural households.
- **Not enough Resources:** The resources of the PACS are much too inadequate in relation to the short-and medium-term credit needs of the rural economy.
- **Overdues and NPAs:** As per the RBI report, PACS had reported lending worth Rs 1,43,044 crore and NPAs of Rs 72,550 crore. Maharashtra has 20,897 PACS of which 11,326 are in losses. They curb the circulation of loanable funds, reduce the borrowing as well as lending power of societies, and give them the bad image of the societies of defaulting debtors are willful.

INTERNATIONAL RELATIONS

1. The quest for hope in Myanmar

Syllabus: India and its neighbourhood- relations

Mains: Political Situation in Myanmar.

Context: Two years ago, in 2021 the military in Myanmar staged a coup and snatched power from the elected leaders. It derailed the limited democracy of the country, violating the 2008 constitution which the generals had given to the people.

Current Scenario in Myanmar:

● There are currently three camps in Myanmar:

- The military which is in power in major towns.
- The opposition called the National Unity Government (NUG) and its partners in the countryside.
- The ethnic groups on the geographic periphery. These groups are further divided into pro-military, pro-NUG, or neutral groups.

● Frequent clashes occur in several parts of Myanmar and there is widespread insecurity. The air force bombs the citizens, whereas people's militias kill government soldiers and policemen.

● The possibility to hold dialogue is ruled out as there is no will for compromise and reconciliation between the military and the NUG. Both of them have termed each other as "terrorists".

● Aung San Suu Kyi is serving a 33-year-long prison sentence in solitary confinement.

● Economic situation:

- There is a sharp decline in the GDP of the country.
- Poverty, unemployment, and inflation have surged.
- Furthermore, the currency is witnessing a free fall.

Global Response:

● According to western countries, it is a direct cause of a repressive and power-hungry army suppressing the citizens and depriving them of their democratic rights. They condemned the act of the military at the United Nations (UN), imposed sanctions against the junta, and provide material assistance to the opposition.

● The UN Security Council adopted Resolution 2669 on 21st December 2022, expressing deep concern about the situation and urging the release of all political prisoners. There were abstentions only by China, Russia, and India. Despite this rare unity, the UN has failed to move the military.

● ASEAN with UN support is keen to play the role of mediator in Myanmar, but the Myanmar government refuses to cooperate with ASEAN. ASEAN's 'Five-Point Consensus' formula as a way out was accepted by Myanmar in April 2021, but it was refused later.

● It should also be noted that ASEAN itself is suffering from internal disturbances and the new chair (Indonesia) realizes its limitations in handling the issue.

● China and Russia are strengthening their cooperation with the Myanmar government. Due to western sanctions on Russia, it has found a willing partner in Myanmar's generals who need Russian arms, training, and political support. China also has extensive interest in the region ranging from economic to strategic domains.

India's Stand:

● India desires a stable and prosperous Myanmar where democracy flourishes. However, its policy of dealing with the government of the day forces it to carry out business with the generals, discomforting the NUG.

● India also has security and economic interests. For instance, it needs assistance to tackle the Indian insurgent groups sheltered in Myanmar; handling its mega infrastructure projects requires the authorities' cooperation; etc. Moreover, it aims to regulate China's influence in Myanmar.

● India is in a dilemma, as India's Myanmar experts offer contradictory advice:

- One group wants India to work with the present-day government.
- However, the other group advocates cooperating with the NUG and the ethnic groups. It also wants India to play the role of mediator.

● India has limited options and it believes that as the root cause of the political problem lies on Myanmar's soil, it should be solved by the leadership of Myanmar.

Conclusion: The elections in Myanmar are due in August 2023. The possibility of holding free and fair elections is grim because of the various challenges like the opposition's plan to disrupt it, the credibility of the elections itself, and the response of the military to the elections.

Nut Graf: Myanmar is witnessing serious issues both in its polity and economy after the 2021 coup. The global response is also varied and there is no hope for a better situation in the near future. It is advised that the matter should be solved through dialogue and compromise among the leadership of the country.

2. Little to celebrate in Sri Lanka at 75

Syllabus: India's neighbourhood.

Mains: Concerns associated with the celebration of Independence in Sri Lanka.

Context: 75th Anniversary of Sri Lanka's Independence is being celebrated on the 4th of February 2023.

Controversies in Sri Lanka:

- The Sri Lankan government is spending 300 million Sri Lankan rupees on its 75th independence day celebrations. This has raised controversy as the country is reeling under economic collapse.
- Another controversy is brewing around the nationwide local government elections, which are supposed to be held before the end of February 2023.
 - There is a widespread debate about whether it is appropriate to spend public money on elections when the country is facing the worst economic crisis.
 - On the one hand, President's office claims that the treasury has no money to spend on elections. It is also said that elections are not an urgent public need.
 - However, the opposition accuses the ruling coalition of using it as an excuse to avoid electoral humiliation.

Concerns associated with celebrating Independence in Sri Lanka:

- In Sri Lanka, the 1948 event (independence) has not been able to strike a chord outside the official circles because of:
 - The specific path to Sri Lanka's independence.
 - What has 'not' been achieved by the governments.
- It has been highlighted that the discourse is sceptical about celebrating independence as an event of national pride because of four root causes namely, Sinhala nationalist, Tamil nationalist, socialist, and academic.
 - **Sinhala Nationalists:**
 - They were enraged because political sovereignty was not granted to Sri Lanka by the colonial rulers.
 - They argued that the Soulbury Constitution of 1947 embodied only partial independence and incomplete sovereignty and the nationalist leaders did not fight for it.
 - Sinhala's nationalists (in 1952) demanded that Ceylon should be made a republic with a special status for Buddhism in the Constitution.
 - **Tamil Nationalists:**
 - Apprehensive of majority dominance, they demanded (before 1948) balanced representation for all minorities in the legislature.
 - However, they were granted only legal protection against discriminatory legislation in the independent Constitution.
 - As a result, Tamil leaders backed regional autonomy and called for a structuring of the post-independence constitutional order.
 - **Socialists:**
 - Socialists argued that only a socialist republic would ensure full political independence and sovereignty for all Sri Lankans.
 - They collaborated with the Sinhala nationalist Sri Lanka Freedom Party in 1970-72 to establish the 'socialist, democratic republic' of Sri Lanka.
 - **Academic:**
 - Academic scepticism has highlighted that the incomplete nature of political independence was associated with the absence of a militant anti-colonial mass movement for independence.
 - It is also argued that the leaders who negotiated independence in Sri Lanka were never committed to severing economic, political, and cultural links with the colonizer.
- Furthermore, another major political debate in Sri Lanka since 1948 was the minimum consensus on the liberal democratic nature of the overall framework of the post-independence political order.
- As a result, the First Republican Constitution of 1972 (the first major structural reform after 1948) accommodated the demands of Sinhalese nationalists and Socialists but ignored the demands of Tamil Nationalists.

Violent Confrontations:

- The social and political peace in Sri Lanka was short-lived and since the early 1970s it has witnessed violent confrontations between the state and citizens. For instance,
 - An armed insurgency in Sinhalese society seeking economic and social rights began in 1971.
 - A second JVP (Janatha Vimukthi Peramuna) insurgency was in place from 1987 to 1989. It was put aside quite harshly.
 - Seeking autonomy for a Tamil 'nation' an insurgency began in the northern Tamil society in 1983. It led to a long and protracted civil war.
- The current economic crisis in the country highlights new questions about the continuing policy and governance failures of Sri Lanka's political elites.
- It should be noted Sri Lanka is now among the top 10 countries in the world with the highest number of malnourished children.

Conclusion:

It is justified on the part of citizens to ask their rulers about their right to spend millions of rupees on independence day celebrations when the meaning of independence is still contested.

Nut Graf: *Independence day celebrations in Sri Lanka are marred by several controversies, especially at this moment when the country is suffering from one of its worst economic crises. It is thus suggested to first put the political order in place and ensure welfare for each and every section of society.*

3. Sri Lankan refugees in India

Syllabus: India and its neighbourhood- relations.

Mains: Major issues of convergence and confrontation between India and Sri Lanka

Context: This article discusses the status of Sri Lankan refugees in India

Introduction:

- Sri Lanka has experienced much strife and conflict over the past few decades, with a civil war that lasted for more than 25 years until it ended in 2009.
- During this period, many Sri Lankan citizens were forced to flee their homes and seek refuge in other countries, including India.
- Sri Lankan people sought protection in India, among a population of identical ethnicity in Tamil Nadu. The vast majority entered India in search of safety, many without travel documents and were received and hosted by the Government of India on humanitarian grounds.
- The Sri Lankan refugees in India also face numerous challenges and struggles in their new environment, and their plight is often overlooked or ignored by the wider world.

Refugees in India:

- The Ministry of Home Affairs (MHA) in its 2021-2022 Annual Report states that 3,04,269 Sri Lankan refugees entered India between 1983 and 2012 and were provided relief including shelter, subsidised ration, educational assistance, medical care and cash allowances.
- At present, 58,648 refugees are residing in 108 camps in Tamil Nadu while 54 are in Odisha. Another 34,135 refugees registered with Tamil Nadu authorities reside outside camps.
- The Government of India provided ₹1,226 crores for the relief and accommodation of refugees.

Issues faced by Sri Lankan Refugees:

- The Sri Lankan refugees in India have been granted asylum by the Indian government, but their situation remains precarious.
- They are not allowed to work in India, therefore, they are reliant on aid from the Indian government, as well as from international organisations such as the United Nations High Commissioner for Refugees (UNHCR) and various non-governmental organisations (NGOs).
- Living conditions in the refugee camps are often poor, with inadequate sanitation, limited access to clean water, and overcrowding.
- The refugees are also at risk of being exploited by human traffickers, who promise to help them reach other countries in exchange for money.
- Sri Lankan refugees in India lack legal status as they are not granted citizenship, which means that they are unable to access many basic rights and services.
- The Sri Lankan refugees in India also face challenges in maintaining their cultural identity as they are not allowed to integrate into Indian society. They are often seen as outsiders and face prejudice and discrimination from the local population.

Slow progress of repatriation:

- The objective of the Government of India remains the repatriation of refugees to Sri Lanka. In line with the Global Compact on Refugees, India along with the international community has significantly contributed to building conditions within Sri Lanka for a safe and durable return.
 - About 99,469 refugees were repatriated to Sri Lanka up to March 1995 and no organised repatriation was done thereafter.
 - Amongst them are 30,000 Persons of Indian Origin (also known as "Hill Tamils"). They have a claim to Sri Lankan citizenship via the Indo-Sri Lanka Agreements of 1964, 1974 and 1987 and amendments to the Grant of Citizenship to Persons of Indian Origin Act of Sri Lanka.
- Sri Lankan Tamil refugees in India who wish to return voluntarily are being facilitated by the Government of Sri Lanka, and development partners.
- They have initiated programmes in the Northern and Eastern provinces, with objectives of resettlement, restoration of critical infrastructure, livelihoods and social services to the local population.
 - This led to significant improvements; the return of internally displaced persons (IDPs), infrastructure development, and expansion of agriculture and livelihoods.

- Over the last year, 208 individuals have returned voluntarily.
- Despite these efforts, several challenges remain, including a lack of funds for recovery needs.
- The Easter Bombings in 2019 followed by COVID-19 slowed the development process, compounded by the economic and political crises in 2022.
- However, recent announcements, to commence ferry services to Kankensanthurai and start direct flights to Jaffna from India are expected to build confidence and aid those desiring to return.

Issue of voluntary return:

- Despite the challenges, the Sri Lankan refugees in India have shown remarkable resilience and resourcefulness. Many of them have set up small businesses in the refugee camps, such as tailoring or food stalls, to support themselves and their families.
- The UNHCR and various NGOs have been working to support the Sri Lankan refugees in India, providing them with aid and legal assistance. They have also been advocating for their rights and for better living conditions in the refugee camps.
- In recent years, the Indian government has allowed some refugees to leave the camps and settle in other parts of India, and some have even been granted Indian citizenship.
- Therefore, a significant population of Sri Lankan refugees in India does not wish to return, preferring to call India home as they were born and educated in India with no knowledge or experience of their country of origin.
 - UNHCR perceives voluntary return as the most desired choice to end refugee status.

Nut Graf: The Sri Lankan refugees in India face significant challenges and struggles in their new environment, including lack of legal status, poor living conditions, and discrimination. It is important for the Indian and Sri Lankan governments, as well as the international community, to provide support and assistance to the Sri Lankan refugees to address these complex and multifaceted issues.

4. Policy folly

Syllabus: India and its neighbourhood- relations.

Mains: Pakistan's approach to dealing with terrorism.

Context: Peshawar blast on 30th January 2023.

Details:

- Pakistan supported the Taliban capture of Kabul in August 2021 citing that "Afghanistan had broken the shackles of slavery". It was considered to be one of the victors of the Afghan Civil War.
- Notably, Pakistan harboured the Taliban leadership in the past.
- However, post the Taliban's triumph, the Tehreek-e-Taliban Pakistan (TTP), the Pakistani version of the Sunni Islamist insurgency was also emboldened.
- As a result, terrorist attacks in Pakistan increased, particularly in Khyber Pakhtunkhwa bordering Afghanistan.
- 30th January's blast in a mosque in Peshawar's highly fortified Police Line area claimed nearly 100 lives. It was the deadliest attack in the past few years and was a stark reminder of how Pakistan's strategy of supporting the "good Taliban" and fighting the "bad Taliban" has backfired.
- Initially, a TTP faction claimed responsibility for the attack, but later a spokesperson denied its role. This shows the divisions within the group. It is found that the blast was a TTP attack as it took place in its stronghold and no other group has claimed responsibility.
- Despite the organizational difference between the TTP and the Afghan Taliban, they are ideologically the same.
- The Pakistan Army cracked down on the group after the 2014 Peshawar school bombing (which killed nearly 150 people). But post the Taliban's return to power in Afghanistan, the dynamics of insurgency in the border region changed again.
- A policy of engagement of TTP was adopted by the government and the Afghan Taliban hosted talks between the TTP and Pakistan which led to a ceasefire.
- The year-long truce collapsed in November 2022. It is believed by many that the TTP used the ceasefire to rearm and reorganize and is now spreading terror with greater power.
- The Peshawar blast has come at a time of great political instability in Pakistan. Currently, the currency is falling, foreign reserves are depleting, inflation is rising and the power situation remains grim.
- The attack has further created a security challenge for the country.

Future Course of Action:

- Pakistan should realize that its policy of selectively harbouring terrorism and extremism has done more harm than good to the country.
- A paradigm shift is required in its approach toward terrorism. It should target TTP that poses an internal security threat.

Nut Graf: The Peshawar terrorist attack has once again highlighted the flaws in Pakistan's strategy of supporting terrorism. This has worsened the situation in the country which is already reeling under political and economic instability. It is thus suggested that Pakistan should revisit its approach and take appropriate measures.

5. Mapping General Pervez Musharraf's legacy

Syllabus: India and its neighbourhood- relations

Mains: India-Pakistan Relations

Context: Former President and Army Chief of Pakistan Pervez Musharraf passed away on February 5th, 2023 after a prolonged illness.

Musharraf's meeting with Indian Prime Minister

- The Army Chief and self-appointed President of Pakistan, General Pervez Musharraf met the then Indian Prime Minister Atal Bihari Vajpayee in July 2001 at Agra.
- The two leaders talked about various issues such as the Jammu and Kashmir issue, cross-border terrorism, nuclear risks, the release of prisoners of war, and commercial ties.
- This meeting highlighted the significant differences in the approaches and wisdom of the two leaders.
- The main focus of Atal Bihari Vajpayee was to clear the existing bilateral differences between the countries and develop constructive and productive relationships.
- However, Musharraf's approaches indicated that he was determined to make India acknowledge that the Jammu and Kashmir conflict was the root cause of all India-Pakistan issues.
- According to Musharraf, the incorporation of Jammu and Kashmir into Pakistan was an unfinished agenda of the Partition of India.

The Kargil ambition

- General Musharraf's actions in Kargil indicate that his approaches are simplistic and tactical.
- Pakistan's operation in Kargil was entirely based on the assumption that India would be unwilling to militarily counter Pakistan's occupation of the Kargil heights.
- Musharraf along with other top leaders of Pakistan had ignored the fact that India would go all out in order to safeguard its northern borders.
- Furthermore, Pakistan failed to predict the reaction from major powers as he expected major powers to put pressure on India to accept a ceasefire thereby enabling Pakistan to occupy the Kargil heights. However, the major powers viewed Pakistan's actions at Kargil as immature and irresponsible.
- Pakistan was humiliated because of Kargil and General Musharraf who had kept the then Prime Minister Nawaz Sharif in the dark during this misadventure of Pakistan began to make plans to oust Nawaz Sharif.
- In October 1999, Musharraf took control of the power in Pakistan and Nawaz Sharif went into exile.

Musharraf's decline

- Musharraf effectively ruled Pakistan from October 1999 to November 2007.
- In November 2007, Musharraf appointed his successor Ashfaq Kayani as Army Chief.
- Musharraf continued as the President of Pakistan till August 2008, after which he was forced to quit under the threat of impeachment.
- Experts believe that Musharraf drew his power from his position as Army Chief and as he handed over the powers to Ashfaq Kayani he started becoming powerless.

The Indian connect

- Musharraf was a "Mohajir" as his parents migrated to Pakistan from Delhi.
 - Mohajir is a term that is used to refer to a Muslim migrant from India.
- Being a Mohajir, Musharraf had to gain the trust of his peers in the army at a time when Pakistan's army was dominated by Punjabis.
- However, Musharraf's Mohajir background did not diminish his negative views about India.
- Even after the failure of the Agra summit in 2001, Prime Minister Vajpayee still remained committed to normalising the bilateral relations between the two countries.
 - Further, Vajpayee's visit to Lahore in 1999 is also considered a monumental gesture in this regard.
- It is said that Musharraf had committed in January 2004 not to allow any territory controlled by Pakistan to be used against India and also engaged in back-channel talks on J&K and other issues with India.
 - However, there is no evidence about these backchannel talks and their outcomes.
- Additionally, there were talks about the four-point formula for the J&K issue which would have facilitated movement between the two sides of the Line of Control (LoC).

Four-point formula for the J&K issue

- Demilitarization or phased withdrawal of troops from the J&K region through deradicalization, disengagement, and rehabilitation (DDR).
- Maintaining the status quo on the borders, but the people of J&K would be allowed to move freely across the LoC.
- Granting for maximum self-governance in the legislative, executive, and judicial areas of the region without independence.
- Establishing a joint supervision mechanism in Jammu and Kashmir involving India, Pakistan and Kashmir.

History of political generals assuming power in Pakistan

- To date, there have been four instances when Army Chiefs held direct political power in Pakistan.
- Muhammad Ayub Khan, who became the second President of Pakistan, was an army general who seized the Presidency through a military coup in 1958.
 - Ayub Khan resigned in 1969 and died in 1974 in Islamabad.
- Yahya Khan, who also was a military general became the third President of Pakistan as he succeeded Ayub Khan in 1969.
 - Yahya Khan was forced to resign in January 1971 as Pakistan suffered a defeat at India's hands.
- Zia-ul-Haq became the sixth President of Pakistan following a coup in 1977.
 - Zia-ul-Haq died in an air crash in 1988.
- Pervez Musharraf became the tenth President of Pakistan in 1999 and resigned in 2008.

Nut graf: Experts in Pakistan believe that India-Pakistan bilateral relations do not just depend on the resolution of the J&K issue but also expect India to be flexible on all bilateral issues even if it involves sacrificing India's own interests. Indian backchannel negotiators have however denied any proposal that compromises India's sovereignty and key interests.

6. Cooperation in Trilateral Framework

Syllabus: Bilateral, regional and global groupings and agreements involving India

Mains: Significance of Multilateral Cooperation for India

Context: India joins UAE, France for trilateral initiatives on various issues.

Introduction:

- India, France and the United Arab Emirates declared their common intent to formalise a "trilateral cooperation initiative" to collaborate on nuclear energy and explore opportunities in the Indian Ocean region.
- Three countries also discussed cooperation in a trilateral framework, to promote compatibility and co-production in the defence sector and in countering infectious diseases.
- A range of trilateral events will be held in the backdrop of the Indian Presidency of the G-20 and UNFCCC COP28 to be held in UAE in November-December 2023.
- The trilateral was first discussed when the three Ministers — Dr. Jaishankar, France's Catherine Colonna and the UAE's Abdullah bin Zayed Al Nahyan — had met on the sidelines of the UN General Assembly in New York in September 2022.

Cooperation to fight Climate Change:

- This trilateral cooperation initiative is with a focus on solar and nuclear energy, the fight against climate change and the protection of biodiversity.
- The initiative is expected to act as a platform to bolster cooperation on sustainable projects between the development agencies of the three countries, which will also work to align their economic, technological and social policies with the objectives of the Paris Agreement.
- The three countries also agreed to expand their cooperation through initiatives such as the Mangrove Alliance for Climate led by the UAE and the Indo-Pacific Parks Partnership led by India and France.
- It was agreed that the three countries should seek to focus on key issues such as single-use plastic pollution, desertification, and food security in the context of the International Year of Millets-2023.
- The three countries also underlined their keen desire to cooperate in the field of the circular economy under the aegis of India's Mission LiFE.

Towards 'One Health':

- Separately, France, India and the UAE also agreed to increase cooperation in the field of combating diseases and pandemics and joining forces in the field of vaccination.
- In this regard, cooperation in multilateral organisations such as World Health Organization (WHO), Gavi-the Vaccine Alliance, the Global Fund, and Unitaaid will be encouraged.
- Further, the three countries are planning to attempt to identify tangible cooperation on implementing the "One Health" approach, and support the development of local capacities in biomedical innovation and production within developing countries.

Collaboration in Defence Sector:

- Foreign Ministers of three countries also discussed cooperation in a trilateral framework to promote compatibility, joint development and co-production while seeking out avenues for further collaboration and training defence forces of the three countries.
- The development of trilateral cooperation between relevant academic and research institutions and efforts to promote co-innovation projects, technology transfer, and entrepreneurship will be encouraged.

Nut Graf: India joins UAE, France for trilateral initiatives on various issues including fight against Climate Change, cooperation in defence sector, combating diseases and pandemics and platform to promote cultural cooperation through a range of joint projects.

7. Initiative on Critical and Emerging Technologies (iCET)

Syllabus: Bilateral, regional and global agreements involving India

Prelims: Initiative on Critical and Emerging Technologies (iCET)

Mains: Developments in India-US bilateral relations

Context: The National Security Adviser of India, Ajit Doval, met his U.S. counterpart, Jake Sullivan, and other senior officials of the US during the inaugural edition of the Initiative on Critical and Emerging Technologies (iCET) dialogue.

Initiative on Critical and Emerging Technologies (iCET)

- The Initiative on Critical and Emerging Technologies (iCET) was announced during the meeting between the Indian Prime Minister and the U.S. President at the Quad meeting held in Tokyo in May 2022.
- The iCET dialogue is expected to focus mainly on various means to remove barriers in technology transfers and co-production in the domains of critical and emerging technologies.
- Further, the iCET also aims to develop supply chains to increase co-production and co-development between the countries and improve the linkages between the start-up ecosystems of the two countries.
- The iCET dialogue is spearheaded by the National Security Councils (NSCs) of India and the USA.

Key outcomes of the inaugural iCET dialogue

- A “fact sheet” released by the White House after the meeting has highlighted six areas of planned cooperation which include enhancing innovation ecosystems, defence innovation and technology cooperation, developing resilient semiconductor supply chains, space, STEM talent and next-generation telecommunications.
- The newly announced programmes include:
 - A Research Agency Partnership between the U.S. National Science Foundation and Indian science agencies.
 - A platform to collaborate on quantum computing that facilitates collaboration with academia and industry.
 - Devising a new defence industrial cooperation roadmap.
 - A mechanism to aid the development of semiconductors in India.
 - Furthering space cooperation which includes human spaceflight.
- 5G cooperation: A private-public dialogue to enhance cooperation with respect to 5G/6G technologies and the adoption of Open RAN (technology that helps connect phones to each other and to the Internet) in India was also announced.
- Jet engines: The U.S. also assured that it will undertake a quick review of an application from General Electric to produce jet engines in India for India’s Light Combat Aircrafts (LCA).
- Easing exports: The two countries also discussed various means to ease export controls and restrictions.
 - The White House has released a statement which says that the U.S. administration would come up with ways to lower barriers to U.S. exports to India of High-Performance Computing and source code.
- Human rights: According to the White House’s statement, both India and the US affirm that the ways in which technology is designed, developed, governed, and used must be shaped by shared democratic values and respect for universal human rights.
 - The statement by the White House further added that the two countries have committed that the technology will “reinforce our democratic values and democratic institutions”.
 - However, it was only the White House’s statement that made references to human rights, as the statement released by the Indian Ministry of External Affairs did not make any reference to human rights.

Nut graf: The launch of the iCET dialogue has assumed significance, particularly at a time when there has been a growing convergence of Indian and US interests with respect to security, economic, and technological challenges presented due to the rise of China. The iCET dialogue is expected to deepen the U.S.-India strategic relationship which is extremely important for the growth and development of the South Asian, Indian Ocean and Indo-Pacific Regions.

8. India-U.S. Space Cooperation

Syllabus: Bilateral agreements Involving India and/or Affecting India's Interests

Mains: Changing dynamics of India-US space cooperation

Context: India-US group met in January 2023 to advance bilateral space collaboration.

Introduction:

- The eighth meeting of India-US Civil Space Joint Working Group (CSJWG) took place from January 30-31 in Washington DC.
- It was co-chaired by representatives from National Aeronautics and Space Administration (NASA) for the United States, and Indian Space Research Organisation (ISRO) for India.
 - The US delegation included officials from the Department of State, NASA, Department of Homeland Security, Federal Aviation Administration, United States Geological Survey and the National Oceanic and Atmospheric Administration of the Department of Commerce.
 - The Indian delegation included representatives from ISRO, Ministry of Environment, Forest and Climate Change, Indian Institute of Astrophysics, Ministry of Earth Sciences and the Ministry of External Affairs.
- The CSJWG discussions covered collaboration in earth and space science as well as human space exploration, global navigation satellite systems, spaceflight safety and space situational awareness, and policies for commercial space.
- Participants also considered implementation of guidelines and best practices developed by the United Nations Committee on the Peaceful Use of Outer Space (COPUOS) to ensure the long-term sustainability of outer space activities.

Significance of India-US Space Collaboration:

- The United States and India have strong bilateral cooperation in space, the NASA-ISRO Synthetic Aperture Radar (NISAR) mission planned to launch in 2024, is expected to systematically map the earth, using two different radar frequencies to monitor resources such as water, forests and agriculture.
 - The mission will provide important earth science data related to ecosystems, earth's surface, natural hazards, sea level rise and the cryosphere, it said.
- Both countries have agreed to advance space collaboration in several areas, under the 'initiative on critical and emerging technology' umbrella, including human space exploration and commercial space partnership.
- In November 2022, the U.S. began its Artemis programme by launching the Orion spacecraft towards the moon and bringing it safely back to earth. This can be crucial to India for its first human spaceflight mission (Gaganyaan) in 2024.
- Both countries have also taken significant strides in advancing the private space sector. Together, these endeavours will shape and impact U.S. and Indian space policies and programmes over the next decade.
- India could secure technologies and expertise by collaborating with an advanced spacefaring nation.

Roadblocks:

Certain structural factors limit the extent to which the U.S. and India can collaborate in the short term. Even though countries have a mindset to collaborate, the structural factors overpower diplomatic incentives to pursue long-term cooperation. They include:

Different Interests

- Two nations' interests in outer space are different right now, which is a structural factor that limits long-term India-U.S. space cooperation
- Although, the U.S. and its partners stress the importance of maintaining capabilities in low-earth orbit. It has ambitions firmly set on the exploration of the moon for the long term.
 - In this regard, the Artemis Program, the Artemis Accords, and the Biden administration's National Cislunar Science & Technology Strategy constitute the foundation for American ambitions beyond earth orbits.
- Meanwhile, India is focusing on building the nation's capability in and under earth orbits.
 - ISRO currently undertakes fewer than 10 launches each year. The Gaganyaan human spaceflight programme hopes to sustain India's human presence in space for the long term.
 - India's top priority is to substantially increase its satellite and launch capabilities in earth orbits and catch up with other spacefaring nations such as China.

Asymmetry in capabilities

- Asymmetry in capabilities is the second structural factor limiting India-U.S. space cooperation.
- The U.S. has the highest number of registered satellites in space. It also has a range of launch vehicles serving both commercial and national-security needs.
- Private entity SpaceX, for example, managed to achieve a record 61 launches in 2022, far higher than the number of launches undertaken by any other commercial entity or country.
- The American private sector has also assumed the challenge of replacing the International Space Station by 2030 with many smaller stations.
- India has just over 60 satellites in orbit and cannot undertake double-digit launches annually.

- The Indian government also opened the space industry to the private sector only in 2020. Since the U.S. already has an extensive network of partners for space cooperation, it has few technical incentives to cooperate with India.

Disagreements: Disagreements over how best to govern space activities on the moon and other celestial bodies is another factor limiting India-U.S. space cooperation.

Way Forward:

- Sustaining the engagement between academics, the private sector and state-led entities would induce long-term cooperation between two countries.
 - Sustained engagement could also take the form of collaborating on highly specialised projects such as the NISAR mission.
- Partnership between state and private entities could substantially help in building a long-term cooperation.
 - A convention of American and Indian aerospace companies to advance collaboration under NASA's Commercial Lunar Payload Services (CLPS) programme was agreed in the recent meeting.
- India can send its astronauts to train at American private companies which could help India reduce its dependence on Russia while ISRO builds its own astronaut training centre.
- A consortium led by the government-owned NewSpace India Limited involving private companies in the U.S could accelerate India's human spaceflight programme and give the U.S. an opportunity to accommodate Indian interests in earth orbits.

Nut Graf: The United States and India have strong bilateral cooperation in space. This cooperation can advance at a measured pace, to enable sustainable long-term civilian and military space partnerships by finding novel solutions to cooperate in the new space age.

9. India-France Partnership

Syllabus: Bilateral relations and agreements involving India

Mains: Significance of India-France partnership in the post-pandemic world.

Context: 25 years of strategic partnership between India and France.

Introduction:

- India's partnership with France is built on common values and goals. Both celebrated 25 years of their strategic partnership on January 26, 2023.
- Both countries signed a strategic partnership in 1998 and a strategic dialogue in 1999.
- The strategic partnership is anchored on the bedrock of deep and consistent mutual trust, abiding faith in strategic autonomy, and commitment to international law.
- Both are committed to the shared values of democracy, fundamental freedoms, rule of law and respect for human rights.
- There is an ongoing high-level India-France political dialogue in defence, maritime, counterterrorism and the Indo-Pacific.
 - They are now forging ahead with cooperation on issues such as digitisation, cyber, green energy, blue economy, ocean sciences, and space.

Trade between India and France:

- France has emerged as a key trading partner of India with annual trade of \$12.42 billion in 2021-22.
- It is the 11th largest foreign investor in India with a cumulative investment of \$10.31 billion from April 2000 to June 2022, which represents 1.70% of the total foreign direct investment inflows into India.
- The highest FDI equity inflows are in the services sector (18.17%), with cement & gypsum products (9.43%) in the second place, followed by air transport (including air freight) (7.72%), miscellaneous industries (7.38%) and petroleum & natural gas (7.22%).
 - These five sectors represent 49.92% of the total equity inflow from France from April 2000 to June 2022.
- India-France Joint Committee for Economic & Technical Cooperation (JCETC) was set up on January 26, 1976, which is the major institutional mechanism for cooperation in the economic and technical sectors.
- A joint announcement was also signed for setting up of a FAST-TRACK system for French companies in India and Indian companies in France which was to be made operational by the end of December 2020.
- Joint Working Groups (JWGs) at the senior official level have also been constituted through MoUs to deal with specific aspects of economic cooperation, including Agriculture and Food Processing, IT & Telecommunications, Roads, Sustainable Urban Development and Energy.

Defense Partnership:

- France is a key defence partner for India; it is the second-largest defence supplier in 2017- 2021.
- France has emerged as a major strategic partner for India with crucial defence deals and increased military-to-military engagement.
- India inducted French Scorpene conventional submarines, being built in India under the technology transfer agreement of 2005.

- The Indian Air Force received 36 Rafale fighter jets in December 2022.
- The Tata group is in collaboration with Airbus to manufacture C-295 tactical transport aircraft in Vadodara, Gujarat.
 - This line is expected to be expanded into other civilian and military aircraft manufacturing in a joint venture with France.
- Both countries also have a robust network of military dialogues and regularly hold joint exercises — Varuna (navy), Garuda (air force), and Shakti (army).

Cooperation in International Forums:

- Both countries have strived to deepen and expand their collaboration as the complexities in the global geopolitical system have evolved.
- France was among the first countries with which India signed a civil nuclear deal.
- France also played a crucial role in limiting India's isolation in the non-proliferation order after the 1998 nuclear tests.
- France also supports India's bid for permanent membership of the United Nations Security Council as well as its entry into the Nuclear Suppliers Group.
- India has supported France in the Paris Agreement expressing its strong commitment towards mitigating climate change impact.
- India and France, as part of their joint efforts on climate change, launched the International Solar Alliance in 2015.
- Both countries are working together to coordinate on playing a constructive role in the ongoing Ukraine war.
- Both nations have committed to cooperating in order to prevent an imbalance in the Indo-Pacific.
- They also share concerns about China's ascent and its aggressive behaviour, both regionally and globally.

Maritime Ties:

- India and France are resident powers of the Indian Ocean and the Indo-Pacific.
- In 2018, both countries welcomed the "Joint Strategic Vision of India-France Cooperation in the Indian Ocean Region" which presented a blueprint for a strengthening of ties.
- Operationally, combined patrolling by French and Indian ships in the Indian Ocean shows New Delhi's desire to work with allies that share its goals for enlarging its presence there.
- Maritime security has further gained momentum as both countries have articulated their common vision for a free, fair and open Indo-Pacific.
- Both countries share a comprehensive strategy for the Indo-Pacific which seeks to provide comprehensive solutions for maritime security, regional cooperation and climate change adaptation.
 - India and France in September 2022 also agreed to set up an Indo-Pacific Trilateral Development Cooperation Fund that will support sustainable innovative solutions for countries in the region.
- Both have formed a trilateral grouping with the United Arab Emirates to ensure maritime domain awareness and security from the east coast of Africa to the far Pacific.

Nut Graf: In a post-pandemic world, India and France reaffirmed their commitment to maintain strategic autonomy and prepare for the future together by further deepening their cooperation, expanding it in new domains to meet emerging challenges and broadening their international partnership.

10. A quick reset in India-Canada ties

Syllabus: Bilateral relations and agreements involving India

Mains: India-Canada relations.

Context: Canadian Foreign Minister Melanie Joly visited New Delhi on 6th-7th February 2023.

Details:

- India is ramping up its international outreach during the G20 presidency. And in this direction, improving ties with Canada is on the government's agenda.
- India's External Affairs Minister, S Jaishankar hosted the Canadian Foreign Minister Melanie Joly for bilateral talks on 6th-7th February 2023.
 - Another visit of the Minister to New Delhi is scheduled for March 2023. And later in the year, Canadian Prime Minister Justin Trudeau will attend the G-20 summit.
- Another factor for the acceleration in bilateral relations is Canada's deteriorating ties with China.
 - In November 2023, Canada announced its new Indo-Pacific Strategy that highlighted China as an "increasingly disruptive global power".
 - Moreover, India was referred to as a "critical partner" of Canada with shared traditions of democracy and pluralism.
- Additionally, Canada's search for new markets to diversify its economic engagement coincides with India's ambition for free trade agreements with many countries. The officials from both countries are working on the "Early Progress Trade Agreement".
- Both countries are also hopeful of securing a Comprehensive Economic Partnership Agreement.
- The relations between India and Canada went through a low in 2018.
- The ties regained traction when the leaders of the two countries met on the sidelines of the G-7 summit in Germany (2022).

Existing challenges:

- India has expressed concerns about the resurgence of Khalistani separatism and calls for a “referendum” among the Sikh community in Canada.
- India has also objected to incidents of vandalism and violence targeting the Indian community in Canada.
- Moreover, Canada’s pronouncements on the internal affairs of India like the rights and freedoms are also risky for diplomatic ties.
 - Canada had criticized the Indian government in 2020-21 for farmers’ agitation (as a result diplomatic activities were cancelled).

India-Canada Relations:

- Canada hosts a massive Indian diaspora and Indian students.
- Canada was one of the first countries that were associated with India’s nuclear programme. However, the relationship ruptured after India’s nuclear tests in 1974.
- The relations improved slightly in the 1980s but it was again distorted as Canada provided shelter to separatist Khalistani groups that were accused of the 1985 bombing of an Air India flight.
- The ties were once again restored in 2010, with the visit of then Prime Minister Manmohan Singh to Canada and through an agreement on civil nuclear cooperation.

Nut Graf: *The India-Canada relationship has fluctuated a lot in the past. The current efforts to strengthen it are steps in the right direction for both strategic and economic gains. However, both countries should focus on side-stepping the possible political pitfalls along the way.*

11. A Nordic-India connect

Syllabus: Bilateral, regional and global groupings and agreements involving India

Mains: India’s ties with Nordic countries

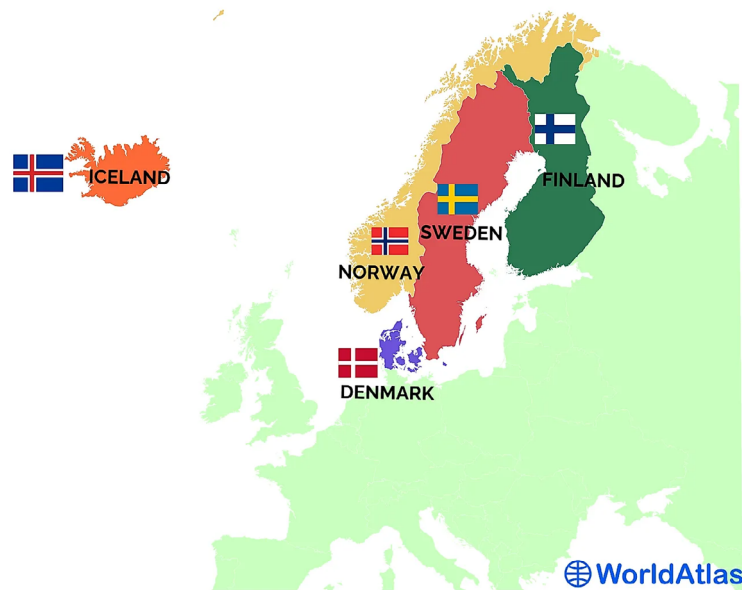
Context: This article discusses the significance of Nordic countries for India.

Introduction:

- Over the last decades, Nordic countries have been pioneering green technologies – hydrogen, offshore wind, batteries and carbon capture and storage — solutions that are essential for the world to succeed in the green transition.
- The Nordic region aims to become the most sustainable and integrated region in the world by 2030.
- At the Nordic-India Summit held in Copenhagen in May 2022, the five Nordic Prime Ministers and India’s Prime Minister Narendra Modi agreed to intensify cooperation on digitalisation, renewable energy, maritime industries, and the circular economy.
- Mr. Modi also expressed an interest in joint Nordic solutions that can support India’s green transition.

Nordic Countries:

- The Nordic countries are a geographical and cultural region in Northern Europe and the North Atlantic.
- It includes the sovereign states of Denmark, Finland, Iceland, Norway and Sweden, and the autonomous territories of the Faroe Islands (an archipelago of islands as an autonomous country within the kingdom of Denmark).
- These countries share similar flags, languages, and many cultural traits.



Source: World Atlas

Connecting with India:

- Trade Ministers of Norway and Finland along with business delegations and companies are currently visiting India together (February 9-10) to showcase the added value to the partnership these countries can bring to India and learn from the impressive innovations and digital solutions being developed in India.
- There are about 240 Norwegian and Finnish companies in India.
- Both Norway and Finland have ongoing free trade agreements and investments negotiations (FTA) with India.
- In addition, trade in services is an area of significant potential, especially with tourism, education, IT, energy, maritime and financial services.
- Finland, as a member of the European Union (EU), is a part of the EU-India FTA negotiations, and Norway is negotiating through the European Free Trade Association.

India-Finland:

- There has been a significant rise in trade and investments between Finland and India in recent years.
- Finland also opened a new Consulate General in Mumbai, which will further increase the number of Nordic representations in India and contribute to strengthening India-Finnish ties.
- Finland's experience in technology and innovation, sustainability, digitalization, carbon neutrality, and other sectors has attracted the attention of several Indian enterprises.
- Additionally, more and more Indian scholars, academics, and professionals are relocating to Finland.
- India is currently the largest growing market for Finnish businesses like Nokia and Fortum, who have made some of their biggest investments there.

India-Norway:

- Trade between Norway and India has doubled in the last three years.
- The Norwegian Sovereign Wealth Fund is likely to become one of India's largest single foreign investors (around \$17.6 billion).
- The Norwegian government has also recently established a new Climate Investment Fund for investments in renewables abroad, and India has been defined as a focus country.
- Almost ₹1,500 crores have been invested so far in India through the climate investment fund, and the number of investments is increasing rapidly.

Significance of Nordic countries to India:

- India and Nordic countries have embarked on a multidimensional strategic cooperation path in recent years based on mutual trust, enduring friendship, and a spirit of shared progress.
- The two sides are regarded as natural partners as they share strong democratic values and principles, pluralism, and institutional foundations.
- India and Nordic countries enjoy robust business partnerships with total bilateral trade and services of USD 13 billion.
- Nordic countries bring in the best of innovation, green technologies, clean energy, climate activism, and energy diversification.

- Apart from the United States, India is the only other country with which the Nordic countries have summit-level meetings.
- Heightened India–Nordic relations are also an enabling factor in promoting India's Arctic Policy which reflects New Delhi's strong determination for strategic presence in that region. Concurrently, it will also enable the consolidation of strategic ties with the European Union (EU).
- Despite ongoing investments and trade between India and Nordic countries, there is still significant untapped potential for trade and further collaboration.
- As India takes rapid strides into a green, digital, and innovative future, Nordic countries can share experiences in these fields and be a part of India's transition.
- A shared interest in enhancing investment in “innovative and sustainable solutions” in conjunction with “identifying new opportunities in sectors such as food processing and agriculture, health projects and life sciences” has been prioritised.
- One of the unique features of the India–Nordic strategic partnership is the emphasis on maritime cooperation. Heightened investment in the blue economy aiming to enhance shared economic progress, employment generation, nutrition, and food security is seen as a positive step.
- Technologies and innovations that are successful and scaled up in India can easily be transferred to other parts of the world.
- Together, the Nordics and India can be the powerhouse of the green transition globally.

Nut Graf: *The heightened India–Nordic partnership has been increasingly recognised globally as a reckoning force towards strengthening the international rules-based system in the evolution of the 21st-century world order. Together, the Nordics and India can deliver key technologies and solutions to stop climate change and boost green growth.*

12. Trade Integration Across Asia

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

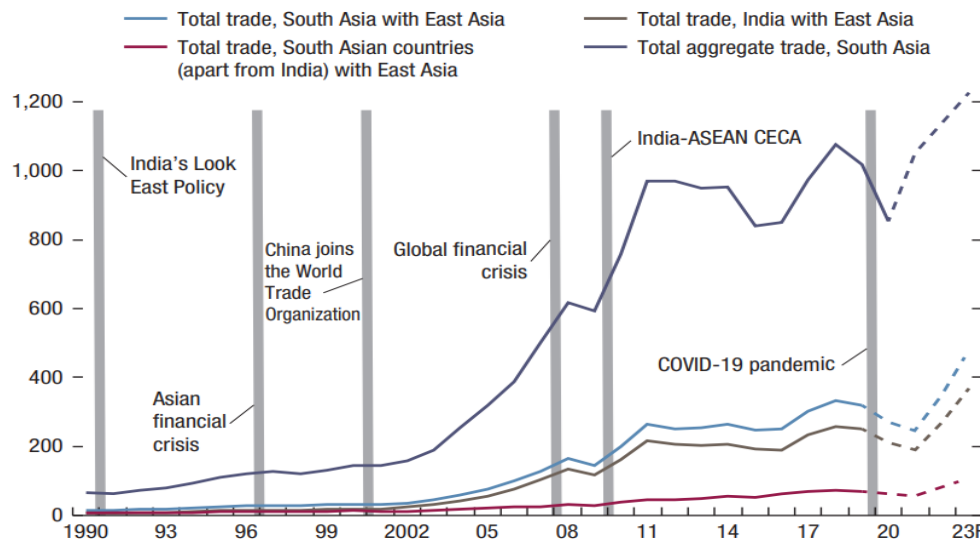
Mains: Significance of Trade and Connectivity Across Asia

Context: IMF Forecast on global trade in 2023.

Resilient growth of South Asia:

- The International Monetary Fund (IMF) on January 31, 2023, warned that global trade would slow down from 5.4% in 2022 to 2.4% in 2023.
- This forecast is optimistic with various risks such as an escalating Russia-Ukraine war, a decoupling from global supply chains and tackling variants of the COVID-19 virus.
- A recently published paper in an IMF book, “South Asia's Path to Resilient Growth”, argues that a strong base exists for South Asia trading more with dynamic East Asia.
- Since the 1990s, South Asia-East Asia trade has gathered pace, which is linked to India's trade re-aligning towards East Asia through its ‘Look East’ and ‘Act East’ policies, South Asia adopting reforms, and also China offshoring global supply chains to Asia.
- South Asia returned to the growth rates of the past two decades, achieved resilient and climate-friendly growth without a renewed buildup of macroeconomic vulnerabilities, and resumed the momentum of poverty reduction after the pandemic shock.
- Between 1990 and 2018, the overall merchandise trade between South Asia and East Asia increased by around 10% yearly, reaching \$332 billion in 2018. This commerce is expected to increase to about \$500 billion in the future.
- As global trade is slowing, trading more within Asia makes economic sense. The political will to implement pro-trade policies can improve the lives of people within Asia.

Figure 10.1. Total Merchandise Trade between South Asia and East Asia, 1990–2023F
(US billion dollars)



Source: Author's calculations based on IMF (2021).

Note: The "F" indicates a forecast. The 2020 and 2021 forecasts for total trade were calculated using percentage change in trade during the periods of 2008–09 and 2009–10, respectively. ASEAN = Association of Southeast Asian Nations; CECA = Comprehensive Economic Cooperation Agreement.

Source: IMF

Regional trade integration across Asia:

- A narrower geographical coverage between South Asia and Southeast Asia may be a building block for eventual trade integration across Asia.
- Regional trade integration across Asia can be encouraged by gradually reducing barriers to goods and services trade which were raised since the 2008 global financial crisis and never reversed.
- South Asia's trade opening should also be calibrated with tax reforms as trade taxes account for much of government revenue in some economies.
- To encourage trade benefits and reduce income inequality, it is also crucial to provide adjustment funding to losing industries so that production components may be redistributed and people can be retrained.
- Economies shall improve the performance of special economic zones (SEZs) by ensuring macroeconomic and political stability, adopting good practice regulatory policies towards investors, providing reliable electricity and 5G broadband cellular technology, and also upgrading worker skills.
 - South Asia has over 600 SEZs in operation, in Kochi (India), Gwadar (Pakistan), Mirsarai (Bangladesh) and Hambantota (Sri Lanka).
- Countries shall pursue comprehensive FTAs that eventually lead to the Regional Comprehensive Economic Partnership (RCEP) to provide for regional rules-based trade to insure against rising protectionism.

Relevance of FTAs:

- Historically, South Asia is described as having one of the lowest levels of trade integration in the world and the South Asian Free Trade Area (SAFTA) is believed to have had little success in facilitating intraregional trade.
- Pursuing comprehensive FTAs eventually leading to RCEP can provide a framework of regional rules-based trade to help insure against rising protectionist tendencies.
- India can still prepare for future RCEP membership by undertaking structural reforms to boost business competitiveness in supply chains and foster greater regulatory coherence with East Asia.
 - The rest of South Asia may be encouraged to join RCEP if India does so due to fear of being left out and facing the negative impacts of trade diversion.
- Stronger economic links and support for the interests of smaller members can be facilitated by a renewed Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC).
 - Reinventing BIMSTEC requires better resourcing of its Secretariat, concluding the long-running BIMSTEC FTA, building trade capacity in smaller economies, and introducing dialogue partner status to encourage open regionalism in Asia.
 - To mitigate a backlash against regionalisation, the larger economies should facilitate gains from trade to the smaller and poorer South Asian economies.

Nut Graf: Regional trade in Asia is recovering after the COVID-19 pandemic and has opened opportunities for South Asia to participate in global value chains and services trade. Therefore, South Asian economies shall have a relook at regional trade across Asia. As South Asia's largest economy, India's G-20 presidency can be a good platform to initiate these changes.

13. Locating China in the Russia-Ukraine war

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

Mains: China's stance and role in the Russia-Ukraine conflict and the rationale behind it

Context: This article examines and analyses China's stance and role in the ongoing Russia-Ukraine war.

China's stand on the war

- China's official stand on the ongoing Russia-Ukraine war has been that "all countries deserve respect for their sovereignty and territorial integrity" and that "support should be given to all efforts that are conducive to peacefully resolving the crisis".
 - China has been reiterating this stance at various global multilateral institutions.
- China with its emphasis on "all countries" seems to be showcasing itself to be equidistant from both the conflicting countries.
 - However, despite this demonstration, China's stance on the conflict has been regarded as "**pro-Russian neutrality**" by various experts.
- Further, out of the seven resolutions put to vote in global institutions such as the UN General Assembly, UN Security Council, UN Human Rights Council and the World Health Organization (WHO) by the West against Russia, China has voted against in three instances and has abstained from voting in the other four occasions.
 - China however voted in favour of a UN Security Council resolution that referred to a proposal raised by Russia on humanitarian aid.
- It is well known that Russia and China are involved in a "**Comprehensive Strategic partnership of coordination for a new era**" and even during the ongoing war, China has moved forward to strengthen its relations with Russia.
- Furthermore, China on multiple occasions has supported the Russian narrative by accusing the U.S. and NATO of being the prime instigators of the crisis.
- Hence, China's narrative of being neutral has many discrepancies.

Involvement of China in the war

- China's actions to date have not been in a direct form and have been in an indirect manner.
- Ever since the onset of the conflict, China has significantly benefited from the purchase of oil and gas from Russia at cheaper prices.
 - China has replaced Germany as the largest buyer of Russian oil and Russia has displaced Saudi Arabia as China's largest supplier of crude oil.
- Apart from oil, gas and hydrocarbons the cooperation between China and Russia also extended to the exchange of materials and technology.
- As per the Wall Street Journal, China had extended covert support to Russia by accessing Russian customs data compiled by an American think tank named C4ADS.
- Reports also suggest that China's defence sector state-owned enterprises have dispatched navigation equipment, jamming technology, radar systems and fighter-jet parts to Russia.
 - Reports also claim that China had dissipated millions of chips which are a critical component of modern military equipment.
- Further, it is said that thousands of shipments of dual-use goods have been sent by China to Russia which would have otherwise been restricted due to sanctions.
- The U.S. has also imposed sanctions recently on a satellite company of China named "Spacety China" which was indirectly providing satellite imagery of Ukraine to a Russian private military force called "Wagner Group" which is involved in the conflict.
- However, China has dismissed such allegations and has held that the military dimensions of such transactions were just speculations.
- China is extending such assistance to Russia at a time when China itself is demanding that Western countries not send military aid to Ukraine as it intensifies the ongoing conflict.

Change in the stance

- As the war progressed, there seems to be a change in the Chinese stance.
- The President of China, during his meeting with the German Chancellor in November 2022 had said that the war should not cross the nuclear threshold referring to the Russian President's nuclear threats to Ukraine.
- Further, the Chinese Foreign Minister in an article said that if China knew about the crisis the war could cause, China would have tried to prevent the war.
- Additionally, there are many leaders within the Chinese governmental hierarchy who have criticised Russia's actions.
- Even during the G-20 summit held at Bali in November 2022, the leaders' declaration on the war, which stated that most of the G-20 members strongly condemned the war, was not endorsed by China only because of its objections towards calling the conflict a "war".
 - But China here only opposed the terminology of "war" and did not oppose the condemnation of the conflict itself.

Path ahead

- China's direct support to Russia will affect its relations with Ukraine as well as the European Union (EU).
 - China is the largest trading partner for both Russia and Ukraine.
 - Ukraine is China's largest corn supplier.
 - Furthermore, Ukraine is the third largest supplier of military equipment to China and Ukraine is the biggest market for defence goods from China.
 - China's first aircraft carrier, **Liaoning**, is a refurbished aircraft carrier bought from Ukraine after the disintegration of the Soviet Union.
 - China at present also has strong economic relations with the EU and cannot risk it.
- It is also important for China to ensure that Russia continues to be its close aid as Russia is China's premier ally in its larger global ambition to displace the U.S. as the global superpower.
 - Not just this, China could also use the Russian card to gain concessions from the West on the trade and technological fronts.
- The war has further provided an opportunity for China to compensate for the withdrawal of Western investment and technology in Russia.
- The prolonged conflict in Ukraine has also distracted the West from the Indo-Pacific theatre which has provided China with a chance to extend its influence in the region.

Nut graf: It has been nearly one year since the start of the Russia-Ukraine war and there are still no signs of de-escalation of the war. Experts in this context believe that it is in China's best interest to keep Russia and the West divided in order to prepare itself for an inevitable period of hostility with the U.S. in the coming years.

14. The New START treaty on pause

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

Prelims: New START treaty.

Mains: New START treaty.

Context: The Russian President announced the suspension of its participation in the New START treaty (February 2023).

Details:

- On the eve of the first anniversary of Russia's "special military operation" in Ukraine (23rd February 2023), Russian President Vladimir Putin said that Russia was unilaterally suspending the last remaining nuclear arms control treaty (New START) with the U.S.
- The U.S. Secretary of State, Antony Blinken, responded by terming the move as "deeply unfortunate and irresponsible".
- The START treaty was signed in 1982 by Ronald Reagan and Mikhail Gorbachev, the then leaders of the U.S. and the erstwhile Soviet Union respectively.

Background Details:

- The U.S. and Russia engaged in multiple bilateral talks to reduce and keep checks on each other's nuclear arsenals. For instance,
 - The Strategic Arms Limitation Talks (SALT) was the first formal dialogue in 1969.
 - The Anti-Ballistic Missile defence systems Treaty was signed in 1972. It provided for the shooting down of incoming missiles. It was unilaterally pulled out of the pact by the U.S. in 2002.
 - In 1991, the Strategic Arms Reduction Treaty (START I) was signed (expired in 2009).
 - The Strategic Offensive Reductions Treaty (SORT or Moscow Treaty) was signed in 2002. However, it was replaced by the New START treaty in 2010.
- The New START treaty was the last remaining nuclear weapons control agreement between Moscow and Washington that together hold 90% of the world's nuclear arsenal.

Details about the New START treaty:

- It was signed by former U.S. President Barack Obama and Russian President Dmitry Medvedev. It came into force in February 2011.
- In 2021, it was extended for five years.
- According to the Treaty, America and Russia cannot deploy more than 1,550 strategic nuclear warheads and more than 700 long-range missiles and bombers.
- It further limits the countries to 800 deployed and non-deployed launchers and delivery vehicles.
- Moreover, it allows both countries to carry out up to 18 short-notice (32 hours) on-site inspections of strategic nuclear weapons sites annually to check that the other country had not violated the limits set in the treaty.
- Russia and the U.S. should also exchange data on ballistic missiles, bombers, test sites, nuclear bases, etc twice a year.
- It also mandates the two countries to send notifications within five days of new changes or updates in their stockpile. For example, moving missiles to a new base or deploying a new warhead to the system.

- The agreement gave both countries seven years to reduce their stockpiles. Consequently, in 2018 both nations met the arms limits prescribed by the pact.
- It should be noted that the inspections were put on hold in March 2020 (due to COVID-19).

Russia's stand:

- Russian President Vladimir Putin said that while the U.S. had pushed for the resumption of inspections of Russian nuclear facilities, NATO allies were helping Ukraine to launch drone attacks on Russian air bases hosting nuclear-capable strategic bombers.
- Russia has also pointed out that the nuclear weapons of Britain and France were part of NATO's nuclear capability but weren't included in the U.S.-Russian pact.
- The U.S. is also accused of rejecting Russian requests for visits to specific U.S. facilities.

Consequences of the move:

- The analysts suggest that the move would not immediately trigger an arms race between the two powers, as Russia has not withdrawn from the treaty and only "suspended" it.
- Moreover, the Russian administration has clearly stated that it does not plan to breach the limits on warheads prescribed in New START.
- Similarly, in another statement by the Russian Foreign Minister, Russia would continue to notify the U.S. of planned test launches of inter-continental ballistic missiles (ICBMs).
- It is also highlighted that the move is a political message indicating that Russia no longer thinks that nuclear arms control is a separate issue from bilateral relations (Russia-Ukraine conflict).
- Observers are of the view that Russia's move will disturb the fragile calculus of nuclear arms controls between the two largest nuclear powers.
- It will also give an opportunity to other nuclear-armed countries, particularly China and others (Pakistan, Iran, Israel, and India) to increase their arsenals.
- It also has the potential to hamper arms control cooperation between the U.S. and China.

Nut Graf: Russia's move to suspend the New START treaty has raised concerns for international peace. It would give the opportunity to other nuclear-armed countries to increase their arsenals.

15. Will the Seattle move shield against caste bias?

Syllabus: Effect of policies of developed countries on India's interests, Indian Diaspora.

Mains: Seattle Ordinance against caste-based discrimination.

Context: Seattle city council has issued an ordinance against caste-based discrimination.

Seattle Ban on Caste Discrimination:

- The Seattle City Council became the first U.S. city to ban caste-based discrimination.
- An ordinance was issued on 21st February 2023 that amended the City Municipal Code and it aims to prevent businesses from discriminating against individuals based on their caste with regard to wages, tenure, promotion, hiring and workplace conditions.
- Many universities in the U.S. such as Harvard, Brown, and California State University also added caste criteria to their anti-discrimination policies.
- Further, the new law will also prohibit caste-based discrimination in places of public accommodation, such as hotels, public transportation, retail establishments, and public restrooms. The law will apply to mortgage loans, property sales and rental housing leases.
- The council defined caste as "A rigid social stratification characterized by hereditary status, endogamy, and social barriers sanctioned by custom, law, or religion".
- The fight against caste-based discrimination in Seattle was led by Dalit rights activists, local groups, and organizations like Equality Labs.
- On one hand, Dalit rights activists praised the ordinance, while some groups like the Hindu American Foundation raised concerns about more legal scrutiny.

Causes of move against caste-based discrimination:

- As per a survey by Equality Labs in 2016, one in four Dalits in the U.S. had faced verbal or physical assault. Moreover, two out of every three reported facing discrimination at work.
- Various companies like Microsoft, Amazon, and Boeing, are located in Seattle and have many workers from South Asia (including India).
- There are more than 150000 South Asian residents based in Seattle (Washington report).
- In the year 2000, the first case of caste exploitation was reported in California, U.S. Several Dalit workers including minor girls were trafficked from Andhra Pradesh, India by a person of a Dominant caste.

Status in India:

- As per Census 2011, 20 crore Dalits are estimated in India.
- The Constitution (Scheduled Castes) Order of 1950 was enacted, recognizing Hindu Dalits as Scheduled Castes. The order was further amended to include Dalits that converted to Sikhism and Buddhism.
- Article 15 of the Indian Constitution also prohibits discrimination on the basis of religion, race, caste, sex, place of birth, or any of them.
- Despite constitutional and various legal provisions (including reservation), discrimination still persists in society. For instance, according to the National Crime Records Bureau (NCRB) around 50,900 cases of crimes against Scheduled Castes (SCs) were registered in 2021. It is a 1.2% increase from 2020.
- The crime rate is particularly high in Madhya Pradesh and Rajasthan.

Nut Graf: *The proposed Seattle ordinance makes it illegal to tarnish someone in the name of caste. It is suggested that every city and nation should add caste to their non-discrimination policies.*

16. Nine guest countries for G-20

Syllabus: Global groupings involving India

Prelims: Facts about G20

Context: The “nine guest countries” to the G-20 summit are expected to come up with their own plans but they will be ultimately guided by the “continuity” of G-20.

G20 or Group of Twenty

Source: pmindia.gov

- G-20 was established in 1999 as an acceptable medium between the elitist G-7 (G-8 earlier) and the Organisation for Economic Co-operation and Development (OECD).
- The G20 is a strategic multilateral platform connecting the world's major developed and emerging economies.
- The G20 holds a strategic role in securing future global economic growth and prosperity as the G20 members represent:
 - Over 80% of the global GDP
 - About 75% of international trade
 - Close to 60% of the world's population
- **Members:** Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States, and the European Union.
- India assumed the presidency of the G20 grouping from Indonesia, on December 1, 2022, and will hold the post for a year.
 - It should also be noted that the current year's “Troika” of G-20 is made up of emerging economies for the first time with India, Indonesia, and Brazil.
 - India's G20 logo juxtaposes planet Earth with the lotus, India's national flower and the theme is ‘Vasudhaiva Kutumbakam’ or ‘One Earth-One Family-One Future’.
 - The G20 Logo draws inspiration from the vibrant colours of India's national flag – saffron, white, green and blue.
- Under India's Presidency, nine countries have been invited to be the “**guest countries**”, they include Bangladesh, Egypt, Mauritius, the Netherlands, Nigeria, Oman, Singapore, Spain and the UAE.

ART AND CULTURE

1. Draft Geo-heritage Sites and Geo-relics (Preservation and Maintenance) Bill, 2022

Syllabus: Conservation of Indian culture in the form of Art, literature and Architecture

Prelims: Geological Survey of India and Archeological Survey of India

Mains: Draft Geo-heritage Sites and Geo-relics (Preservation and Maintenance) Bill – salient features, significance and various associated concerns.

Context: The country's geo-sciences and palaeontology experts have raised concerns over the Draft Geo-heritage Sites and Geo-relics (Preservation and Maintenance) Bill, 2022 as they believe that the Bill vests powers entirely in the hands of the Geological Survey of India (GSI).

Draft Geo-heritage Sites and Geo-relics (Preservation and Maintenance) Bill, 2022

- As a signatory to the UNESCO Convention on Protection of the World Cultural and Natural Heritage, India was required to formulate legislation for protecting and preserving the geo-heritage of the country.
- In this context, the Union Ministry of Mines has formulated a draft of the Geoheritage Sites and Geo-relics (Preservation and Maintenance) Bill, 2022.
- The Bill aims to provide for the declaration, preservation, protection and maintenance of geo-heritage sites and geo-relics of national importance for geological studies, research and spreading awareness about such sites.
 - Geo-heritage sites are those sites that are of rare and unique geological and geomorphologic significance having geomorphological, mineralogical, petrological, paleontological, and stratigraphic significance.
 - Geo-relics are those relics or materials of geological significance or of national and international interest such as various minerals, meteorites, etc.
- The protection under the Bill also extends to caves, fossils, sedimentary rocks, natural rock sculptures, natural structures, etc.
- The draft Bill further notes that the deterioration of such material of geo-heritage and geo-relics significance will result in harmful impoverishment of the natural heritage of the Indian subcontinent that showcases unique geological characteristics of outstanding universal value.

Salient features of the draft Bill

- The draft Bill empowers the Union Government to declare a geo-heritage site to be of national importance.
 - While declaring such sites, the Union Government is required to provide two months' notice and consider objections before the declaration.
- The Bill has further empowered the Union Government to acquire an area under a geo-heritage site under the provisions of the **Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013**.
- Both the Union Government as well as GSI are required to undertake measures to preserve and maintain every geo-heritage site and are authorised to inspect, survey, collect measurements and samples, undertake exploration operations, examine documents, etc.
- The Bill prohibits the construction, reconstruction, repair, or renovation of any building within the geo-heritage site area except for the purpose of conservation and maintenance of the geo-heritage site or if such construction is essential to the public.
- The Bill further provides penalties for destruction, removal, defacement, and misuse of geo-heritage sites and geo-relics.
- The powers accorded to GSI:
 - Identifying and declaring sites as having "geo-heritage" value.
 - Take possession of relics that rest in private hands.
 - Prohibit construction about 100 metres around geo-heritage sites.
 - Impose penalties against vandalism, defacement, and violations of directives of a site.

Associated concerns

- Experts, despite welcoming a geo-heritage bill, believe that instead of providing all authority to the Director General of GSI, there must be provisions to form a wider committee of experts from a range of institutions.
- Experts opine that by extending powers entirely to the hands of GSI, the Bill has neglected the interests and difficulties faced by researchers who actually undertake field studies.
- Furthermore, according to experts, the GSI is not equipped to manage such tasks of geo-heritage conservation, as it is mainly a research body.
 - They believe that the Archeological Survey of India (ASI) is more experienced in the conservation, preservation, and restoration of artefacts and sites.
- The new Bill also empowers the Union government to denotify existing geo-heritage sites without any provision for public consultation if the Government believes that such sites are no longer of national importance.

- The Bill fails to provide for collaborations with other departments and also dilutes the powers of the State Governments which are currently managing most of the geo-heritage monuments.

Geological Survey of India:

- The Geological Survey of India (GSI) is a scientific agency established in 1851, for conducting geological surveys and studies of India, and also is the prime provider of basic earth science information to the government, industry and the general public.
- Currently, the Geological Survey of India is an attached office to the Ministry of Mines.
- GSI is headquartered in Kolkata. Further, GSI has six Regional offices located at Lucknow, Jaipur, Nagpur, Hyderabad, Shillong and Kolkata.
- The main functions of GSI relate to creation and updating national geoscientific information and mineral resource assessment.
- The GSI has declared 32 geo-heritage sites, including the Siwalik Fossil Park in Himachal Pradesh; Stromatolite Fossil Park, Jharmarkotra Rock Phosphate deposit, and Akal Fossil Wood Park in Rajasthan.

Archeological Survey of India (ASI)

- The Archaeological Survey of India (ASI) is the premier institution in India for archaeological research.
- ASI is an attached agency of the Ministry of Culture of the Government of India.
- ASI was founded in 1861 by a British Army engineer who took a keen interest in archaeology in India, James Cunningham. Post the Indian independence, ASI has been working as a statutory body under the Ancient Monuments and Archaeological Sites and Remains Act (AMASR Act) of 1958.
- The ASI is headed by a Director-General and is headquartered in New Delhi.
- The ASI performs and regulates all activities related to archaeological research and excavation in India. It also preserves and maintains historical monuments and sites.
- ASI has more than 3500 protected monuments and archaeological sites of National Importance that it protects and preserves.

Nut graf: The geo-diversity of the Indian subcontinent is said to be 4.5 billion years old and records some of the world's most significant geological events which are required to be preserved and protected for geological studies, and research purposes. In this regard, the formulation of a draft Bill for the conservation of such sites is a welcome move, but various concerns associated with the Bill must be well addressed before passing it as legislation.

2. Mohiniyattam Dance

Syllabus: Salient aspects of Art Forms

Prelims: Mohiniyattam Dance Form

Context: Well-known Mohiniyattam artiste Padma Bhushan Dr. Kanak Rele has passed away.

Mohiniyattam

- Mohiniyattam is a classical dance form of India belonging to the **State of Kerala**.
- Mohiniyattam dance is performed by women to honour **lord Vishnu** in his incarnation as Mohini.
- It is traditionally performed only by women. Kathakali, on the other hand, was confined to men, although, in modern times, women also take it up.
- Mohiniyattam's underlying traditions are found in **Bharata Muni's Natya Shastra**.
- Mohiniyattam is based on Natya Shastra's **lasya style**.
- The dancer wears a white or cream plain saree adorned with coloured or gold brocade weaved in its fringes in the typical Kerala style. The artist also wears gold jewellery on her neck, arms, hands, ears, etc.
- One of the earliest references of Mohiniyattam is available in **Vyavaharamala**, which is a 16th century text on Indian jurisprudence authored by Mazhamangalam Narayanan Namboodiri.
- Mohiniyattam dance form involves delicate footsteps, undulating body movements, and subtle facial expressions.
- The language of the lyrics or song is **Manipravalam** which is a mixture of Malayalam and Sanskrit and the songs are generally in the **Sopana style**.
- Instruments used are flute, veena, and percussion instruments such as Mridangam, Maddalam, Idakka and Kuzhitalam (cymbals).
- Travancore King Swati Thirunal contributed immensely to the growth and systematisation of the art form.

Padma Bhushan Dr. Kanak Rele

- Noted classical dancer and dance educationist, Kanak Rele, who is widely recognized as one of India's most innovative dancers, passed away on 22 Feb 2023.
- Kanak Rele played a pivotal role in bringing a systematic structure, academic credibility and prominence to Mohiniyattam, in addition to promoting female roles in Kathakali.
- In her performances, Rele depicted the nayika as a strong character, rather than a lovelorn woman merely waiting for her nayaka.
- Furthermore, she documented and developed an academic framework for Mohiniyattam, establishing the Nalanda Dance Research Centre in 1966 and the Nalanda Nritya Kala Mahavidyalay in 1972.
- Rele's efforts also involved securing affiliation with the University of Mumbai for Nalanda, leading to a formal degree in the art form.

3. Aadi Mahotsav festival

Syllabus: Indian Heritage and Culture

Prelims: Aadi Mahotsav festival

Context: The Prime Minister of India will inaugurate the Aadi Mahotsav festival at Major Dhyan Chand Stadium in New Delhi on the 16th of February 2023.

Aadi Mahotsav festival

- Aadi Mahotsav festival is a celebration of the spirit of Tribal Culture, Craft, Cuisine, and Commerce.
- The Aadi Mahotsav festival is a flagship event of the Tribal Co-Operative Marketing Development Federation of India Ltd. (TRIFED).
- Aadi Mahotsav is the National Tribal Craft Expo which provides a platform for the tribal population of the country to showcase their products and help them connect with the mainstream populations.
 - Thus, Aadi Mahotsav plays a key role in establishing a direct connection between the tribal communities and a direct market in large metro cities and State capitals.
- Various tribal art and crafts exhibited at Aadi Mahotsav include handlooms, paintings, jewellery, cane and bamboo, pottery, food, natural products, tribal cuisine, etc.

4. ASI decides to form special panel to trace and certify 24 'missing' monuments

- The Archaeological Survey of India (ASI) will be setting up a special panel to trace and certify about 24 protected monuments that have gone "missing" after repeated concerns raised by a parliamentary committee and the Economic Advisory Council to the Prime Minister.
- A Standing Committee on Transport, Tourism and Culture in the Rajya Sabha had cited the performance audit by the Comptroller and Auditor-General of India (CAG) which had convened a joint physical inspection of about 1,655 monuments and sites along with the ASI.
 - The Standing Committee had said that it was disturbing to find that the Barakhamba Cemetery, which was in the very heart of the capital city, was among the untraceable monuments.
 - Other monuments to be missing include ruins of a temple complex in Mirzapur (Uttar Pradesh) dating to AD 1000, two Kos Minars (one in Faridabad's Mujesar and the other in Kurukshetra's Shahabad), a 12th-century temple in Rajasthan's Baran and the Inchla Wali Gumti at Mubarakpur Kotla, New Delhi.
- The Union Minister of Culture has said in the Rajya Sabha that the 2013 report of the CAG had found 92 protected monuments to be missing out of which the ASI had traced 68 monuments and 24 are yet to be traced.
- At present, there are 3,693 Centrally protected monuments and sites in India and according to the existing process, a special committee would be set up with experts of the ASI and usually headed by the Director-General of the ASI which would survey the missing 24 monuments and certify them as "found" or "not found".
 - If in case a monument is "not found", then a process would be started to denotify such sites through the parliamentary procedure.

5. Bhimbetka Rock Shelters

Context: Fossils of an extinct species, Dickinsonia, that scientists reported in a discovery from India's Bhimbetka Rock Shelters in 2021 have been found to be a false alarm.

Details:

- The findings of fossils of an extinct species of animal from India's Bhimbetka Rock Shelters in 2021 have been found to be untrue.
- Researchers had found what looked like a 44-cm-wide fossil of Dickinsonia in a cave in Bhimbetka.
- Dickinsonia is an animal that lived at least 538 million years ago.
- However, the Dickinsonia fossils found in other parts of the world were found to be circular or oval in shape, somewhat flat, with rib-like structures radiating from a central column which pointed out discrepancies in the one found in the Bhimbetka cave.

- More research has revealed that the fossil impression found in the Bhimbetka cave is the result of the decay of a modern beehive that was attached to a fractured rock surface.



Source: Times of India

About Bhimbetka Rock Shelters:

- The Bhimbetka rock shelters are an archaeological site in central India that spans the Paleolithic and Mesolithic periods, as well as the historic period.
- It exhibits the earliest traces of human life in India and evidence of Stone Age starting at the site in Acheulian times.
- It is located in the Raisen District of Madhya Pradesh.
- **It is a UNESCO World Heritage Site.**
- Some of the Bhimbetka rock shelters feature prehistoric cave paintings.
- The rock shelters and caves provide evidence of a “rare glimpse” into human settlement and cultural evolution from hunter-gatherers, to agriculture, and expressions of prehistoric spirituality.



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SCIENCE AND TECHNOLOGY

1. Budget Allocation for Science

Syllabus: Science and Technology- developments and their effects in everyday life.

Mains: India's budget policy on Science and Technology

Context: The Ministry of Science & Technology has received an increased allocation in the Union Budget 2023-24.

Key Details:

- The Ministry of Science & Technology has been granted an allocation of ₹16,361.42 crores which marks a nominal increase of 15% from the previous budget estimate.
- Out of this, the Department of Science and Technology (DST) has received ₹7,931.05 crores (32.1% increase compared to the previous year).
 - It was ₹2,683.86 crore for the Department of Biotechnology, or DBT (a nominal hike of 3.9%), and ₹5,746.51 crore (1.9%) for the Department of Scientific and Industrial Research (DSIR).
- However, between 2021-22 and 2022-23, the Ministry has seen a 3.9% decrease.
- The Ministry of Science & Technology was crucial during the COVID-19 pandemic, especially in supporting research and innovation on vaccines, medical devices, and drugs.
- Most of the DST's increase comes from a ₹2,000 crore allocation to the National Research Foundation (NRF).
 - The government announced NRF in 2021 with an outlay of ₹50,000 crore over five years to "strengthen the governance structure of the research-related institutions and to improve linkages between R&D, academia, and industry".
- The Biotechnology Industry Research Assistance Council (BIRAC) under the DBT, an implementing body under the government's 'Mission COVID Suraksha' in 2020 to develop COVID-19 vaccines and augment vaccine manufacturing, has received a 40% cut.
- The Ministry of Earth Sciences has received ₹3,319.88 crore, a hike of 25.11%. While high, this is relatively lower than the previous hike of 40%.
 - The Deep Ocean mission, which includes among other components developing a deep-submersible vehicle, has substantially higher hikes than in previous years.

Analysis of budget allocation:

- Allocation of ₹16,361.42 crore for the Union Ministry of Science and Technology makes up only 0.36 per cent of the overall Union Budget 2023-24.
 - The allocation is very less in comparison with South Korea's 4.8 percent of GDP in science and technology, according to the World Bank. The United States and China spend 3.45 per cent and 2.4 per cent, respectively.
- India's gross expenditure on research and development (GERD), which includes State government and private-sector investments, has been steadily declining since 2009-2010, making higher public sector investment in R&D a longstanding demand of the national research community.
- The budget speech made several references to investing in dedicated centres for excellence in 'Artificial intelligence' research, initiatives to scale up the technology to produce laboratory-made diamonds and a centre for research in sickle cell anaemia.
 - To realise the vision of "Make A-I in India and Make A-I work for India", three centres of excellence for Artificial Intelligence will be set up in top educational institutions.
- However, none of the budgetary allocations suggests a significant scale-up of basic research.
 - The numbers mentioned in the Budget do not translate into meaningful results on the ground many times.
 - For example, DST has announced a new scheme called Women in Science and Engineering Post-doctoral fellowship which awards women researchers a fellowship of Rs 55,000 per month and a research grant of Rs 2 lakh annually to help close the gender gap in science.
 - Rs 2 lakh covers research expenses, contingency, travel and the like. But the grant is restrictive which demotivates individual women post-doctoral researchers, who are not employed but get research support from the government.
- A major challenge continues to be research scholars not getting promised funds on time and the wait for quality equipment required by researchers due to bureaucratic hurdles.
- The bulk of research continues to be funded by the government and the participation of the private sector has grown only incrementally.
- Therefore, the government must increase the size of the funding and also ease the procedures to make the most efficient use of it in the coming years.

Nut Graf: The Ministry of Science & Technology has been allocated ₹16,361.42 crores in the 2023-24 Union Budget. Although it marks a nominal increase of 15% from the previous Budget estimate, it still makes up only 0.36 per cent of the Budget. Experts believe that the present allocation is not sufficient as it does not account for inflation or foster a research ecosystem.

2. India's R&D estimates

Syllabus: Science and Technology - indigenization of technology and developing new technology.

Mains: Various issues with R&D Statistics compilation in India

Context: This article discusses India's research and development (R&D) statistics.

Introduction:

- India's R&D expenditure-GDP ratio has been relatively low compared to other developed countries. According to the National Science and Technology Management Information System (NSTMIS), the R&D expenditure-GDP ratio in India was around 0.7% in 2018-19.
- While this represents an increase from previous years, it is still significantly lower than the R&D expenditure-GDP ratios of many other countries, including the United States, Japan, and South Korea, which all invest over 3% of their GDP in R&D.

Inaccurate Data:

- The main reason is the low investment in R&D by the corporate sector. While the corporate sector accounts for about two-thirds of gross domestic expenditure on R&D (GERD) in leading economies, its share in India is just 37%.
- However, evidence suggests that India's GERD data are incomplete and inaccurate.
 - For instance, a 2022 info brief of the National Science Foundation (NSF) of the United States on Foreign R&D by U.S.-based multinational corporations (MNCs) shows a spend of \$9.5 billion (₹649.7 billion) on R&D in India in 2018.
 - But the latest Research and Development Statistics, published by the Department of Science and Technology (DST) in 2020 has provided an estimate of ₹60.9 billion in R&D spending in 2017-18 by foreign MNCs, which is only about 10% of what U.S. firms have reported to have spent in India on R&D.

Issues with the current system:

- NSTMIS compiles GERD statistics in India. And it faces challenges in collecting data from the private corporate sector.
- One issue with compiling statistics on GERD is the challenge of defining what exactly counts as research and development. Different countries and organisations may have different definitions and criteria for what qualifies as R&D spending, which can lead to discrepancies in reported figures.
- The method used by NSTMIS for the identification of R&D performing firms does not capture all the R&D performing firms due to poor registration and categorisation of firms.
 - For example, SigTuple Technologies, which is a leading start-up in India focusing on artificial intelligence-based HealthTech and has filed 19 patents as of 2021, is unlisted in government databases.
- For those firms which do not respond to the survey by NSTMIS, the data is collected from secondary sources such as annual reports and the Prowess database.
 - This method will work only if firms disclose their R&D spending. However, some firms do not report any spending on R&D in spite of their declarations and have patents granted in India.
- Additionally, accurately measuring R&D spending can be difficult, as it may involve estimating the value of intangible assets such as intellectual property.

Way Forward:

- In the short term, the NSTMIS should use the patents granted data, both in India and the U.S., in addition to its current method to identify R&D-performing enterprises.
- Annual R&D estimates can be prepared from mandatory disclosures that the enterprises are required to make to the Ministry of Corporate Affairs instead of confining R&D statistics to the responses to the surveys.
- In order to ensure compliance and proper reporting, technologies can be used like in the case of revamped income-tax return forms where various sections are interlinked.
- Proper disclosure of information to regulatory agencies, including R&D spending data, should be made an essential component of the environmental, social and governance (ESG) ranking of enterprises.
- While GERD statistics can provide valuable insights into the state of research and development in a country, they may not capture all relevant factors, such as the quality or impact of the research being funded. It is important to interpret statistical data in context and to consider other sources of information when making decisions related to research policy and funding.

Nut Graf: India's research and development (R&D) expenditure-GDP ratio is 0.7% which is much below the world average of 1.8%. India also has various issues with collecting data from the private corporate sector on gross domestic expenditure on R&D (GERD). Therefore, transforming India's R&D statistics to truly reflect the R&D ecosystem calls for short-term and medium-term measures.

3. Voice deepfakes: how they are generated, used, misused and differentiated

Syllabus: Science and Technology – developments and the associated issues

Prelims: About Deepfakes and Voice Deepfakes

Mains: Voice deepfakes – associated concerns and possible solutions

Context: Recently, users of social media platform named “4chan” used the features of “speech synthesis” and “voice cloning” and replicated the voice deepfakes of celebrities to make racist, abusive, and violent comments.

Deepfakes

- Deepfakes refer to digital content such as video, audio and images which are edited, altered and manipulated using Artificial Intelligence (AI) technology.
- Deepfakes are artificial images and audio that are often put together using machine-learning algorithms and are used to spread misinformation and replicate a person’s appearance, voice, etc.
- The main machine learning methods used to create deepfakes are based on deep learning and involve training generative neural network architectures, such as autoencoders or generative adversarial networks (GANs).

Voice deepfakes

- Audio can also be deepfaked to create “voice skins” or “voice clones” of public figures or celebrities.
- A voice deepfake refers to mimicking a real person’s voice by accurately replicating the tone, accents and other unique features of that person.
- Voice deepfake is created using AI, advanced computers with high-end graphics cards and robust cloud computing technologies.
- Other than the specialised applications and softwares, training data are to be fed to AI models in order to create deepfakes.
 - This training data includes original voice recordings of the targeted individual so that the AI can use the training data to render an authentic-sounding voice.
- **Well-known tools/software used for voice cloning:** OpenAI’s Vall-e, My Own Voice, Resemble, Descript, ReSpeecher, and iSpeech.

Concerns associated with voice deepfakes



Source: www.fortinet.com

- There have been instances where voice deepfakes were used to defraud users and in various other illegal activities such as phone scams and posting fake videos on social media.
 - In the UAE, a bank manager was duped \$35 million by a person who had cloned a company director’s voice.
- Critics have also flagged the potential risks of identity theft using deepfakes and voice deepfakes.
- Also, the use of voice deepfakes in filmmaking has given rise to ethical concerns about the use of the technology.
- Furthermore, improvements and advancements in the existing technologies are making it much easier to gather clear voice recordings of people and improving the quality of data fed to AI models. This has facilitated the creation of more accurate and believable deepfake voices which can lead to scarier situations.

Ways to detect voice deepfakes and the way forward

- Detecting voice deepfakes requires the adoption of highly advanced applications, software, and technologies that have the ability to synthesize speech patterns, background noise, and other elements.
- However, there are still no cybersecurity tools that can detect audio deepfakes in a foolproof manner.
- Researchers across the world are examining the prospects of using watermarks and blockchain technologies to detect deepfake technology.
- Existing applications such as “Deepttrace” are helping to provide protection to a certain extent.
 - The “Deepttrace” application uses a combination of antivirus and spam filters that surveil data and flags suspicious content.
- Researchers at the University of Florida have also come up with a technique that measures acoustic and fluid dynamic differences between original voice samples and those created artificially.
- Call centres across the world are required to undertake various measures to mitigate the threat from voice deepfakes.
- There is a need to deploy multifactor authentication (MFA) and anti-fraud solutions in order to address the risks associated with deepfakes.
- Additionally, factors such as devising call metadata for ID verification, digital tone analysis, and key-press are to be used to analyse behavioural biometrics and identify fake or suspicious calls.

Nut graf: Deepfake technology is posing significant threats to cybersecurity in recent times. The challenges posed by the issue require governments across the world to adopt a multi-stakeholder and multi-modal approach along with the introduction of regulations and technology interventions.

4. CAR T-cell therapy: the next step towards a holistic treatment of cancer

Syllabus: Science and Technology – developments and their applications and effects in everyday life.

Prelims: About CAR T-cell therapy

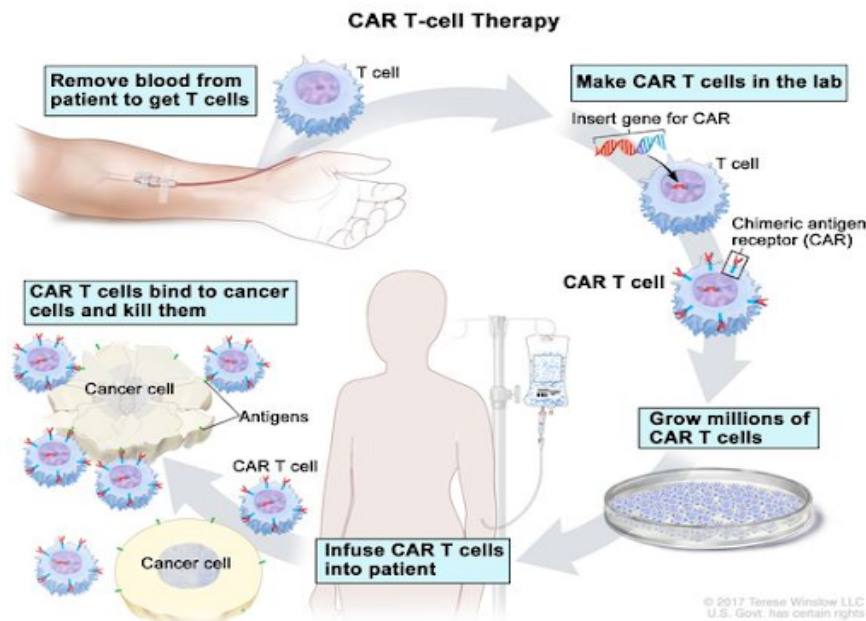
Mains: CAR T-cell therapy – working, significance, application, key issues and the way forward.

Context: CAR T-cell therapy is a new development in the available treatment of cancer which is currently attracting the attention of several researchers across the world.

Details

- Traditionally, there have been three major types of treatment for any type of cancer, they are:
 - **Surgery:** Involves removal of the cancer.
 - **Radiotherapy:** Involves delivering ionising radiation to the tumour in order to cure cancer.
 - **Systemic therapy:** In this type of treatment medicines are administered that act on the tumour.
- While surgery and radiotherapy forms of treatments have been refined over the years, systemic therapy methods have experienced significant advances.
 - **Chemotherapy** was the earliest form of systemic therapy. However, it was seen that the chemotherapeutic therapy had lower response rates along with significant potential side effects which affected various other essential cells in the body.
 - **Immunotherapy** was the next stage of advancement in systemic therapy. In this case, the drugs bind themselves to specific immune cancer cells that aid the tumour to grow and spread faster.
 - Despite having fewer side effects the treatment through immunotherapy was limited as it is effective only against tumours that express these target cells.
 - **CAR T-cell** therapy is a development that has evolved due to the advances in systemic therapy treatment of cancer.

CAR T-cell therapy



Source: National Cancer Institute (USA)

- Chimeric antigen receptor (CAR) T-cell therapies, unlike chemotherapy or immunotherapy methods, **use a patient's own cells to treat cancer**.
 - This nature of the therapy negates the need for the mass production of injectable or oral medications which are required for administering chemotherapy or immunotherapy.
- In CAR T-cell therapy, a patient's own cells are modified in a lab to activate their T-cells to attack tumours. Thus this form of therapy is regarded as "**living drugs**".
 - **T cells or T lymphocytes** are a type of **leukocytes** (white blood cells) that are important cells in the human immune system.
- Researchers modify the t-cells so that the cells express specific proteins called **chimeric antigen receptors (CAR)**.
 - **CAR proteins** have an affinity towards proteins existing on the surface of tumour cells. Hence the modification to express CAR proteins helps the CAR T-cells to bind to the tumour more effectively which facilitates the direct attack of tumour cells.
- Further, the modified t-cells are infused back into the patient's bloodstream after preparing them in such a way that they multiply more effectively.
- These infused t-cells are more specific than targeted agents therefore they directly activate the patient's immune system against cancer. This makes the treatment more clinically effective as compared to other forms of systemic therapy.
- The final step in the destruction of tumorous cells involves their clearance by the patient's immune system.

Applications of CAR T-cell therapy

- At present, CAR T-cell therapies have been approved for treating leukaemias (arising from the cells that produce white blood cells) and lymphomas (arising from the lymphatic system).
 - These types of cancers are caused due to unregulated reproduction of a single clone of cells i.e. a single type of cell producing millions of identical copies.
 - Since identical types of cells are involved, CAR T-cell therapies are very much consistent and reliable in treating such types of cancers.
- Further, CAR T-cell therapy is also used to treat cancers that have reappeared after an initial successful treatment or to treat cancers that have not responded to previous combinations of chemotherapy or immunotherapy treatments.

Key concerns associated with the use of CAR T-cell therapy

- The efficacy of CAR T-cell therapy is about 90% when it is used to treat certain types of cancers such as leukaemias and lymphomas. However, the efficacy of CAR T-cell therapy is significantly lower when used to treat other types of cancers.
 - CAR T-cells lack the ability to bind on highly heterogeneous cancers which do not have a consistent target cell.
- There have been reports of potential side effects which include **cytokine release syndrome** which is a result of widespread activation of the immune system. This syndrome can cause significant collateral damage to the other normal cells.
 - Furthermore, neurological side effects such as severe confusion, seizures, and speech impairment are also reported.
- Additionally, the complexity of preparing CAR T-cells has also been a key challenge to the use of CAR T-cell therapies.
- The cost associated with the administration of CAR T-cell therapy is also very high.

CAR T-cell therapy in India

- The first indigenously developed therapy in India was successfully performed in 2022.
- There are two main challenges in introducing CAR T-cell therapy on a larger scale. They are cost and value.
- Critics believe that developing new facilities in India to facilitate CAR T-cell therapy may be redundant as CAR T-cell therapy is unaffordable to most Indians.
- However, investments in developing new facilities and such technologies in India have the potential to reduce the cost of treatment.
- Further, trials are being undertaken to develop CAR T-cell therapy indigenously which helps to cut down the cost and the preliminary results have been positive.

Nut graf: With India looking at 3 crore cancer cases by 2025, the advancements and the efficacies of cancer therapies such as CAR T-cell therapy have provided the much-needed hope to fight the dreaded disease. However, there is still a need to promote the development of therapies with fewer side effects and that are affordable to the general public.

5. Organ on a chip Technology

Syllabus: Science and Technology- developments and their applications and effects in everyday life.

Prelims: Organ on a chip technology

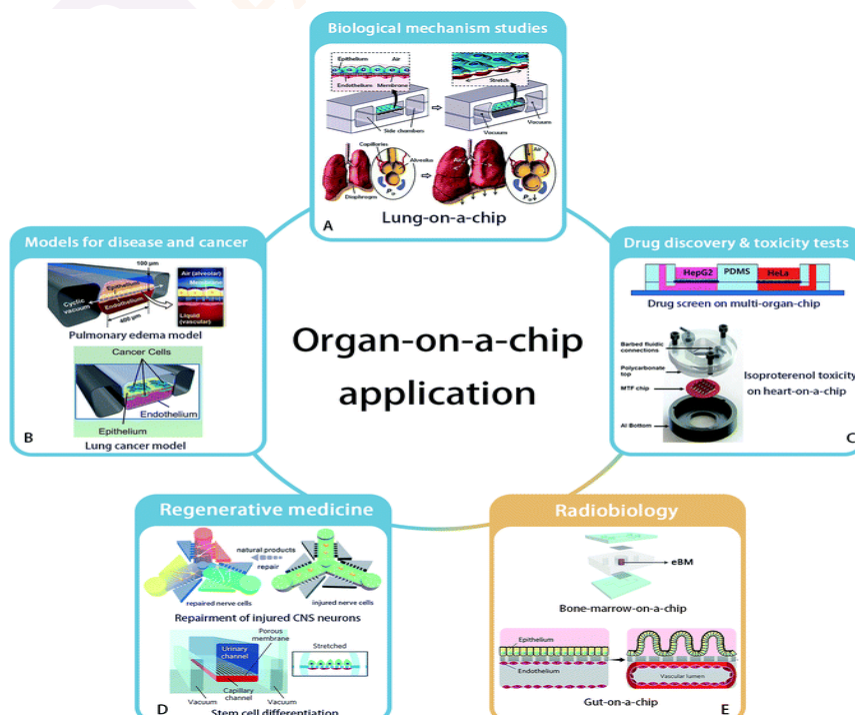
Mains: Key issues associated with the existing procedure for introducing a new drug and the significance and advantages of using Organ on a chip technology

Context: The passage of the Food and Drug Administration Modernization Act 2.0 by the US government in December 2022 is expected to provide momentum to the R&D of “organ chips”.

Organ chips or Organ on a chip model

- Organ chips are small devices with human cells that are used to mimic the environment in human organs such as blood flow and breathing movements, that can act as synthetic environments to test new drugs.
- Such chips are translucent which helps provide a window for researchers to look into the inner workings of the organ being studied.
- Donald Ingber, a professor of bioengineering and director of the Wyss Institute at Harvard University along with his colleagues developed the first human organ-on-a-chip model in 2010.
 - This first organ-on-a-chip model was a “lung on a chip” that resembled the biochemical aspects of the lung and its breathing mechanism.
- Later in 2014, members of the Wyss Institute started a startup named “Emulate Inc.” to commercialise the organ-on-a-chip technology.
- This group of researchers at Emulate Inc have created various such different chips which include that of the epithelial barrier, bone marrow, kidney, gut, vagina and liver.

Benefits and significance of Organ chips



Source: pubs.rsc.org

- The most significant advantage of using Organ on a chip technology is that it can help predict how specific organs respond to the exposure of a potential chemical hazard found in foods, cosmetics and/or dietary supplements with better precision than other methods currently in use such as cell-culture or animal-based tests.
- Further, the Organ on a chip model is seen to be an alternative for clinical trials of drugs on animals which are criticised widely as an unethical and scientifically bogus practice.
 - Organ chips can thus help prevent the death of thousands of laboratory animals.
- The technology can be used to identify, develop, and test novel drugs to treat a host of different diseases in a reliable manner and predict treatment outcomes better than conventional systems.
- Example: the liver chips developed by Emulate Inc could predict the ability of drugs to cause liver injury with 87% sensitivity and 100% specificity.
 - Further, the liver chips were used to assess the toxic effects of 27 drugs known to be either safe or unsafe for human livers.
- The organ chips developed from isolating cells from a patient to develop biomimetic tissues that mimic a specific disease can be used to extend personalised therapies for individual patients.

Existing procedure followed for Introducing a new drug

- The existing procedure for introducing a new drug into the market is an expensive and complex process.
- **Identification of compounds:** Researchers first would identify various chemical compounds that can be used to treat a condition using various techniques such as modelling.
- **Preclinical trial:** After identifying such compounds, researchers then test them on cells grown on plastic dishes in the lab or on animals that can mimic the disease in certain conditions.
 - Animals such as mice, rats, hamsters, and guinea pigs are used for Preclinical trials.
 - In this stage, researchers look to determine whether these drugs are toxic and if they are capable of treating the condition efficiently.
- **Clinical trials:** Based on the findings of the preclinical trials, a series of research studies are performed on people to evaluate a potential medical, surgical, or behavioral intervention.
- **Approval:** If these tests prove that the drug works as intended without too many adverse side-effects, the drug will be approved and can be provided patent protection.

Key issues:

- If the drug fails to get approval based on its evaluation in the tests, the entire investment made for the trials and R&D is lost
- According to reports, less than 10% of the new drugs complete preclinical trials and less than 50% of these drugs successfully complete clinical trials.
- Experts and researchers blame the use of animal models in preclinical trials for the enormous failure rate as animals can only mimic some of the human diseases well and not all.
- Therefore in few cases, side effects related to the drug only become apparent during the clinical trials phase.

Organ chips in India

- A few of the research groups in India have also involved themselves in developing new organ-on-chip models.
- Researchers and experts at the Institute of Chemical Technology, Mumbai along with the team of chemical engineers at IIT Bombay have developed a skin-on-chip model.
 - This model is being tested for studying skin irritation and toxicity.
 - This group of experts has also developed a retina-on-chip model.
- Researchers in India are also developing a placenta-on-chip model.
- Apart from organs, researchers are also trying to mimic different diseases using organ chips.
 - A team of experts at the Savitribai Phule Pune University (SPPU), have developed an infection-on-a-chip model to recreate a human skin wound infection state.
 - The objective is to mimic an infection that doesn't heal despite repeated antibiotic treatment.

Path ahead

- A few of these organs-on-chips models developed by Indian scientists are ready for use as drug test-beds in laboratories. However, the implementation of these models must be given a push so that the industry adopts these technologies quickly.
- There is a need for forging collaborations with academia in order to extend training programmes to popularise the technology, and get government support.
- Researchers in the West are looking to develop larger and more complex human-on-chip models such as micro-brain bioreactor and assemblies of different organ chips containing nutrients for the cells flowing across them, mimicking the flow of blood and nutrients across different organs in the body.
 - Such models can help evaluate the efficacy of a drug against a disease in the presence of multiple organ systems instead of isolated systems.

Nut graf: In the wake of ethical concerns surrounding the use of animals in the clinical testing of drugs, various alternative methods are gaining attention. In this context, the development of organ on a chip technology marks a significant shift in the clinical trial landscape as it is not just a reliable approach for drug testing but also a humane approach as it negates animal suffering.

6. Can we use moon dust to slow down global warming?

Syllabus: Awareness in the fields of Space

Prelims: About Moon dust coolers and solar radiation management (SRM)

Mains: Critical evaluation of solar radiation management (SRM) proposals

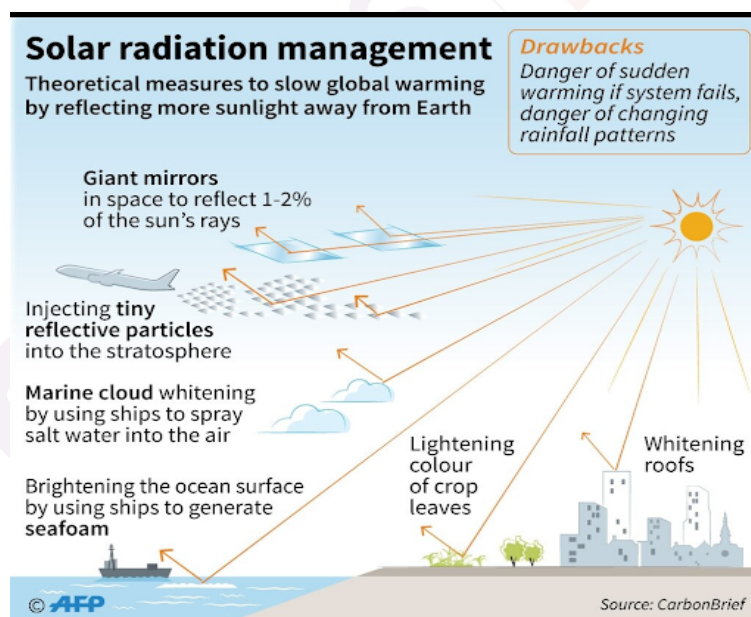
Context

- It is said that a summerless year followed the volcanic eruption of Mt. Tambora in 1816 which released sulphates and other aerosols into the stratosphere that cooled the atmosphere.
- This has encouraged people to examine the possibility of using similar methods artificially to slow down global warming.

Moon dust coolers

- In a recent paper published in the PLoS Climate journal, researchers from the U.S. have proposed the idea of launching tonnes of dust from the moon to a point in space where the gravitational forces of the earth and the Sun cancel each other out.
- Launching the dust to such a point will ensure that the dust will be stationed there which helps cast a shadow on earth and reduce sunlight to offset carbon emissions.
- Aerosols in the stratosphere, particularly those which are radiation-scattering such as sulphates, have a cooling effect.
- It is to be noted that the summerless year which followed the 1816 eruption significantly affected crop yields worldwide causing disease and starvation.
 - Additionally, various climate models also have confirmed that dimming the amount of incoming sunlight with stratospheric aerosols will have similar implications on crop yield.
- A few studies however have argued that such droughts would not be as harmful and that the GDPs of the countries will be positively affected by such solar radiation management (SRM).

Solar Radiation Management (SRM)



Source: phys.org

- Solar radiation management (SRM) is a type of climate engineering that aims to reduce or slow down global warming by reflecting sunlight.
- The proposed methods of SRM include increasing the planetary albedo by:
 - Placing reflective balloons, sunshades, or mirrors in space.
 - Injecting heat-deflecting aerosols directly into Earth's stratosphere to bounce more of the Sun's heat back into space.
 - Marine Cloud Brightening involves introducing saltwater particles from the ocean up into the cloud layer to increase the reflectivity of clouds.
 - Adopting surface-based approaches like whitening roofs, growing more reflective crops, etc.
 - Adopting restorative methods such as protecting natural heat reflectors like sea ice, snow and glaciers with engineering projects.
- SRM is said to be a fast and inexpensive approach to slowing down global warming.

Concerns associated with SRM

- These methods are best when adopted at the continental scale and not at the regional scale. Thus these measures cannot offset the adverse effects of heatwaves and droughts regionally.
- Despite the availability of state-of-the-art climate models, they are only skilled at simulating the temperature response to changes in solar radiation and are inadequate at estimating the precipitation response to solar radiation.
 - Hence there is still uncertainty about the potential changes in rainfall patterns as a result of blocking sunlight which can have unintended consequences in the form of drought and crop losses.
- Various natural and social scientists have raised concerns about SRM techniques and governance.
- There are also concerns regarding the aerosol-loading approach that there will be a rebound effect once spraying stops and the aerosols are washed out of the atmosphere.
- Further, there have been questions regarding
 - Who would decide when, where and how aerosols are deployed?
 - Who would monitor unintended consequences?
 - Will a country bear liability if it conducts an experiment that affects rainfall in another country?
 - What can be the compensation for the damages caused?

Nut graf: At a time when countries across the world are looking at various innovative measures to arrest global warming, SRM is seen to be an effective and relatively inexpensive method to offset the rising temperatures. However, there have been fears about the unintended consequences and their potential to destabilise global weather patterns which can undermine global food security associated with various solar geoengineering methods.

7. Lab grown diamond

Syllabus: Indigenization of technology and developing new technology.

Prelims: About Lab grown diamonds

Mains: Significance of Lab grown diamonds and how the government is promoting its production

Context: In its 2023-24 Union Budget, the Ministry of Finance (MoF) has placed a special emphasis on Laboratory-Grown Diamonds (LGD).

- In 1954, scientists at a General Electric research laboratory in New York are credited with developing the world's first LGD.

What are Laboratory-Grown Diamonds?

- In contrast to naturally occurring diamonds, LGD are created in laboratories. However, the two have the same chemical composition as well as other physical and optical properties.
- Diamonds form naturally over millions of years when carbon deposits buried beneath the earth are exposed to extreme heat and pressure.
- **Manufacturing process of LGDs**
 - They are mostly produced using one of two processes: high pressure, high temperature (HPHT) or chemical vapour deposition (CVD).
 - Both HPHT and CVD methods of artificially growing diamonds begin with a seed, a slice of another diamond.
 - The seed, along with pure graphite carbon, is exposed to temperatures around 1,500 degrees Celsius and extremely high pressure in the HPHT method.
 - The seed is heated to around 800 degrees Celsius inside a sealed chamber filled with a carbon-rich gas in the CVD method. The gas adheres to the seed, slowly forming the diamond.

Application Of LGD:

- They are used as cutters and in other tools and machinery that need these characteristics.
- They are often employed in industrial settings because of their strength and hardness..
- In electronics, pure synthetic diamonds are used as a heat spreader for high-power laser diodes, laser arrays, and high-power transistors.

Significance:

- A laboratory-grown diamond has a much smaller environmental footprint than a naturally occurring diamond.
- According to a report by Diamond Foundry, an environmentally conscious LGD manufacturer, extracting a natural diamond from the earth requires ten times the energy required to create one above ground.
- One of the most common methods of extracting naturally occurring diamonds is open-pit mining, which involves moving tonnes of earth and rock.

Status of Diamond industry in India

- India is the world's largest diamond cutting and polishing centre, accounting for more than 90% of global polished diamond manufacturing. This is due to factors such as the ease of access to highly skilled labour, cutting-edge technology, and lower costs.
- Surat, Gujarat, is a global diamond manufacturing centre.

- The United States is the largest market for cut and polished diamonds, with China coming in second.
- India accounts for 19% of total global diamond exports.
- In addition, the UAE is the most important export destination for Indian gold jewellery, accounting for more than 75% of the South Asian country's jewellery exports.
- In November 2022, India's total gems and jewellery exports were USD 2.43 billion, up 2.05% from the previous year.

Indian Government Initiatives to Promote Lab-Grown Diamond:

- The Union Budget for 2023 promises to reduce the basic customs duty on seeds used in the manufacture of lab-grown diamonds in order to popularise their production in India—the duty on rough LGD seeds will be reduced from 5% to nil.
- A five-year research grant will also be awarded to one of the Indian Institutes of Technology (IITs) for LGD research and development.
- The Ministry of Finance has also proposed the establishment of new tariff lines to aid in the identification of a variety of products, including synthetic diamonds.
 - The goal of the move is to help facilitate trade while also providing clarity on how to obtain concessional import duty.

8. NISAR satellite

Syllabus: Awareness in the fields of Space

Prelims: NISAR satellite

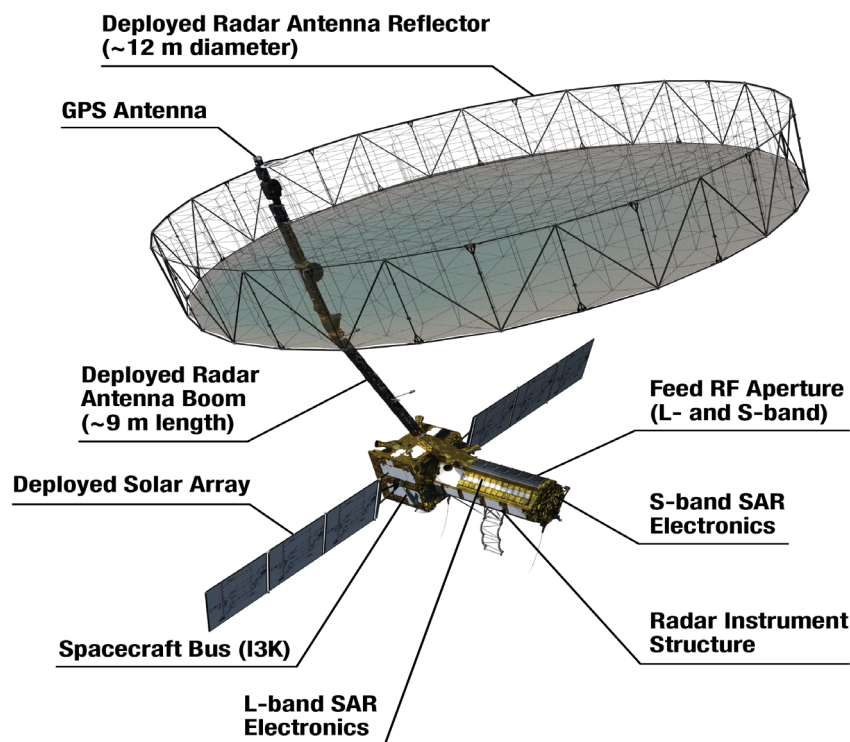
Mains: Key features and significance of NISAR satellite

Context: Recently, NISAR (NASA-ISRO Synthetic Aperture Radar) has received a send-off ceremony at the NASA's Jet Propulsion Laboratory (JPL) in California, USA.

- NISAR will be the first radar of its kind in space to systematically map Earth, using two different radar frequencies (L-band and S-band) to measure changes in our planet's surface less than a centimeter across.

About NISAR satellite:

- NISAR has been built by space agencies of the US and India under a partnership agreement signed in 2014.
- It is expected to be launched in January 2024 from Satish Dhawan Space Centre into a near-polar orbit.
- The satellite will operate for a minimum of three years.
- It is a Low Earth Orbit (LEO) observatory.
- NISAR will map the entire globe in 12 days.



Features of NISAR:

- It is a 2,800 kilograms satellite consisting of both L-band and S-band Synthetic Aperture Radar (SAR) instruments, which makes it a dual-frequency imaging radar satellite.
- While NASA has provided the L-band radar, GPS, a high-capacity solid-state recorder to store data, and a payload data subsystem, ISRO has provided the S-band radar, the GSLV launch system and spacecraft.
- S band radars operate on a wavelength of 8-15 cm and a frequency of 2-4 GHz. Because of the wavelength and frequency, they are not easily attenuated. This makes them useful for near and far range weather observation.
- By using SAR, NISAR will produce high-resolution images. SAR is capable of penetrating clouds and can collect data day and night regardless of the weather conditions.
- NASA requires the L-band radar for its global science operations for at least three years. Meanwhile, ISRO will utilise the S-band radar for a minimum of five years.

Different frequency bands:**Following satellites frequencies are usually used:**

- **L:** 1-2 GHz for GPS etc
- **S:** 2-4 GHz for NASA space shuttle etc
- **C:** 4-8 GHz for V Networks etc
- **X:** 8-12 GHz for Military
- **Ku:** 12-18 GHz for Satellite Communications
- **Ka:** 26-40 GHz for Satellite Communications

Objectives of NISAR projects:

- The NASA-ISRO SAR (NISAR) Mission will measure Earth's changing ecosystems, dynamic surfaces, and ice masses providing information about biomass, natural hazards, sea level rise, and groundwater, and will support a host of other applications.

Benefits and significance of NISAR:

- **Earth Science:** NISAR will provide a wealth of data and information about the Earth's surface changes, natural hazards, and ecosystem disturbances, helping to advance our understanding of Earth system processes and climate change.
- **Disaster Management:** The mission will provide critical information to help manage natural disasters such as earthquakes, tsunamis, and volcanic eruptions, enabling faster response times and better risk assessments.
- **Agriculture:** NISAR data will be used to improve agriculture management and food security by providing information about crop growth, soil moisture, and land-use changes.
- **Infrastructure Monitoring:**
- **Climate Change monitoring**
- **Societal Relevance of NISAR Mission:** As discussed earlier, the NISAR Mission mainly aims at studying the elements of Earth from an observing satellite. This space mission will benefit its multiple applications. Discussed below are the same in detail:
 - **Life and Civilisation:** NISAR will provide maps of surface soil moisture globally every 6 to 12 days at the spatial scale of individual farm fields. This offers unprecedented detail and is vital for monitoring the habitats of plants, animals, and humans
 - **Damage Mapping:** The NISAR satellite mission can provide maps and images of any disturbance which may lead to a natural disaster. Within hours to days of natural disasters like major earthquakes, hurricanes, tsunamis, and landslides, the NISAR satellite will present its observations which will rapidly provide information for rescue operations, economic loss estimates, and the health of the critical infrastructure.
 - **Protecting water and Oil Spills:** Every year emergency responders work to prevent hundreds of oil and chemical spills from harming people and the environment. Rapid identification of spilled oil in the vast open waters of the oceans and gulf is key to minimizing damage, and radar remote sensing can provide the necessary information.
 - **Glaciers and Ice Sheet:** Observations of the flow of Earth's ice sheets and glaciers are critical to understanding current and future rates of sea-level rise. Synthetic aperture radar can serve as a 'radar speed gun' to provide global maps of ice flow in support of sea-level rise impact assessments
 - **Marine Hazards:** NISAR will provide information used to monitor ocean wind, waves, and sea-ice extent that can aid weather forecasting and warn of marine hazards. Its coverage of coastal oceans benefits sea transportation and coastal communities.
 - **Flood Forecasting:** Flood forecasting informs downstream communities if a flood is coming and how much flooding to expect. Like a virtual stream gauge, synthetic aperture radar is able to measure changing water levels in standing vegetation as floodwaters from heavy upriver rains head downstream.
 - **Protecting Forest Resources:** NISAR is designed to monitor global forest extent and quality and to provide accurate and timely information on forest volume and products for sustainable development and management of ecosystem goods and services.

Nut graf: This mission will prove to be a boon for both ISRO and NASA in terms of their space mission and a boon to humanity and livelihood as the SAR will be able to notify any hazardous disturbance in the Earth's surface days prior to a disaster or calamity.

9. Aditya-L1 mission diamond

Syllabus: Awareness in the fields of Space

Prelims: About Aditya-L1 mission

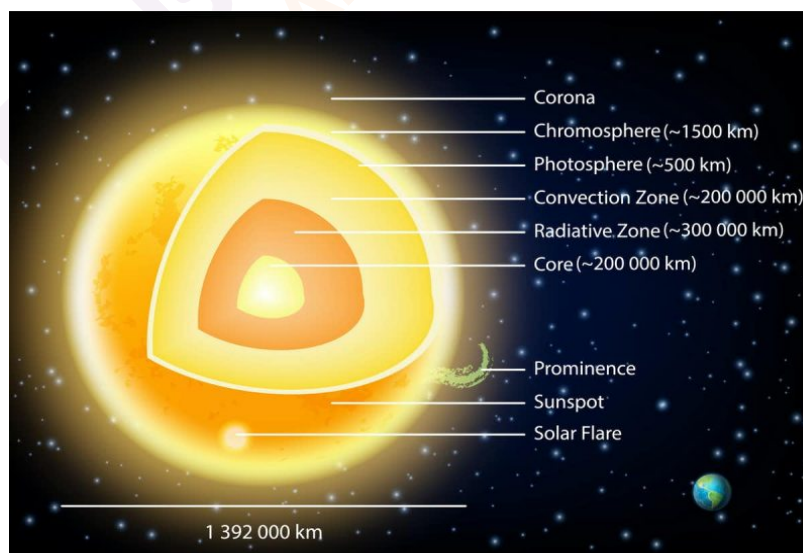
Context: Recently, the ISRO chairman confirmed the launch of India's first mission to study the Sun by mid of 2023.

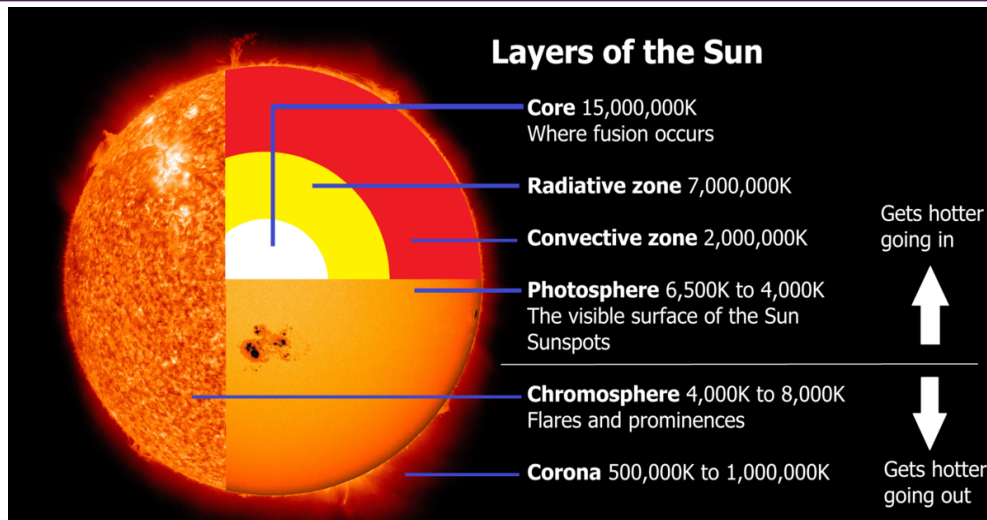
Details:

- **ISRO will launch Aditya-L1 to place the satellite into the L1 orbit to study the sun.**
- Recently, the primary payload Visible Line Emission Coronagraph for Aditya-L1 was handed over to the Indian Space Research Organisation- ISRO by the Indian Institute of Astrophysics (IIA).
- The Visible Line Emission Coronagraph is the largest and one of the most technically challenging of the seven payloads that will be placed on Aditya-L1.
- **One of the most significant unresolved problems in the study of solar physics is the difference between the Sun's upper atmosphere's temperature of 1,000,000 K and its lower layer temperature of 6,000 K.**
- This mission will help solar astronomy around the world and the data is expected to answer many unsolved answers in the field.

About Aditya L1:

- Aditya-L1 is the first space-based Indian mission to study the sun from the Lagrangian point 1 (L1) of the sun-earth system which is around 1.5 million kilometres from Earth.
- **Initially the project was proposed as Aditya-1, a 400 kg class satellite carrying a single payload, the Visible Emission Line Coronagraph (VELC).**
- But it was renamed 'Aditya-L1 mission' since the satellite was positioned in the hallowed orbit of the Sun-Earth system's Lagrangian point 1 (L1).
- **Named after one of many Sanskrit names for the Sun- Aditya- is scheduled to be launched from Sriharikota, Andhra Pradesh using the Polar Satellite Launch Vehicle (PSLV-XL).**
- The aim of the mission is to capture near-simultaneous photos of the many layers of the Sun's atmosphere, revealing how energy is routed and transported from one layer to the next.
- **The mission has seven payloads** on board to observe the photosphere, chromosphere, and the outermost layers of the sun viz.,
 - Visible Line Emission Coronagraph (VELC),
 - Solar Ultraviolet Imaging Telescope,
 - Aditya Solar Wind Particle Experiment,
 - Plasma Analyser Package for Aditya,
 - Solar Low Energy X-ray Spectrometer,
 - High Energy L1 Orbiting X-ray Spectrometer,
 - Magnetometer.

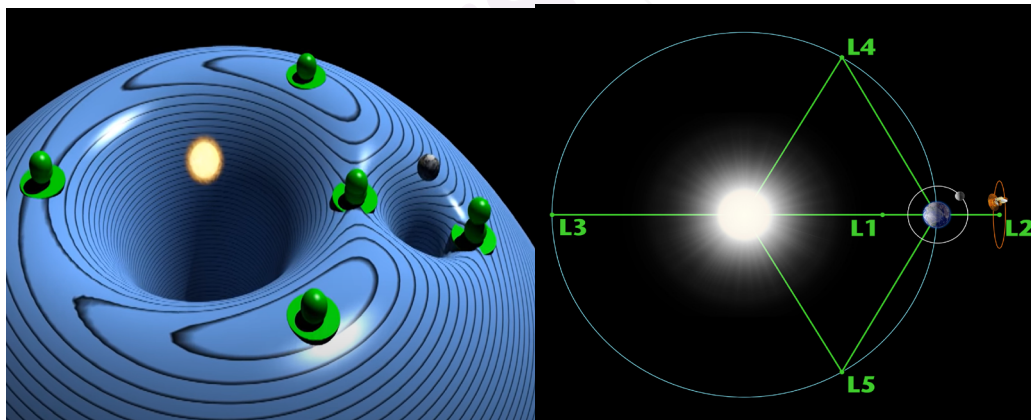




Source: NASA

Lagrangian points:

- These are specific locations in space where the gravitational forces of two large bodies, such as the Earth and the Moon or the Earth and the Sun, balance the centrifugal force experienced by a smaller object, such as a satellite.
- There are five Lagrangian points L1 - L5, in the three-dimensional space surrounding two large bodies in orbit around each other.
- **L1, L2, and L3 are located on a line that connects the two large bodies** and are unstable equilibrium points. It means an object placed there will not stay in that position without continuous propulsion.
- **L4 and L5 are located at the third corners of a tetrahedron formed by the two large bodies and their barycenter**, and are stable equilibrium points, meaning an object placed there will remain in that position without propulsion.
- These points have been used in many space missions, like the Solar and Heliospheric Observatory (SOHO) which orbits the Sun-Earth L1 point, allowing it to have a continuous view of the Sun.

**10. Small Satellite Launch Vehicle-D2****Syllabus:** Science and Technology – Awareness in the field of Space**Prelims:** About Small Satellite Launch Vehicle-D2**Context:** The Indian Space Research Organisation (ISRO) is undertaking the second development flight of the Small Satellite Launch Vehicle (SSLV)-D2 from Satish Dhawan Space Centre in Sriharikota.**Details:**

- SSLV-D2 is intended to place ISRO's **EOS-07**, Antaris's (U.S.-based firm) **Janus-1** and the Chennai-based space start-up Space Kidz's **AzaadiSAT-2** satellites into a 450-km circular orbit in its 15-minute flight.
- The objective of the development of the EOS-07 satellite is to design and develop payload instruments compatible with microsatellite launch vehicles and technologies that are required for future operational satellites.
- AzaadiSAT-2 has been developed by about 750 girl students across India guided by Space Kidz India start-up in Chennai.

Small Satellite Launch Vehicle (SSLV)-D2:

- The Small Satellite Launch Vehicles cater to the launch of satellites of up to 500 kgs to Low Earth Orbits on a “launch-on-demand” basis.
- SSLV is a cheaper alternative for placing small payloads in orbit and can carry multiple nano, micro and small satellites.
- SSLVs further boast of facilitating low-cost access to space, offering low turnaround time, flexibility in accommodating multiple satellites, and requiring only basic launch infrastructure.
- The Centre had sanctioned a total of ₹169 crores for the development project, which includes the cost of development, qualification of vehicle systems and flight demonstration through the three planned development flights named SSLV-D1, SSLV-D2 and SSLV-D3.
- SSLV had its maiden flight SSLV-D1 in August 2022.
- SSLV-D2 launch vehicle uses **three solid stages** which are then followed by a **liquid-fuel-based Velocity Trimming Module (VTM)** to place satellites in the intended orbits.

11. Gaganyaan

Syllabus: Science and Technology – Awareness in the field of Space

Prelims: Gaganyaan Mission

Context: The Indian Space Research Organisation (ISRO) and the Indian Navy have jointly conducted a key trial for the Gaganyaan mission.

Details:

- The trials were part of the preparation for crew module recovery operations for the Gaganyaan mission.
- The recent trial included a Crew Module Recovery Model (CMRM) that simulates the mass, centre of gravity, outer dimensions, and externals of the actual Crew Module at touchdown.
- Safe recovery of the crew is said to be the final step to be achieved for the success of human spaceflight missions.

Gaganyaan mission:

- Gaganyaan is ISRO's first human space flight mission.
- Gaganyaan project aims to demonstrate the human spaceflight capability of the country by launching a three-membered crew to an orbit of 400 km for a 3 days mission and bringing them back safely by landing them in Indian waters.
- LVM3 rocket has been identified as the launch vehicle for the Gaganyaan mission.
 - The LVM3 rocket consists of a 3-stage engine i.e. solid stage, liquid stage and cryogenic stage.
 - The systems in the LVM3 rocket are re-configured to meet human rating requirements and has been re-named Human Rated LVM3 (HLVM3).
- The total cost of the mission is expected to be close to ₹10000 crores.
- ISRO is developing the spacecraft for the mission while the Russian space agency ROSCOSMOS is helping in extending the required training to the astronauts.
- If the mission is successful, India would become the fourth country to have sent humans to space after the US, Russia and China.

12. The microbiome link to autism disorders

Syllabus: Awareness of various diseases

Prelims: Autism spectrum disorder

Mains: Scientific advancements in understanding the link between human health, diseases, and microbiomes.

Context: This article tries to establish the link between gut microbiome composition and Autism spectrum disorder.

Autism spectrum disorder (ASD)

- Autism spectrum disorder (ASD) is a neurodevelopmental disability caused by differences in the brain.
- ASD is a complicated developmental disorder characterised by difficulty in social interaction, verbal and nonverbal communication, repetitive behaviour, and a narrow focus of interest.
- ASD is referred to as a “developmental disorder” because symptoms usually appear in the first 2 years of the child.
- Autism is also termed a “spectrum” disorder because there is wide variation in the type and severity of symptoms people experience.
- Currently, there is no cure or therapy available to treat or reverse ASD.

Link between gut microbiome and Autism

- Although the researchers have still not established the aetiology of ASD completely, there have been reports which say that the gut-brain axis could have a prominent role in causing ASD.
 - Aetiology is the study of factors that cause a disorder or disability or disease.

- In recent times, extensive studies on the human microbiome have been undertaken by researchers which have been supported by advances in gene-sequencing technologies and high-end bioinformatic analysis.
- The gut microbiome is found to have a big impact on immune modulation and metabolic activities in humans and differences in gut microbiome composition have been seen with respect to various diseases such as Crohn's disease, celiac disease and autism.
 - Immune modulation refers to the actions undertaken by the immune system of the body to ensure its response is proportionate to a threat.
- Studies on the dynamic cross-talk between the gut microbiome and the host environment have found potential connections to ASD symptoms.
 - Example: abnormal antigens which are trafficked through an impaired intestinal barrier allow such antigens to pass through the barrier surrounding the brain which could cause a chain of reactions that worsen ASD symptoms.
- Reports from research have indicated that even if the gut microbiome doesn't play a direct role, abnormalities in the gut microbiome can induce toxic metabolites and prevent the person from synthesising the metabolites required to produce neurotransmitters that are involved in cognition, behaviour, mood, and sleep.
- For instance, research that involved the study of children with and without ASD:
 - Dysbiosis (imbalance) was seen in the gut microbiome of children with ASD.
 - The fraction of bacteria of the phylum firmicutes was seen to be higher in the guts of children with ASD.
 - Bacteria such as lactobacillaceae, bifidobacteriaceae, and veillonellaceae were also abundantly present in the gut microbiome in children with ASD.
 - Further, bacteria such faecalibacterium and roseburia that produce short-chain fatty acids (SCFA) were underrepresented in children with ASD which suggests that lower levels of SCFAs could lead to an imbalance in brain function and behaviour.

Path ahead

- Recent findings suggest that fixing the gut in ASD-affected children can reduce the toxic burden and help complete the required neurotransmitter synthesis pathways.
- Furthermore, bringing about a balance in the gut microbiome (reversing gut dysbiosis) among children with ASD has the potential to address various problems associated with the disease.
- Faecal microbial transplantation (FMT) is regarded as one of the most promising approaches to reverse gut dysbiosis.
 - Under FMT, stool samples from healthy individuals are transplanted into the large intestines of affected children.
 - A study conducted by Ohio State University in 2017 on FMT reported that the intervention improved both gastrointestinal and ASD-related symptoms.
 - FMT is also a cost-effective approach with minimal risk. However, there is a need to build consensus among all stakeholders in order to adopt it.

Nut graf: As per the WHO, ASD affects one in 100 children and has a significant negative impact on the cognitive abilities and quality of life of these children. Advance studies have revealed that balancing the gut microbiome through approaches such as FMT can alleviate several problems associated with ASD. However, there is a need to build consensus among the scientific community as well as all the stakeholders before any such actions are undertaken.

13. Marburg Virus Disease (MVD)

Syllabus: Awareness about various diseases

Prelims: About Marburg virus disease (MVD)

Context: Equatorial Guinea has confirmed its first-ever outbreak of Marburg virus disease, which has killed at least nine people.

About Marburg Virus:

- Marburg virus disease (MVD), formerly known as Marburg hemorrhagic fever, is a serious, often fatal illness that affects humans.
- The Filoviridae family includes both the Marburg and Ebola viruses (filovirus). Despite the fact that they are caused by different viruses, the two diseases are clinically similar.
- Marburg virus disease is a highly contagious disease that causes hemorrhagic fever and is transmitted by bats. It has an 88% fatality rate.

Past Outbreak

- In 1967, two large outbreaks in Marburg and Frankfurt, Germany, as well as Belgrade, Serbia, led to the disease's initial recognition.
- The outbreak was linked to research involving African green monkeys (*Cercopithecus aethiops*) imported from Uganda.
- Outbreaks and isolated cases have since been reported in Angola, the Democratic Republic of the Congo, Kenya, South Africa, and Uganda.
- Since 1967, there have been 12 major Marburg outbreaks, the majority of which have occurred in southern and eastern Africa.

Symptoms:

- Jaundice, pancreatic inflammation, severe weight loss, liver failure, massive haemorrhaging, and multi-organ dysfunction are all possible symptoms.
- Headache, vomiting blood, muscle pains, and bleeding from various orifices are all symptoms.

Transmission:

- Fruit bats of the Pteropodidae family, *Rousettus aegyptiacus*, are thought to be natural hosts of the Marburg virus.
- The Marburg virus is transmitted to humans by fruit bats and spreads among humans through direct contact with infected people's blood, organs, or other bodily fluids, as well as surfaces and materials contaminated with these fluids.

Human-Infection:

- Human infection with Marburg virus disease is caused by prolonged exposure to mines or caves where *Rousettus* bat colonies live.
- *Rousettus* is a genus of fruit bats or megabats from the Old World. They are also known as dog-faced fruit bats or flying foxes.

Diagnosis:

- Many of the symptoms of the disease are similar to those of malaria and typhoid fever, making a diagnosis difficult.
- Polymerase Chain Reaction (PCR) and Enzyme-Linked Immunosorbent Assay (ELISA) testing, on the other hand, can be used to confirm a case.

Treatment:

- Marburg hemorrhagic fever does not have a specific treatment or vaccine. Hospital therapy should be used to provide support.
- Supportive hospital therapy includes maintaining the patient's oxygen status and blood pressure, replacing lost blood and clotting factors, and treating any complicating infections.

14. National Science Day

Syllabus: Achievements of Indians in science & technology

Prelims: National Science Day and about Sir C.V. Raman

National Science Day:

- India celebrates National Science Day every year on February 28th.
- In 1986, the Union Government, under then Prime Minister Rajiv Gandhi, designated February 28 as National Science Day.
- National Science Day is celebrated every year to commemorate the discovery of the "Raman Effect" by Sir C.V. Raman.
 - Physicist Sir CV Raman won the Nobel Prize in 1930 for the discovery of the Raman Effect.
- The theme for National Science Day 2023 in light of India's G20 presidency is "**Global Science for Global Wellbeing**".

About Sir C.V. Raman:

- Sir C.V. Raman was born on 7th November 1888 in Tiruchirapalli in modern Tamil Nadu.
- From an early age, Raman was exposed to science. He was a brilliant student and joined the Presidency College at Chennai in 1902 aged just 13 for his graduation. He passed out in 1904 with a Gold Medal in Physics. He completed his post-graduation from the University of Madras in 1907 with distinction.
- He continued to do research at the Indian Association for Cultivation of Sciences in Calcutta (IACS) and also published papers in leading international journals such as 'Nature' and 'Physics Review'.
- It was at IACS that Raman along with his collaborators discovered what is now called the "Raman Effect".
 - This discovery on the scattering of light was made on February 28, 1928.
 - This effect proved the quantum nature of light and had huge value at that time.
 - The Raman Spectroscopy was based on this phenomenon.
- For this discovery, Raman was awarded the Nobel Prize in Physics in the year 1930. He became the first Indian, Asian and non-white person to win a Nobel Prize for the sciences.
- In 1933, he became the first Indian Director of the Indian Institute of Science (IISc) in Bangalore. He was the institute's director till 1937 and the Head of the Physics Department till 1948.
- In 1948, he founded the Raman Research Institute (RRI) in Bangalore for conducting experiments in Physics. He continued to do research at RRI till his death in 1970.
- **Honours and awards:**
 - Knighthood – 1929
 - Nobel Prize (Physics) – 1930
 - Bharat Ratna – 1954
 - Lenin Peace Prize – 1957

15. 4G in name only: data needles stutter in 'grey spots' in India

- The Government in India has revised the minimum broadband speed definition from 512 Kbps to 2 Mbps.
 - As per the Telecom Regulatory Authority of India (TRAI), from September 2022, the three main telecom providers in India classify almost 95% of their customer base as "broadband" customers, which now means that they should be able to access Internet speeds of minimum 2 Mbps.
 - Broadband speeds below 2 Mbps are not sufficient for video calls, streaming video and many other services.
- However, in the country, high speed broadband speeds are taken for granted in large cities whereas there are villages without any 4G network coverage.
- Besides these two categories there are smaller urban settlements and towns which are affected due to weak connectivity.
 - **White spots** are those places without cellular connectivity.
 - **Grey spots** are areas that are connected but may not let users get enough out of their access.
- The users in these towns, despite having 4G network towers, struggle to get usable Internet speeds mainly because of the shortage of towers i.e. these towers cannot handle high traffic due to high number of users.
- According to the data released by Ookla in December 2022, the mean wireless Internet speed in India was 108.86 Mbps, while the median was just 25.29 Mbps.
 - **Mean Speed:** indicates the internet speed an average user usually gets.
 - **Median Speed:** midpoint of the fastest and slowest connections.
 - This huge difference between the mean and median shows that there is huge inequality in the quality of access.

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DEFENCE AND INTERNAL SECURITY

1. Spy balloon

Syllabus: Security – Security challenges and their management

Prelims: About Spy Balloon

Mains: Important developments in China-US relations.

Context

- The US shot down a Chinese surveillance balloon that had floated over its airspace.
- China has reacted angrily to the shooting down of the balloon which according to China is a civilian airship used for meteorological research.

Spy balloons

- Balloons are known to have been used for military purposes since the 18th century.
- Balloons were mainly used to provide a big-picture reconnaissance and perspective on enemy positions and movements.
- Balloons were used for surveillance during the French Revolutionary Wars in the late 18th century and there is evidence that proves the use of balloons in the **Battle of Fleurus** in 1794.
- Balloons were also used in the **American Civil War** and **World War I** until the advancement of aircraft technology.
- Even during World War II, balloons were deployed and the advancements in the technologies had helped to push balloons to even higher altitudes.
 - For example, the Japanese military had attempted to loft bombs into US territory using balloons designed to float in jet stream air currents.
- In the later years, the US military through its mission named “Project Genet” used high-altitude photographic spy balloons over Soviet bloc territory.

Relevance of spy balloons in the present situation

- The advancements in satellite, aircraft and drone technologies have reduced the relevance of spy balloons in the military.
- However, spy balloons still occupy an important niche in the military domain as they do not require huge investments and sophisticated technologies.
- Further, the high-altitude spy balloons have the advantage of being able to hover around at lower heights at a slower pace as compared to satellites/aircraft/drones which allows balloons to take better quality photographs and also provide more time to gather information.

China-U.S. “spy balloon” row

- The shooting down of a Chinese surveillance balloon by the U.S. military reflects the deep distrust characterizing relations between the two global superpowers.
- The balloon was detected over Montana and soon it sparked a diplomatic crisis and resulted in the U.S. Secretary of State Antony Blinken calling off the visit to China (scheduled from 6 February 2023). Notably, it would have been the first visit by a top U.S. diplomat since 2018.
- It is suggested that the balloon controversy has punctured the process of restoring stability in relations between the US and China.
- **China’s arguments:**
 - China said that the balloon was “civilian” (meteorology) and had drifted to the US.
 - It also termed the shooting down as an “overreaction”.
- **The United States stand:**
 - The U.S. has termed the deployment of the surveillance balloon deep into its airspace as a grave provocation. It further suggested that such an activity would not be tolerated.

Associated concerns:

- A similar incident occurred during the Trump administration. Such balloons were also spotted over Japan in 2020 and 2021, and over the Andaman Islands (India) in 2022.
 - However, none of the governments shot down the balloons, presumably concluding that the balloons, in the age of intelligence powered by advanced satellites, were not very important.
- The latest incident might prompt India and Japan to reassess such intrusions in the future.
- China would also reconsider both the advantages and disadvantages of what appears to be a new and provocative tool for intelligence-gathering.
- The response of the Biden administration on spotting the balloon and the consequent cancellation of the top-diplomat visit to Beijing reflects that China has become a hot-button issue in U.S. politics.
- It is presumed that a crisis might arise due to rising rivalry, muscle-flexing over the Taiwan issue, and heated domestic discourse.

Nut Graf: The relations between the United States and China are at their lowest point. It has further worsened due to the spotting and consequent shooting down of the so-called Chinese Surveillance Balloon in American airspace. Reviving relations between the two countries seems difficult and would require considerable effort from both of them.

2. Jammu, village defence and governance

Syllabus: Security Challenges and their management in border areas.

Mains: Village Defence Committees in border areas.

Context: Rise in terror-related strikes in Rajouri and Poonch (border district of Jammu division).

Details:

- Despite militancy-related indices not showing alarming signs, any complacency by the government can result in serious consequences in the mid and long-term peace.
- The militancy in the peaceful Jammu region is distinct from those prevalent in Kashmir because of the demographic profile that has a nearly equal proportion of Hindus and Muslims.
- It should be remembered that conflict resolution in such areas is a function of utilizing the people's involvement in decision-making and execution processes.

Background:

- Many terror-related incidents were witnessed in the region in the last few years. However, the Dangri attack on 1st January 2023 was the gravest among all.
- As per the South Asia Terrorism Portal (January 2023), there were attempts of infiltration, recoveries of war-like stores, explosions followed by gunshots at the house of a local MLA, a neutralization of hideouts, and the nabbing of suspects in Rajouri and Poonch.
- After the Dangri case, the demand for the revival of Village Defence Committees has emerged.

Village Defence Committees (VDC)

- The VDCs were set up in 1995 in 10 districts of the Jammu region to fight militants in remote places.
- The VDCs were created for self-defence and for supplementing efforts of the forces to curb militancy and cross-border infiltration in the mid-90s.
- VDCs (rechristened as Village Defence Guards or VDGs) instil a sense of self-protection, with the district's superintendent of police mandated to exercise command and control.
- Nearly 26,567 locals were recruited to VDCs.
- The Indian Army conducts training camps for VDCs consisting of weapons training and intelligence gathering basics.
- They were provided with hi-tech weapons to fight the militants.
- They are a force multiplier that holds the front against militants till the arrival of the security forces.

Way Ahead:

- It is suggested that state policy on VDGs should mitigate the negative perception and evolve a new command and control mechanism. Currently, the top-down approach is followed with the Superintendent of Police at the helm which requires close supervision and may not be the ideal one.
- The local government bodies should be empowered and moved beyond elections.
- The revival of the VDG would further empower the local bodies. It should be noted that Panchayats best understand the local dynamics in a conflict zone.
- Additionally, panchayats should be tasked with assisting the local police in an institutionalized manner. This would result in expanding public participation in security matters, checking the quality of VDG cadres during the selection, monitoring their activities, and consolidating control by oversight and deterrence.
- In several instances, VDCs have proved to be counterproductive by misusing their authority and alleged human rights violations. Thus the VDG's role should remain confined to self-defence and deterrence instead of intelligence and tactical operation.
- Ultimately, the key to all challenges in Jammu and Kashmir lies in empowering the local population by strengthening democracy and making it more participatory at the grassroots level.

Nut Graf: The increasing number of terror-related incidents in the Jammu division has once again raised the demands for appropriate action by the state. It is suggested that entrusting local bodies to manage the Village Defence Guards would not only deter militancy but also elicit a positive vibrancy from the local population.

3. Indo-Tibetan Border Police

Syllabus: Various Security Forces & Agencies & Their Mandate

Prelims: About Indo-Tibetan Border Police (ITBP)

Mains: Role and Significance of Indo-Tibetan Border Police (ITBP)

Context:

- On February 15 2023, the Cabinet Committee on Security (CCS) approved raising seven new battalions, comprising 9,400 personnel, for deployment in Arunachal Pradesh.
 - The outposts were sanctioned in January 2020. A sector headquarter for the ITBP was also announced.
- The battalions are expected to be raised by 2025-26, increasing the strength of the ITBP from the current 88,000 to 97,000, making it the fourth largest CAPF.

Backdrop:

- India and China share one of the longest borders in the world, stretching over 3,488 kilometres, touching five Indian states, and two Chinese autonomous regions.
- Recently, tensions between the two countries have escalated with both sides accusing each other of violating the Line of Actual Control (LAC).
- In May 2020, Chinese troops intruded into Indian territory in the Galwan Valley, leading to a violent clash that resulted in the death of 20 Indian soldiers and an unknown number of Chinese soldiers.
- Since then, tensions between the two countries have escalated. India has accused China of increasing its troop presence in the region, building military infrastructure, and violating the status quo. China, on the other hand, has accused India of crossing the LAC and interfering with its territorial sovereignty.
- In February 2021, both sides agreed to a complete disengagement from the Pangong Tso area, but the process was halted due to disagreements over the timing and sequence of the withdrawal.
- In April 2021, tensions between the two countries escalated again when China accused India of crossing the LAC and firing warning shots in the air.
- The incident led to a military buildup on both sides, with both countries increasing their troop presence in the region.

Indo-Tibetan Border Police (ITBP)

- The Indo-Tibetan Border Police (ITBP) is a specialised paramilitary force that is responsible for guarding India's borders with Tibet and China.
- The ITBP was established in 1962, in the wake of the Chinese aggression of 1962.
- ITBP was initially set up under the CRPF Act. However, in 1992, parliament enacted the ITBPF Act.
- The motto of the Force is "Shaurya-Dridhata-Karma Nishtha" (Valour - Determination - Devotion to Duty).
- ITBP personnel are also called "Himveers".
- ITBP replaced Assam Rifles in Sikkim and Arunachal Pradesh in 2004.
- The India-China border covering the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh are guarded by the ITBP (from the Karakoram pass to Jachep La)

Role of ITBP in LAC

- The ITBP is mainly responsible for guarding one of the most difficult and inhospitable terrains in the world, and the ITBP personnel face several challenges in performing their duties.
 - The terrain is rugged and rocky, and the climate is harsh, with temperatures dropping to as low as -50 degrees Celsius in winter. The high altitude also makes it difficult for the ITBP personnel to breathe, and they need to undergo special training to acclimatise to the conditions.
- The ITBP personnel are trained in several skills, including mountaineering, skiing, and rock climbing, which are essential for patrolling and guarding the difficult terrain of the Indo-China border.
- They are also trained in combat skills, including unarmed combat, marksmanship, and tactical operations, which are necessary for countering any hostile action by Chinese troops.
- The ITBP has around 2,100 women personnel and a sizable number are deployed at the Border Out Posts (BOPs) in the Himalayas.
- The ITBP has been actively involved in several operations along the Indo-China border, including the Sino-Indian War of 1962, the Nathu La and Cho La incidents of 1967, the Doklam standoff of 2017, and the recent border tensions in Ladakh.
- The ITBP also has a specialised force called the Special Frontier Force (SFF), which is a covert force trained to carry out special operations behind enemy lines.
 - The SFF was created in the aftermath of the Chinese aggression of 1962 and played a crucial role in the 1971 war against Pakistan.
 - The SFF personnel are drawn from the Tibetan community and are trained in specialised skills, including guerrilla warfare, sabotage, and intelligence gathering.
- The ITBP personnel work in close coordination with other security forces, including the Indian Army, Border Security Force (BSF), and the local police.

- They also work with the local communities and engage in several developmental activities to improve the quality of life of the people living in the border areas.
 - These activities include the construction of schools, hospitals, and roads, and providing essential services like healthcare, education, and clean drinking water.
- The ITBP also plays a critical role in disaster management and rescue operations in the border areas.
 - The Himalayan region is prone to natural disasters like earthquakes, landslides, and floods, and the ITBP personnel are trained to respond to such emergencies.
- The ITBP also provides security to various sensitive installations and proximate security cover to important dignitaries.
- It offers security, communication and medical cover to the pilgrims during the Kailash Mansarovar Yatra in coordination with the Ministry of External Affairs at Lipulekh Pass (Uttarakhand) and Nathu La Pass (Sikkim border).

Foreign deployment:

- The force has been deployed in foreign countries as well. It provided security at the Indian High Commission in Colombo from 1988 to 2005.
- ITBP commandos were first deployed in Afghanistan in 2002 to secure the premises of the Indian Embassy in Kabul and four consulates in Jalalabad, Herat, Mazar-i-Sharif and Kandahar.
 - They were withdrawn from Afghanistan in August 2021 after the Indian Embassy shut following the takeover of the country by the Taliban.
- In 2004, ITBP personnel were deployed in Gurguri, Minar and Zaranj in Afghanistan to provide security cover to the Indian road construction agency Border Roads Organisation (BRO), which was undertaking the Delaram-Zaranj road project.
- With the LAC remaining tense after the Galwan and Yangtze incidents and India and China ramping up infrastructure in the border areas, the ITBP has come under greater focus.

Nut Graf: The ITBP's role in safeguarding India's border with China is critical, therefore the union government recently approved raising seven new battalions, comprising 9,400 personnel, for deployment in Arunachal Pradesh with a sector headquarter to provide the ITBP with all necessary support and resources to carry out its duties effectively.

4. Cyberattacks are rising, but there is an ideal patch

Syllabus: Basics of cyber security

Mains: Concerns associated with Cyberattacks and cybersecurity.

Prelims: Cybersecurity.

Details:

- Examples of some cyberattacks in India in the past few months:
 - Ransomware attack on the servers of the premium medical institute, the All India Institute of Medical Sciences (AIIMS). It is said that around 40 million health records were compromised. Moreover, two weeks were required to bring the system back online.
 - In another incident, a ransomware gang, BlackCat attacked Solar Industries Limited and extracted more than 2 terabytes of data.

Ransomware attacks

- Ransomware is a category of malicious cyber attack software, used by cybercriminals.
 - This malicious software first infects a computer system by blocking access to the stored data by encrypting the files and later demands a ransom amount from the owner in exchange for the decryption key.
 - These types of malware usually are injected remotely by manipulating the user into downloading it upon clicking a link sent through email or other means.
 - Ransomware attacks can also facilitate the theft of sensitive and confidential data for evil motives.
- It is found that around 75% of Indian organizations have faced such attacks, with each breach costing an average of ₹35 crores of damage.
- All the critical infrastructure of the country like banking and power systems have become highly vulnerable to such attacks from hostile state and non-state actors.
- Cyber capabilities are also used in conflict situations. For instance, in Ukraine, electronic systems in warheads, radars, and communication devices were rendered ineffective through hacking and GPS jamming.

Other types of Cyber Attacks

- **Malware:** Malware is a form of application that performs nefarious activities and can be designed to create access to networks, spy on credentials and to cause disruption.
- **Phishing:** In Phishing, an attacker tricks an unsuspecting target into handing over valuable information, such as passwords, credit card details, etc.
- **Man-in-the-middle attack (MITM):** MITM consists of a message interception between two parties in an attempt to spy on the targets.
- **Distributed Denial-of-Service (DDoS) attack:** In a DDoS attack, an attacker floods a target server with traffic that will disrupt it. Since most servers cannot handle it, it may lead to services slowing down on the website and if it eventually crashes.
- **Zero-day exploit:** When cyber-criminals learn of a vulnerability in a frequently used software application they target users and organizations using the software to exploit it until a fix is available. This is called a Zero-day exploit.
- **DNS Tunnelling:** A DNS Tunnelling provides attackers with a stable and consistent line of communication to the given target. The malware used will gather information as long as the DNS tunnelling is active.
- **Business Email Compromise (BEC):** In a BEC attack, hackers target employees who have specific authority to finalize business transactions. They trick them into transferring money into an account belonging to the hacker.
- **Cryptojacking:** Cryptojacking is used to target a computer in order to mine cryptocurrencies such as bitcoin.
- **Drive-by Attack:** A website is loaded with malware, and when a visitor happens to come across such a website their device is infected with the malware which can be used to steal valuable data or crash the system.

Existing provisions for cybersecurity:

- In 2022, the cyber security agency of India, CERT-in (Indian Computer Emergency Response Team) issued a set of guidelines for organizations in the digital realm. Some of the provisions are:
 - Obligations of immediately reporting cyberattack incidents.
 - Appointing a person to interact with CERT-In.
- The draft Digital Personal Protection Bill 2022 has proposed a penalty of up to ₹500 crore for data breaches.
- A Defence Cyber Agency (DCyA), capable of offensive and defensive manoeuvres has been established by India's armed forces.
- Moreover, all the states have installed their own cyber command and control centres.
- Apart from the above provisions, organizations would be advised to consider the Digital Geneva Convention.
 - In Digital Geneva Conventions, more than 30 global companies have signed a declaration to safeguard customers and users from cyber breaches, and collaborate with like-minded intergovernmental and state frameworks.
- India has signed cybersecurity treaties with several countries like the U.S., Russia, the U.K., South Korea, and the European Union.
- Efforts are also made to enhance cooperation in the fields of cyber responses, technology collaboration, capacity building, and cyber resilience at multilateral forums like QUAD and I2U2.
- The UN General Assembly has introduced the two processes for security purposes in the information and communication technologies (ICT) environment.
 - The Open-ended Working Group (OEWG) was established through a resolution by Russia. It comprises all the UN members.
 - Another resolution is proposed by the U.S. It is about the continuation of the Group of Governmental Experts (GGE). It includes 25 countries from all the major regions of the world.

Associated Concerns:

- Organizations lack the tools to identify cyber threats.
- There is an acute shortage of cybersecurity professionals. For instance, India has a total workforce of 3 lakhs in contrast to the US which has 12 lakh people in its workforce.
- The organizations in India are primarily private enterprises and thus their participation in India's cybersecurity structures is limited.
- The vulnerability would further increase with the arrival of 5G and quantum computing.
- There is no global framework for cybersecurity.
- The two permanent members of the UN Security Council and India's crucial strategic partners (Russia and the U.S.) differ from each other on many aspects like openness, restrictions on data flow, and digital sovereignty.

Way Ahead:

- It is estimated that in 2023, cybercrimes will cause nearly \$8 trillion in damage worldwide. Thus, international cooperation would be critical to secure the digital space.
- The G20 summit should be seen as an opportunity to bring together domestic and international groups, and steer the direction of cybersecurity consultations.
 - Further, it is important for India to garner international cooperation and support for countering cyber-attacks.
- India can also try to conceptualize a global framework of common minimum acceptance for cybersecurity.
 - The National Cyber Security Strategy which has been conceptualised by the Data Security Council of India will ensure that adequate preparedness is in place to deal with cyber attacks.
- Adequate budgets must be allocated to various ministries to enhance their cyber security systems.
- Capacity enhancement of all the agencies that deal with cyber crimes in India have to be undertaken at the earliest.

Agencies that deal with cyber-crimes in India

- The **Indian Computer Emergency Response Team (CERT-In)** is the national-level nodal agency that collects, analyses and circulates inputs on cyber-attacks.
 - CERT-In is further tasked with issuing guidelines, recommending preventive measures, forecasting, alerting and extending training.
 - CERT-In is also responsible for undertaking measures to handle any significant cyber security event.
- The **National Cyber Security Coordinator (NCSC)** under the National Security Council Secretariat, coordinates with various agencies at the national level on cybersecurity issues.
- The **National Critical Information Infrastructure Protection Centre (NCIIPC)** which has been established under Section 70A of the Information Technology Act, 2000 is entrusted with the protection of the critical information infrastructure of the country.
- The **Cyber Swachhta Kendra** (Botnet Cleaning and Malware Analysis Centre) has been set up for the detection of malicious software programmes and to provide free tools to address the issues of malicious software.
- The **National Cyber Coordination Centre** is tasked with creating awareness about existing and potential threats.
- The **Intelligence Fusion and Strategic Operations (IFSO)** is the cybercrime unit of the Delhi Police that is specialised in managing complex and sensitive cybercrime cases. IFSO has been involved in some of the most sensitive cybercrime cases such as the Bulli Bai case and the Sulli deal app case.

Nut Graf: *With fast-expanding digital networks and emerging technologies, the risk of cyber attacks would rise exponentially. The need of the hour is to cooperate with all the countries of the world and build a global framework for cybersecurity.*

5. Aero India 2023

Prelims: About Aero India event

Context: The 2023 edition of Aero India saw the participation of 98 Countries and over 809 Companies.

Aero India

- Aero India is a biennial Air show on Aerospace, Defence and Civil aviation launched in 1996.
- The Aero India exhibition is usually held at Yelahanka Air Force Station, Bengaluru.
- The Aero India event is organised by the Defence Exhibition Organisation (DEO) working under the Department of Defence Production of the Ministry of Defence.
- The event is regarded as “Asia’s biggest Air Show”
- This biennial event is attended by various business leaders, foreign decision-makers, industry chiefs, pilots and technicians.
- Aero India also provides a platform for the industry professionals to gain market insights, announce new developments and showcase new products.
- Aero India-23 is the 14th edition of Aero India.
- The Theme of Aero India-2023 is “The Runway to a Billion Opportunities”.
- Aero India 2023 will showcase India’s manufacturing capabilities and the progress achieved towards realising Atma Nirbhar Bharat.

Indo-U.S. Unmanned Aerial Vehicle to be flight-tested:

- A member of the U.S. government delegation who was attending the Aero India 2023, has said that a prototype of the Air-Launched Unmanned Aerial Vehicle (ALUAV) jointly developed by India and the US would be flight-tested soon.
- The US government official has said that the flight testing of ALUAV is expected to commence in September-November of 2023.
 - The flight testing will take place at a range in northern India and also in the US.
- India and the US had signed the Project Arrangement (PA) to ALUAV in 2021 as a part of the Defence Technology and Trade Initiative (DTTI).
- Bengaluru-based Aeronautical Development Establishment (ADE) and the Aerospace Systems Directorate at the U.S. Air Force Research Laboratory, along with the Air Forces of India and the U.S. are the main organisations involved in the execution of the project.
- According to reports, ALUAV would be launched from the C130J aircraft.

U.S. Air Force’s B-1B Lancer lands at Aero India 2023 in Bengaluru:

- The United States Air Force (USAF) has added two more aircraft to its fleet at Aero India 2023 as two supersonic heavy bombers, the B-1B Lancer landed at Bengaluru.
- B-1B Lancer, which is also called “Bone (for B-one)”, carries the largest conventional payload of both guided and unguided weapons in the USAF.
 - B-1B Lancer is also regarded as the backbone of America’s long-range bomber force.
- Only B-1B Lancer had also participated during the last edition in 2021 and the return of the long-range, supersonic, heavy bomber to participate in Aero India 2023 underscores the importance the United States places on the growing strategic partnership with India according to the US Consulate General.

- Assistant Deputy Under Secretary (International Affairs), USAF said that B-1 offers flexible options to senior leaders and commanders and enhanced integration with our allies and partners throughout the region in recent years is a positive step towards greater interoperability.

6. Malabar Exercise

Syllabus: Various Security forces and agencies and their mandate

Prelims: About Malabar Exercise

Context: Australia will host its first Malabar Exercise in August 2023.

Malabar Exercise:

- Malabar is a multilateral naval exercise, consisting of India, Australia, Japan and the U.S.
- Malabar series of exercises started in 1992 as a bilateral exercise between the navies of India and the US. The exercise gained further prominence with the joining of the navies of Australia and Japan.
- In 2015, Japan joined the exercise while the Australian Navy joined the Malabar Exercise in 2020.
- This exercise includes a diverse range of activities such as fighter combat operations and maritime interdiction operations.
- The exercise aims to enhance understanding of each other's operational methodologies and ability to cooperate to tackle myriad maritime challenges.
- Apart from the Malabar Exercise, the Indian Navy is also involved in the Passage Exercises (PASSEX) with the navies of Japan, Australia and the US.

7. Hindustan 228-201 LW aircraft

Syllabus: Defence and Security

Prelims: About Hindustan 228-201 LW aircraft

Context: The Directorate General of Civil Aviation (DGCA) has approved a new variant of the Hindustan 228-201 LW aircraft.

Hindustan 228-201 LW aircraft



Source: The Hindu

- Hindustan 228-201 LW aircraft is developed by the defence PSU, Hindustan Aeronautics Limited (HAL).
- The Hindustan 228-201 LW is a modified version of the German Dornier-228 aircraft of the HAL.
 - The Dornier-228 aircraft has been in use for short-range maritime patrol and surveillance by the Indian Navy and Coast Guard.
 - In 2016, HAL decided to produce a civilian version of the aircraft with the launch of the Hindustan 228 variant.
 - HAL has added advanced features to the Dornier 228 such as the FLIR system, satellite communication tools, ESM technology, speech encryption, etc.
- According to HAL, the Hindustan 228-201 LW version of the aircraft has a maximum take-off weight of 5,695 kg with 19 passengers and the aircraft would fall in the sub-5,700 kg aircraft category.
- This variant of the aircraft offers various operational benefits such as reduced pilot qualification requirements, enabled pilots with a commercial license to fly the aircraft, reduced operational cost and reduced training requirements.

8. Antonov-32 (AN-32)

Source: The Print

- The Indian Air Force has initiated the process to find a replacement for the AN-32 transport aircraft in service.
- It has issued a Request For Information (RFI) for the procurement of a Medium Transport Aircraft (MTA) with a carrying capacity of 18 to 30 tonnes.
- An-32 is a twin engine, tactical light transport aircraft designed and manufactured by Antonov Design Bureau of Ukraine for the Indian Air Force (IAF).
 - Its NATO reporting name is Cline.
- The IAF currently operates a fleet of more than 90 AN-32s that play a critical role in supporting forward-deployed troops along the country's frontiers including Ladakh and the Northeast.
- The aircraft can transport either 7.5t of cargo, 50 passengers, 42 paratroopers, or 24 patients and three medical crew over domestic and international air routes.

9. LWE-related violence down by 76% in 2022 from cases in 2010

- The Union Home Minister while chairing the meeting of the Parliamentary Consultative Committee on Left-wing Extremism (LWE) has said that violence related to LWE had declined by 76% in 2022 as compared to 2010.
 - He further added that the number of deaths of civilians and security forces was under 100 in 2020 for the first time in about 40 years.
 - The number of districts affected has also reduced from 90 to 45.
- According to the Home Minister, LWE-related violence has come down mainly due to the success of the Centre's three-pronged strategy which involves:
 - Adoption of a resolute approach to curb extremist violence
 - Better coordination with the affected States
 - Development through public participation
- Furthermore, the Border Security Force's (BSF) air wing has been strengthened with the induction of new pilots and engineers which has helped to choke the funding of banned outfits.

ENVIRONMENT AND ECOLOGY

1. Why have mangroves got a Budget push?

Syllabus: Conservation

Mains: Mangroves and Mangrove plantation proposed in Budget 2023-24.

Prelims: MISHTI initiative

Context: Mangrove plantation initiative in the Union Budget 2023-24.

Details:

- The Union Budget for 2023-24 has proposed Mangrove plantation along the coastline and on salt pan lands under **MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes)**.

Significance of Mangroves:

- The salt-tolerant plant communities found in tropical and subtropical intertidal regions are called Mangroves.
- They are crucial for coastal biodiversity and act as bio-shields against extreme climatic events like floods and cyclones.
- They are very important because the threat of climate change and frequent tropical storms are increasing at exponential rates.
- Thus planting more mangroves along the coastline of India (7500 km) is a great step in the right direction.

Background Details:

- According to the 'State of World Mangroves 2022' report by the Global Mangrove Alliance, the total mangrove cover of the world is around 147000 sq km (14.7 million hectares).
- The report further highlights that mangroves hold up to four times more the amount of carbon than other ecosystems. It was explicitly mentioned that "the loss of even 1% of remaining mangroves could lead to the loss of 0.23 gigatons of CO₂ equivalent, equal to over 520 million barrels of oil."
- As per the Indian State of Forest Report (ISFR) 2021, India has nearly 4992 sq km (0.49 million hectares) of mangroves.
- In India, Mangroves are distributed across 9 States and 3 Union Territories with West Bengal having the highest mangrove cover of 2114 sq km.
- The ISFR report also showed that the mangrove cover in India has increased from 4046 sq km in 1987 to 4992 sq km in 2021.
- However, the mangrove ecosystem in India is facing challenges due to the rising population in coastal areas and the increasing demand for land, timber, fodder, fuel-wood, and other non-wood forest products like fisheries.
- The tree species in mangrove forests/ecosystems are categorized into:
 - **True mangroves:** They display morphological adaptations like pneumatophores, vivipary or crypto-vivipary germination, and salt-secreting cells. There are 42 true mangrove species in India.
 - **Mangroves associates:** The species that exist side by side with the true mangroves. There are 68 mangrove associated species in India.

Challenges to Wetland Ecosystem:

- One of the biggest threats to the mangrove ecosystem is the aquaculture or fisheries along the coast that obstructs the tidal flow. For instance, in Sunderbans (the largest mangrove forest in India) several instances of clearing the mangrove forest for aquaculture has been witnessed.
- Land reclamation for agriculture and industries along the coastline also impacts the mangrove ecosystem.
- Discharge of untreated domestic and industrial effluents hampers the natural inter-tidal flow along the coast and obstructs the mixing of freshwater and saline water, which is important for the formation of the mangrove forest.

Mangrove plantation initiative:

- MISHTI will be implemented through the convergence of various schemes like MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme), CAMPA (Compensatory Afforestation Fund Management and Planning Authority) Fund, and other sources.
 - The MISHTI programme aims at intensive afforestation of coastal mangrove forests.
- It would further require extensive cooperation from local communities.
- It is found that the survival rate of mangrove seed plantation and saplings is 50% and 60% respectively. Moreover, it takes three years for a new plant to stabilize. Thus a contract-based one-time plantation under MGNREGS and CAMPA might not work efficiently without the local communities taking ownership of the forests.
- Moreover, MISHTI is in line with India's Nationally Determined Contributions of creating an additional carbon sink of 2.5-3 billion tonnes of carbon dioxide (CO₂) equivalent by 2030.
- Additionally, India also joined the Mangrove Alliance for Climate at COP27.

Mangrove Alliance for Climate (MAC)

- The Mangrove Alliance for Climate (MAC) was launched during COP27 in Egypt.
- MAC is an initiative pioneered by the United States of Emirates (UAE) and Indonesia which was later joined by India, Sri Lanka, Australia, Japan, and Spain.
- The members will also share expertise and support each other in researching, managing and protecting coastal areas.
- MAC is an intergovernmental alliance with no binding targets.

Nut Graf: *Mangrove Ecosystem is crucial for environment and biodiversity. However, it is under extreme pressure due to the rising population and increasing demand for land. In this direction, the government of India has involved the mangrove restoration in the Budget of 2023-24 through an initiative called MISHTI.*

2. Climate Change and Hydropower Generation

Syllabus: Environmental pollution and degradation

Mains: Impact of Climate change on hydropower generation and reservoirs in India

Context: This article discusses the impact of climate change on hydropower generation.

Introduction:

- A two-person team from IIT Gandhinagar studied the hydroclimatic changes in the catchment areas and their implications for hydropower generation in 46 major dams located in north, central and south India. The findings have been published in the journal iScience.
- According to their study, hydropower, which accounts for 13% of total power generation, is a significant contributor to clean global electricity generation.
- The team looked at the increase in rainfall in the catchment areas and the resultant inflow into all the 46 major reservoirs in the near (2021–2040), mid (2041–2060), and far (2081–2100) periods against the reference period (1995–2014) for two shared socioeconomic pathway scenarios.

Projected Increase:

- Under a warmer climate, hydropower production is expected to increase across the country as precipitation increases, resulting in increased inflow to reservoirs.
- Based on selected hydroelectric dams, the projected increase in hydropower potential in India is 10-23%.
- A warmer and wetter climate is projected to bring about 5%-33% increased rainfall. As a result, hydropower production is very likely to increase by 9%-36% for most dams due to increased inflow (7-70%) into the dams.
- The potential hydropower generation is projected to rise by more than 50% in Tehri, Ramganga, Kadana, Omkareshwar, Maheshwar, and Sriramsagar dams in the far period.
- In south India, eight out of eleven dams are projected to experience a decline in hydropower potential.
- Dams in central India are expected to generate more hydropower than dams in the north and south of the country.
- Significant warming forecast for north India may reduce snow and glacial storage, lowering snowmelt water contribution in the long run. However, a significant increase in rainfall is more likely to compensate for the loss from snowmelt in north India.

Impact on Reservoirs:

- Extreme rainfall caused by global warming will result in an increase in extreme inflow and high reservoir storage conditions for the majority of dams.
- High and sudden inflow from extreme rainfall, particularly when reservoirs are already full, can complicate reservoir operations and create a flood-like situation due to sudden water release.
 - Chennai in 2015 and Kerala in 2018 witnessed massive flooding due to heavy inflow into already full reservoirs.
- Compared with central and south India, north India is projected to experience higher warming in the future.
 - According to the study, north India will experience the greatest warming (about 5 degrees Celsius), while central and southern India will experience warming of 3-4 degrees Celsius.
- The study found that inflow to a few dams in Ganga, Mahanadi, Brahmani, and west-coast river basins is projected to decline in the future.
 - This reduction in inflow is due to increase in atmospheric water demands in response to the considerable warming compared to increase in precipitation.

Nut Graf: *Recent study by a team from IIT Gandhinagar on the impact of climate change on hydropower generation provides crucial insights into projected changes in hydroclimate and hydropower for the major dams in India. This can be significant to guide reservoir rule curves on how much storage should be permitted at different times during the monsoon season.*

3. An effort to go green

Syllabus: Conservation, Environmental pollution and degradation

Mains: Role of community-based environmental conservation efforts

Context: Telangana state government's green initiatives help create awareness about the environment.

Introduction:

- Telangana state in India has been recognized as one of the leading states in India for its initiatives towards the environment. It has implemented various green initiatives in the past few years, which have helped to create awareness about the environment among the people of the state.
- Over the past two years, Hyderabad has won multiple awards for being a green city with an improving forest cover.
 - Hyderabad is among the two cities in India, along with Mumbai, to be listed as 'Tree Cities of the World-2021' by Arbor Day Foundation and FAO of UN.
 - Hyderabad has also been awarded the overall 'World Green City Award 2022' at the International Association of Horticulture Producers (AIPH) 2022 World Green City Awards 2022.
- The Telangana government's green initiatives have not only helped create awareness about the environment but have also generated employment opportunities in the state.
 - The Haritha Haram program has created thousands of jobs in the nurseries, and the Vehicle Scrappage Policy has generated employment opportunities in the automobile sector.

Green Initiatives undertaken by the Telangana Government:

- **Haritha Haram:**
 - Haritha Haram is a flagship program of the Telangana state government, launched in July 2015. The aim of the program was to increase the green cover in the state from the existing 24% to 33% by planting 230 crore saplings in five years.
 - The state government has replanted 9.65 lakh acres and developed 109 urban forests. This year, 13 lakh acres of forest have been "rejuvenated" with a funding of ₹1,500 crore.
 - The program has been successful in creating awareness among the people about the importance of planting trees and protecting the environment. The government has involved various stakeholders, including schools, colleges, NGOs, and corporate companies, to plant saplings and take care of them.
- **Swachh Telangana**
 - Swachh Telangana was launched in 2014 to create a clean and hygienic environment in the state. Under this program, the government has constructed public toilets, installed dustbins, and launched a massive awareness campaign to promote cleanliness.
 - The program has been successful in creating awareness among the people about the importance of cleanliness and hygiene.
- **Mission Kakatiya**
 - Mission Kakatiya was launched in 2014 to rejuvenate the lakes and tanks in the state and improve the groundwater level. Under this program, the government has identified and restored more than 45,000 tanks and lakes in the state.
 - The Mission Kakatiya program has contributed to improving the groundwater level in the state. The restoration of the lakes and tanks has led to an increase in the water storage capacity, which has helped in recharging the groundwater level.

Issues and challenges:

- One of the most significant issues facing Telangana's forest conservation efforts is the illegal felling of trees.
- Many people engage in this activity for commercial purposes, which has led to massive deforestation in several areas of the state. The lack of proper monitoring and enforcement of forest laws has contributed to this problem.
- Environmental advocates have doubts over the numbers of rejuvenated forests and trees as there is a steady loss of tree cover due to evergrowing construction works in the city.
- Questions have also been raised about the awards. The nomination for 'Tree City of the World' was submitted by providing a certification from the Mayor on the number of trees and there is no external auditing to establish the truthfulness of the information.
- State is also facing the challenge of encroachments into forest lands by the indigenous people. The right for permanent settlement in areas that were once considered forest has been a divisive issue which could impact voting patterns.
 - Recently, a forest official was killed while trying to mark boundaries in the forest.
- Forest fires are a common occurrence in Telangana, especially during the summer months.
 - These fires often result from human activities such as burning of agricultural waste, cigarette smoking, and campfires.
 - The fires cause extensive damage to the flora and fauna of the forests, and the government's efforts to prevent them have been inadequate.

Nut Graf: The Telangana state government's green initiatives have been successful in creating awareness about the environment and encouraging people to adopt sustainable practices. These initiatives have not only helped reduce pollution levels and conserve natural resources but have also generated employment opportunities in the state.

4. Carbon Trading Market In India

Syllabus: Conservation, environmental pollution and degradation

Mains: Significance of India's Evolving Carbon Market

Context: This article discusses the prospects of the carbon trading market in India.

Carbon Trade and Carbon Market:

- Carbon trade is the buying and selling of credits that permit a company or other entity to emit a certain amount of carbon dioxide or other greenhouse gases.
- The carbon credits and the carbon trade are authorised by governments with the goal of gradually reducing overall carbon emissions and mitigating their contribution to climate change.
- Rules for a global carbon market were established at the Glasgow COP26 climate change conference in 2021, enacting an agreement first laid out in the 2015 Paris Climate Agreement.
- According to Article 6 of the Paris Agreement countries can make use of international carbon markets to fulfil their Nationally Determined Contributions (NDC) that help mitigate global warming under 2°C.
- A carbon credit is nothing but a tradable permit that, according to UN standards, is equal to one tonne of carbon dioxide reduced or sequestered from the atmosphere. Carbon credits are created by various activities which reduce carbon dioxide from the air, such as afforestation.
- Carbon markets are mainly categorised into two types namely:
 - **Voluntary markets:** These markets are those in which emitters such as corporations, private individuals, and others buy carbon credits to offset the emission of one tonne of CO₂ or equivalent greenhouse gas.
 - **Compliance markets:** These markets on the other hand are established by policies at the national, regional, or international levels and are officially regulated.
- According to the United Nations Development Program (UNDP), the interest in carbon markets is increasing across the world as about 83% of NDCs submitted by countries talk about their intent of utilising the international market mechanisms to reduce greenhouse gas emissions.

India's Evolving Carbon Market:

India's carbon market is still evolving, and the country is taking steps to develop a robust and effective carbon trading system. Here are some of the key developments and initiatives in India's evolving carbon market:

- **Energy Conservation (Amendment) Bill, 2022:** The amendment bill empowers the government to set up carbon markets in India and specify a carbon credit trading scheme.
 - As per the Bill, the Union Government or any authorised agency will be empowered to issue carbon credit certificates that would be tradeable in nature.
- **Pilot carbon trading platforms:** The Union government has launched pilot carbon trading platforms in collaboration with various organisations, such as the World Bank and the Federation of Indian Chambers of Commerce and Industry (FICCI). These platforms aim to test and refine different approaches to carbon trading in India.
- **National Carbon Market:** In February 2021, the Indian government announced its intention to establish a national carbon market. The market will be based on a "cap-and-trade" system, where the government sets a cap on emissions and allows companies to trade emissions allowances. Parliament amended the energy conservation bill in 2022 in order to establish a carbon market in India.
- **Carbon pricing:** India has implemented several policies to put a price on carbon, such as a tax on coal and a clean energy cess. These policies aim to incentivize companies to reduce emissions by making it more expensive to use high-emitting fuels.
- **Clean Development Mechanism (CDM) projects:** India is one of the largest beneficiaries of the Clean Development Mechanism under the Kyoto Protocol, with over 2,200 CDM projects registered in the country.
- **Renewable Energy Certificates (RECs):** India has a market-based system for trading RECs, which represent the environmental attributes of renewable energy.
- India has also notified the **National Designated Authority** for the Implementation of the Paris Agreement (NDAIPA) to take decisions in regard to the type of projects that may take part in the international carbon market under Article 6 mechanisms of the Paris Agreement.

Carbon trading in European Union (EU):

- EU-Emissions Trading Systems is the world's first and the biggest major carbon market.
- Under EU-Emissions Trading Systems (ETS), government-mandated emission limits on industrial sectors such as aluminium or steel plants require industries to either cut emissions or buy government-certified permits from companies that cut more emissions than required or were auctioned by governments.

Significance of the Carbon Market:

- The significance of the carbon market lies in its ability to incentivize and facilitate emissions reductions in a cost-effective way.
- The carbon market can help developing countries access finance for low-carbon development and provide an incentive for developed countries to invest in emissions reductions in developing countries.
- Carbon markets can provide finance for low-carbon development and support sustainable development projects, such as energy efficiency upgrades, sustainable transport, and afforestation. This can help India meet its development goals while also reducing emissions.

- As a developing country with a large and rapidly growing economy, India's climate actions are closely watched by the international community. By participating in carbon markets and demonstrating its commitment to reducing emissions, India can enhance its international climate leadership and influence.
- The carbon market creates a transparent and standardized system for measuring, reporting, and verifying emissions reductions, which can help increase accountability and trust in climate action.

Nut Graf: India's evolving carbon market reflects the country's commitment to reducing emissions and transitioning to a low-carbon economy. As the market continues to develop, it has the potential to provide a cost-effective way for Indian companies to reduce emissions and promote sustainable development.

5. New e-waste rules

Syllabus: Environmental pollution and degradation.

Mains: e-waste rules in India and its associated concerns.

Context: New e-waste rules will come into force on 1st April 2023.

e-Waste management rules in India:

- In the era of rapid urbanization, digitalisation, and population growth, managing e-waste has become a big challenge.
- A set of E-waste rules was first notified in 2011 (came into effect in 2012).
- An important component of the rules was Extended Producer Responsibility (EPR).
- E-waste rules 2016 (amended in 2018) were comprehensive rules and introduced features like 'authorization' and 'product stewardship'. It also proposed the provisions of 'Producer Responsibility Organisations (PRO)'.
- The Ministry of Environment, Forests, and Climate Change (MoEFCC) notified a new set of e-waste rules in November 2022 (it will come into force on 1st April 2023).

Extended Producer Responsibility (EPR)

- Extended Producer Responsibility (EPR) implies that 'producers' are responsible for the safe disposal of electronic and electric products once the consumer discards them.
- EPR is essentially the use of financial incentives to encourage manufacturers to design environmentally friendly products by making producers accountable for their product management during end-stage consumption.
- EPR is carried out bearing in mind that brand owners have the greatest control over product design and hence are in a better position to design their products in such a manner that it will reduce harmful effects on the environment as a whole.
- Extended Producers Responsibility is done through, reuse, buyback, or recycling.
- The producer has also the option of delegating this responsibility to a third-party which can be paid by the producer for used-product management.
- EPR further shifts the responsibility for waste management from the government to private industries, making it easy for producers or sellers to internalise waste management and ensure the safe handling of their products.

Salient features of the new e-waste rules:

- It includes the provision of an EPR framework with the mandatory requirement of 'Registration of Stakeholders' (manufacturer, producer, refurbisher, and recycler).
- A 'digitalized systems approach' is also proposed in the new rules (2022) which will address the challenges of the weak monitoring systems, lack of transparency, inadequate compliance, and channelizing processing to the informal sector (which is a violation of the law).
- A common digital portal will also reduce instances of 'paper trading' or 'false trails'. It means the practice of falsely revealing 100% collection on paper while collecting and/or weighing 'scrap' to meet targets.
- It also briefly touches on the two aspects namely 'component recovery' and 'residual disposal'.
 - **Component recovery** refers to adequate and efficient recoveries of rare earth metals so as to reduce dependence on virgin resources.
 - **Residual disposal** means the safe disposal of the 'residual' material during the e-waste recycling process.

Associated concerns:

- It is argued that the proposed rules do not clearly state the requirement for ensuring the 'recovery tangent'.
- Moreover, the new rules eliminate the PRO and dismantlers and give the entire responsibility of recycling to authorized recyclers.
 - It should be noted that PROs acted as an intermediary between producers and formal recyclers and arranged for 'certified and authorized' recycling.
 - They also ensured 'double verification' in terms of the quantity and quality of recycling.
- The new rules neglect the role of the informal sector despite the fact that 95% of e-waste is channelized by them.
 - Notably, all the stages (collection, segregation, and clustered accumulation of e-waste) do not involve any hazardous practices.
 - It is probably the last stage, where e-waste is handed over to the informal dismantlers/recyclers, which poses a major concern in e-waste management.

- Many producers have not established collection centres. Similarly, formal companies fail to provide facilities for doorstep collection to consumers.
- Moreover, consumers lack awareness of the existence of e-waste collection services.

Way Ahead:

- The activities of the recyclers should be recorded and the authorities should periodically monitor the quantity of e-waste undergoing the recycling process.
- Integration of informal aggregators in the collection mechanism – This will provide a safe and structured system and will provide financial and legal security to the informal sector. For example, the initiative of 'Karo Sambhav' in Delhi.
- For the efficient implementation of the law, stakeholders should have the appropriate information with a clear intent of safely disposing of the e-waste.
- It is also important to:
 - Raise consumer awareness
 - Strengthen reverse logistics
 - Build the capacity of stakeholders
 - Improve existing infrastructure
 - Enhance product design
 - Rationalize input control (particularly by defining 'rare earth elements' as 'critical raw materials')
 - Adopt green procurement practices.
 - Ensure a robust collection and recycling system

Nut Graf: New e-waste management rules have been notified by the government. However, it has multiple challenges like the reduced role of the informal sector, which needs to be addressed on an urgent basis as the informal sector is the 'face' of e-waste disposal in India.

6. Breathing the toxic air of Chandrapur

Syllabus: Environmental pollution – Air pollution.

Mains: Air pollution - a case study of Chandrapur, Maharashtra.

Prelims: Air pollution.

Details:

- The coal-fired Chandrapur Super Thermal Power Station (CSTPS) in Maharashtra's Chandrapur district is a seven-unit facility with a capacity of around 2920 MW. It lies in the Vidarbha region, the coal-rich belt of Maharashtra.
- Chandrapur is known as 'India's Black Gold City'. However, it is also one of the most polluted cities in India.
- Apart from mines, Chandrapur also has cement, explosives, paper, and textile factories.

Air Pollution in Chandrapur and associated concerns:

- The CSTPS plant releases approximately 7,100 metric tonnes of fly ash which is almost equal to the weight of 18 jumbo jets.
- Moreover, it also generates 2900 metric tonnes of bottom ash (it is heavier coal waste that is non-combustible and requires safe storage).
- Notably, fly ash and bottom ash are together known as coal ash.
- In 2019, it was found that Chandrapur had a very high Comprehensive Environmental Pollution Index (CEPI) score of 76.41.
 - CEPI monitors the overall environmental quality of industrial areas in India.
- In January 2022, the air became toxic and the air quality index reached a dangerous 400.
- The sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) emissions were also found to be extremely high than the standard limit.
- According to a study conducted in June 2020, 32% of the surveyed street vendors complained of respiratory tract infections.
- Similarly, a report published by the Centre for Research on Energy and Clean Air (CREA) in February 2022 showed that the operation of units at CSTPS in 2020 could be linked to an estimated 85 premature deaths in Chandrapur and 62 in Nagpur. However, a defamation notice was issued by MAHAGENCO (Maharashtra State Power Generation Co. Ltd) against the report.
- The respiratory issues have increased considerably in the area around the plant. It is highlighted by the environmental activists that the CSTPS has been flouting environmental norms.
- The Maharashtra Pollution Control Board (MPCB) further highlighted in September 2021 that seven million metric tonnes per annum of ash were dumped in the bund and the plant stores ash in an unscientific manner.
- A pipe that carries fly ash slurry from the thermal plant to the ash pond also leaked right over the Erai river (the lifeline of people of Chandrapur) in March 2022.
 - According to the Flyash Watch Group, 76 slurry leak incidents were reported in India in the previous decade.

- India produces nearly 180 million metric tonnes of fly ash annually and it majorly remains untreated and unrecycled.
- As per the Centre for Science and Environment, one in every two coal-based plants flouts environmental norms.

Existing provisions to control air pollution:

- According to the new rules, the government has mandated 100% fly ash utilization. This implies that all coal power plants must reuse 100% of their fly ash within three years or face a fine of ₹1,000 per tonne.
- Notably, despite several concerns, the CSTPS has always obtained 'consent to operate' from the National Green Tribunal and the Pollution Control Board.
- The Indian government has issued a notification demanding the installation of flue gas desulphurization (FGD) units and the safe disposal of fly ash.
 - FGD is a system that can curb SO₂ emissions by up to 80-90% in some units.

Way Ahead:

- FGD should be installed at all thermal power plants.
- Fly ash should also be effectively reused.
- Efforts should also be made to constantly monitor and keep the contaminants' concentrations in drinking water well within the safety limits.
- Moreover, state-run power plants should operate lawfully considering the impact on the lives of local residents.

Nut Graf: *The Chandrapur Super Thermal Power Station (CSTPS) in Maharashtra is severely impacting its immediate environment and has become one of the most polluted cities in India. It is advised that appropriate measures should be taken by the authorities to ensure a safe and secure environment in the area.*

7. Deep sea fish conservation

Syllabus: Conservation

Prelims: Purse Seine Fishing

Mains: Sustainable fishing practices to harness marine and inland water resources.

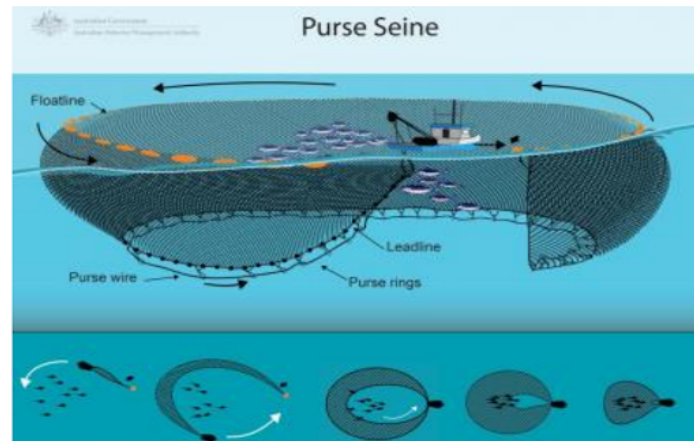
Context: The Supreme Court of India gave an interim order on a Special Leave Petition regarding the use of a fishing method called Purse Seine Fishing on January 24, 2023.

Overview:

- The Supreme Court of India gave permission to fishermen using purse seine fishing gear to fish beyond territorial waters and within the Exclusive Economic Zone (EEZ) of Tamil Nadu with certain restrictions.
- The Tamil Nadu government in 2022 had banned the use of purse seine nets within its territorial waters by invoking the Tamil Nadu Marine Fishing Regulations Act, 1983.
- The Madras High Court upheld the ban in 2018 and 2021 and ever since the fishermen had been demanding to ease the restrictions.
- The Union government has placed no restrictions on this method of fishing.

What is purse seine fishing?

- A purse seine is made of a long wall of netting framed with floating and leadline and having purse rings hanging from the lower edge of the gear, through which runs a purse line made from steel wire or rope which allows the pursing of the net.
- It is used in the open ocean to target dense schools of single-species pelagic (midwater) fish.
- Purse-seine fishing in open water is generally considered to be an efficient form of fishing. It has no contact with the seabed and can have low levels of bycatch (accidental catch of unwanted species).
- Purse seines can also be used to catch fish congregating around fish aggregating devices. This fishing method can result in higher levels of bycatch.



Source: afma.gov

What are the advantages of Purse Seine Fishing?

- Purse-seine fishing in open water is regarded as an efficient method of fishing.
- It has no contact with the seafloor and can have low bycatch levels.
- It can also be used to catch fish that have gathered around aggregating devices.
- In the open ocean, it is used to target dense schools of single-species pelagic (midwater) fish such as tuna and mackerel.

What are the Concerns?

- On the western coasts of some states, this technique has been linked to concerns about dwindling stocks of small, pelagic shoaling fish such as sardines, mackerel, anchovies, and trevally.
- The scientific community contends that climatic conditions, including the El Nino phenomenon, are to blame for the ten-year decline in such fish catch.
- Traditional fishermen, on the other hand, blame the rise of purse seine fishing and fear a further drop in the availability of these small fish if the ban is lifted.
 - They have also demanded that, because the Centre has supported the lifting of the ban, it publishes the expert committee report on which its position is based.
- The scarcity of oil sardines, a favourite of Kerala's fish eaters, is a major source of concern.
 - Kerala caught only 3,297 tonnes of sardine in 2021, a significant decrease from the 3.9 lakh tonnes caught in 2012.
- Purse seine is a non-targeted fishing gear that catches any fish that comes into contact with the net, including juveniles. As a result, they are extremely harmful to marine resources.

Present status of purse seine fishing:

- It is prohibited by Tamil Nadu, Kerala, Puducherry, Odisha, Dadra and Nagar Haveli, Daman and Diu and Andaman and Nicobar Islands in their respective territorial waters of up to 12 nautical miles.
 - Maharashtra has issued certain orders for the regulation of purse seine fishing in its territorial waters.
- States like Gujarat, Andhra, Goa, Karnataka, and West Bengal have not imposed any such ban on purse seine fishing.
- The Union government had recommended the lifting of the ban on purse seine fishing in a report submitted by an expert committee in November 2022.

What is the Union Government's Argument Against Ban?

- According to a report submitted by an expert committee, the Union Ministry of Fisheries, Animal Husbandry, and Dairying has recommended lifting the ban on purse seine fishing.
- The expert panel has said that this mode of fishing "per se has not resulted in any serious resource depletion so far, given the available evidence".
- The expert panel has recommended that purse seiners be allowed to fish in territorial waters and the Indian Exclusive Economic Zone (EEZ) under certain conditions.
- The committee has also suggested the framing of a "national management plan on purse seine fisheries."

Conditions placed by the Supreme Court:

- Only registered fishing vessels, that is fishing vessels registered under Section 11 of the Marine Products Export Development Authority Act, 1972 and registered with the state government under rules and regulations currently in force in Tamil Nadu will be given permission to do such fishing.
- Permission is given to only those boats where an approved Vessel Tracking System (VTS) has been installed and which shall be kept running during the operating time of the vessels.
- These vessels will be allowed to operate only twice a week, i.e., on Mondays and Thursdays.
 - All other restrictions of the non-fishing period will apply to them as applicable to all other fishing activities.
- The vessels shall leave the coastline on or after 8 AM and shall return to the designated place positively by 6 PM the same day.

- Mandatory for all sailors to keep their biometric card/photo ID with them. It will be compulsory for them to provide the VTS code to the Fisheries Department, Marine Police, Coast Guard and the Indian Navy.
- The Fisheries Department of the state shall also give a colour code to these Purse Seine Fishing Boats.

Implications of recent court order on deep sea fish conservation:

- One of the primary ecological arguments against purse seine nets is that they tend to draw only the targeted fish but also at-risk varieties, including turtles.
 - This could also be a potential ground for a trade embargo.
- Purse seiners tend to overfish and it is used by affluent and rich fishermen or big fishing companies, as this technology is costly and is beyond the reach of ordinary fishermen. The vast majority of fishermen who are traditionally engaged in fishing for their livelihood cannot afford this technology and depend on traditional methods of fishing.
 - Moreover, the uncontrolled use of purse seine nets triggers intense clashes between the fishermen from different coastal villages.
- In some States, this technique is linked to concerns about the decreasing stock of small, pelagic shoaling fish such as sardines, mackerel, anchovies and trevally on the western coasts.
- Merely restricting the purse seiner to fish on two days is not sufficient without regulating the fishing methods used.
- The most recent court ruling appears to disregard the conservation measures and duties that a coastal state is required to take in its EEZ by the United Nations Convention on the Law of the Sea (UNCLOS).
 - Under Articles 56.1(a) and 56.1(b)(iii) of UNCLOS, coastal states have sovereign rights to ensure that the living and non-living resources of the EEZ are used, conserved and managed, and not subject to overexploitation.
- The recent ruling is also against certain obligations arising from the multilateral and regional conventions which are meant to bring in sustainable fishing practices over a certain period of time, thereby allowing a common resource such as fish to be naturally replenished.
- There are several regional organizations that either prohibit the use of large drift nets or at least call for their prohibition, such as the 1989 Tarawa Declaration of the South Pacific Forum.
- The 1989 Convention for the Prohibition of Fishing with Long Drift Nets in the South Pacific also restricted port access for drift net fishing vessels.

Nut Graf: *In a relief to fishermen of Tamil Nadu, the Supreme Court conditionally allowed Purse Seine Fishing beyond the territorial waters of the state but within the exclusive economic zone. Uncontrolled fishing using purse seine nets could have several negative consequences on deep-sea fish conservation efforts.*

8. India as a Biodiversity Champion

Syllabus: Biodiversity and Conservation

Mains: Evidence-based implementation of 'Green Growth' Programmes for biodiversity conservation

Context: This article discusses various initiatives by India towards biodiversity conservation.

Introduction:

- Biodiversity conservation refers to the protection, management, and restoration of the variety of life on Earth, including all plant and animal species and their habitats. Biodiversity is essential for the healthy functioning of ecosystems, the provision of ecosystem services, and the survival and well-being of human societies.
- India currently hosts 17% of the planet's human population and 17% of the global area in biodiversity hotspots, placing it at the helm to guide the planet in becoming a biodiversity champion.
- However, India is facing serious losses of natural assets such as soils, land, water, and biodiversity due to rapid growth in population and its after-effects.

Initiatives towards biodiversity conservation:

- The **National Mission for a Green India** aims to increase forest cover on degraded lands and protect existing forested lands.
- The **National Mission for Himalayan Studies** was launched in 2015 to support research and development in the Himalayan region. The mission aims to promote sustainable development and conservation of the Himalayan ecosystem.
- India has identified and notified over 160 **Biodiversity Heritage Sites**, which are areas of ecological, biodiversity, cultural or aesthetic importance. These sites are protected and managed for the conservation of biodiversity and cultural heritage.
- The **National Mission on Biodiversity and Human Wellbeing** has been approved by the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC).
 - This mission seeks to harness the power of interdisciplinary knowledge — for greening India and its economy and to position India as a global leader in applied biodiversity science.
- On December 19, 2022, 188 country representatives at the United Nations Biodiversity Conference in Montreal, Canada adopted an agreement to "halt and reverse" biodiversity loss by conserving 30% of the world's land and 30% of the world's oceans by 2030, known as the 30×30 pledge.
- In response to this call, the Union Budget 2023 mentioned "**Green Growth**" as one of the seven priorities or 'Saptarishis'.

Way Forward:

- Administration shall focus on evidence-based implementation and inclusive monitoring programmes that could result in documentation and distillation of lessons learnt for replication, nationally as well as globally.
- We must focus on reducing water use in agriculture by promoting the adoption of less water-intensive crops and by making investments in water recycling in urban areas using a combination of grey and blue-green infrastructure to maintain ecological flows that will determine the fate of our wetland ecosystems.
- Implementation of the Green India Mission should focus on ecological restoration rather than tree plantation and choose sites where it can contribute to ecological connectivity in landscapes fragmented by linear infrastructure.
 - The choice of species and density should be based on knowledge and evidence on resilience under emerging climate change.
- Under the 'Mangrove Initiative for Shoreline Habitats & Tangible Incomes' (MISHTI) initiative, site selection should be considered with a greater emphasis on the diversity of mangrove species with retention of the integrity of coastal mud-flats and salt pans themselves.
- Conservation efforts must be inclusive of local and nomadic communities where these initiatives will be implemented.
 - Traditional knowledge and practices of these communities should be integrated into the implementation plans.
- The National Mission on Biodiversity and Human Wellbeing shall be launched without much delay to educate and bring awareness to India's biological wealth.

Nut Graf: Biodiversity conservation is a complex and multi-faceted challenge that requires a range of scientific approaches and strategies. It is important to engage a variety of stakeholders, including governments, communities, and businesses, to work together towards the common goal of conserving biodiversity and ensuring the long-term sustainability of our planet.

9. Animal Welfare Board of India

Syllabus: Biodiversity Conservation

Prelims: About Animal Welfare Board of India

Context: The Animal Welfare Board of India (AWBI) recently withdrew its February 6 appeal urging people to celebrate February 14 as 'Cow Hug Day'.

Details:

- The appeal invited criticism from farmers' organisations and trade unions that such a circular was against the promotion of scientific temper.
- The appeal was withdrawn after directions from the Ministry of Fisheries, Animal Husbandry and Dairying.
- Appeal from AWBI claimed that hugging cows will bring "emotional richness" and will increase "individual and collective happiness."

Animal Welfare Board of India:

- It is a statutory advisory body under the Union Ministry of Fisheries, Animal Husbandry and Dairying.
- It was established in 1962 under Section 4 of the Prevention of Cruelty to Animals Act, 1960.
- Shrimati Rukmini Devi Arundale pioneered the setting up of the Board, with its Headquarters in Chennai.
- Headquarters was shifted to Ballabgarh, Haryana from Chennai in 2018.
- **Mandate:**
 - To prevent the infliction of unnecessary pain or suffering on animals, in terms of the provision of the Prevention of Cruelty to Animals (PCA) Act, 1960.
 - It has also frequently litigated to have stricter laws to ensure animals were not unduly harassed or tortured.
 - The Board grants recognition to newly started Animal Welfare Organisations (AWOs) and provides financial assistance to them.
- **Membership:**
 - Several government organisations, along with animal rights activists and parliamentarians, are represented on the Board.
 - The Board consists of 28 Members. The term of office of Members is for a period of 3 years.

10. Indian Pangolin & TRAFFIC

Syllabus: Biodiversity and Conservation

Prelims: About Indian Pangolin and TRAFFIC

Context:

- On the eve of World Pangolin Day, February 18, TRAFFIC (a non-profit organisation that works on the international trade of animals and plants) reported that 1,203 pangolins were discovered in illegal wildlife trade in India between 2018 and 2022.
- A snow leopard has been spotted for the first time in Uttarakhand's Pithoragarh district, at an elevation of about 11,120 feet.
 - The sighting was made by a group of explorers looking for high-Himalayan fauna in the Darma valley.

About Indian Pangolin:**● Characteristics of a Pangolin**

- The scales of a pangolin are aries depending on the colour of its environment. It feeds on primarily insects (insectivore) eating ants and termites, digging them out of mounds and logs. It is active during night and it rests in deep burrows during daytime
- Lacking any teeth, the pangolin relies on its tongue to feed itself, relying on its strong stomach to aid in its digestion. Its characteristic scales covers its upper face and body excluding the belly and inside of the legs
- **India is home to two species:** the Indian Pangolin, which is found throughout the subcontinent, and the Chinese Pangolin, which is found throughout South Asia. Both are present in Bihar, West Bengal, and Assam.
- Both species are listed on Schedule I of India's Wildlife Protection Act, which could result in jail sentences for those who hunt the animals listed here.

Pangolin Poaching:

- TRAFFIC's 2018 analysis of the illegal pangolin trade in India reported the poaching of 6,000 pangolins between 2009 and 2017.
- India reports a high number of pangolin trafficking incidents, as evidenced by seizures throughout the country.
 - They are primarily poached for their scales, which are used as an ingredient in traditional medicines in China and Southeast Asia.

Threats to Pangolins in India:

- Hunting and poaching for its meat and scales in East and South East Asian countries, particularly China and Vietnam, and international trade for its meat and scales.

Protection Status:

- **IUCN Red List**
 - Indian Pangolin: Endangered
 - Chinese Pangolin: Critically Endangered
- Both these species are listed under Schedule I, Part I of the Wildlife (Protection) Act, 1972

Ecological Importance:

- They are important in ecosystem management because they aerate and add moisture to the soil, as well as the succession of plant communities through burrowing.

About TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce)

- TRAFFIC is an organisation founded in 1976 by WWF and IUCN as a wildlife trade monitoring network to collect, analyse, and provide recommendations to inform wildlife trade decision making.
- As a joint WWF-IUCN programme, TRAFFIC has served as a leader in wildlife trade research for over 40 years.
- In 2017, TRAFFIC became an independent non-profit organisation, with the WWF and IUCN joining an independent Board of Directors.
- As a provider of objective and reliable information, TRAFFIC is globally recognised for its expertise and influence in the wildlife trade and conservation arena.
- Its expert staff implements innovative projects and develops new tools to carry out the mission of protecting nature and promoting sustainable development by resolving wildlife trade issues.

11. CITES database reveals red sanders smuggling

Syllabus: Biodiversity and Conservation

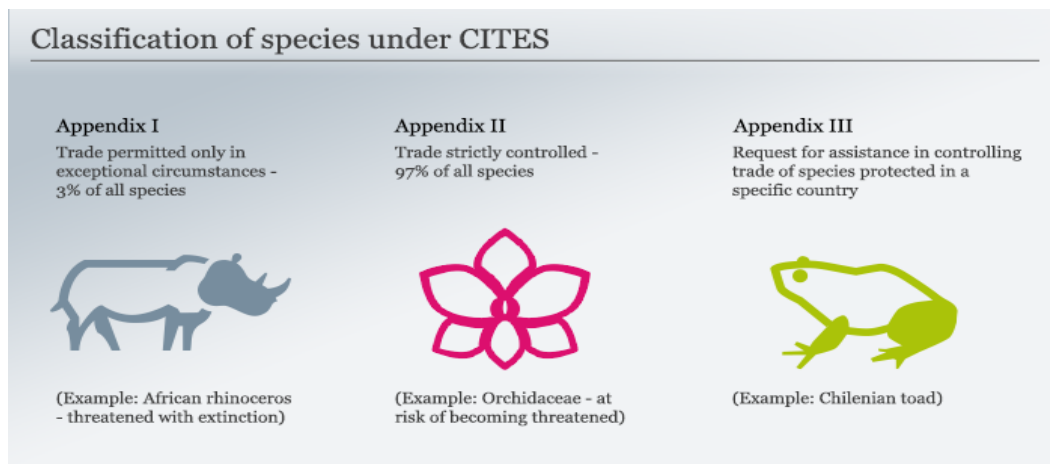
Prelims: About CITES and Red sanders

Context:

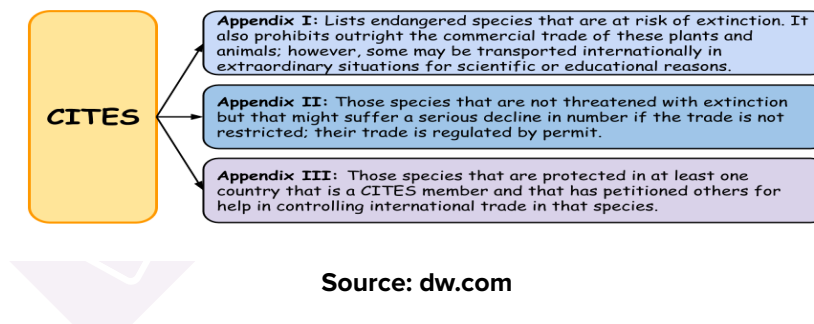
- According to a fact sheet prepared by TRAFFIC, the trade database of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** has recorded 28 incidents of red sanders confiscation and seizure while being exported from India.
- The consignments of red sanders were exported to China (53.5%), Hong Kong (25.0%), Singapore (17.8%) and the US (3.5%) from 2016 to 2020.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):

- CITES is an international agreement between countries that aims to ensure that the international trade in wild animals and plants does not threaten the survival of the species.
- It is legally binding on state parties to the convention, which are obliged to adopt their own domestic legislation to implement its goals.



Source: CITES



Source: dw.com

About Red Sanders:

- **Red Sanders (*Pterocarpus santalinus*)** which is also known as red sandalwood, is an endemic tree species with distribution restricted to the Eastern Ghats in India.
- The tree which is found in the State of Andhra Pradesh is said to be one of the most exploited tree species in the country.
- According to the foreign trade policy of India, the **import of Red Sanders is prohibited**, while **export is restricted**.
 - However, the heartwood of the tree is in great demand both in domestic as well as international markets
- Heartwood is used in the manufacturing of furniture and handicrafts, and red dye obtained from the wood is used as a colouring agent in textiles and medicines.
- The tree species is listed under:
 - Wildlife Protection Act: **Schedule IV**
 - IUCN status: **Endangered**
 - CITES: **Appendix II**

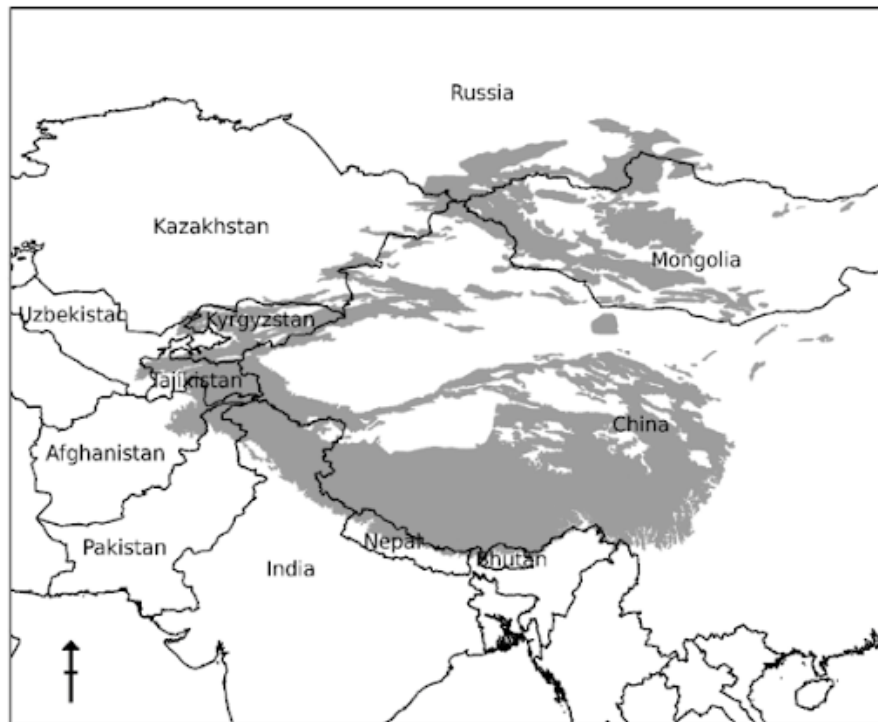
12. Snow Leopard

Syllabus: Biodiversity and Conservation

Prelims: About Snow Leopard

Context: A Snow Leopard was recently sighted for the first time at a height of about 11,120 feet in the Darma valley in the Pithoragarh district of Uttarakhand.

Snow Leopard



Source: Research Gate

- It is known as Lama in the Lisu dialect, and it is also known as Lamaphu.
- It is a field of the genus *Panthera* native to Central and South Asian mountain ranges.
- It lives in alpine and subalpine zones at elevations ranging from eastern Afghanistan, the Himalayas, and the Tibetan Plateau to southern Siberia, Mongolia, and western China.
- Their thick white-gray coat spotted with large black rosettes not just protects them from the cold but also makes them almost invisible in their surroundings providing natural camouflage.
- Snow Leopards are often termed “ghosts of the mountains”. It is known as Lama in the Lisu dialect, and it is also known as Lamaphu.
- Snow Leopards are known to have evolved to survive in some of the harshest conditions on Earth.
- Snow leopards reach sexual maturity at two to three years of age and live in the wild for 15 to 18 years.
- They can live in captivity for up to 25 years.

Conservation efforts- National level:

- According to reports, India is home to approximately 450-500 snow leopards, which can be seen in the country's upper Himalayan regions.
- Snow Leopard has been accorded **Schedule I Protection** under the Wildlife Protection Act, 1972.
- Through the **Project Snow Leopard**, India has been working to protect snow leopards and their habitats (PSL).
- Since 2013, India has also been a member of the **Global Snow Leopard and Ecosystem Protection (GSLEP) Programme**.
- India has designated three large landscapes for conservation: Hemis-Spiti in Ladakh and Himachal Pradesh, Nanda Devi-Gangotri in Uttarakhand, and Khangchendzonga-Tawang in Sikkim and Arunachal Pradesh.
- The Snow Leopard is one of 22 critically endangered species on the Ministry of Environment, Forests, and Climate Change's recovery list.
- **SECURE Himalaya:** The project on high-altitude biodiversity conservation and reducing local communities' reliance on natural ecosystems was funded by the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP). This project is now in four snow leopard range states: Jammu and Kashmir, Himachal Pradesh, Uttarakhand, and Sikkim.
- **“HimalSanrakshak”** is a **community** volunteer programme to protect snow leopards.

Conservation efforts- International level:

- Snow leopards Under IUCN list were considered endangered species until 2017 but the status was changed to **vulnerable** later in the year.
- The **Bishkek Declaration**, issued in 2013, established a goal of protecting at least 20 snow leopard landscapes with viable snow leopard populations by 2020, resulting in the establishment of the Global Snow Leopard and Ecosystem Protection Program (GSLEP). Since then, October 23 has been designated as International Snow Leopard Day.
- On the same day, the **Global Snow Leopard and Ecosystem Protection Programme (GSLEP)** was launched to address high-mountain development issues by using snow leopard conservation as a model.

13. Indian Rhinoceros

Syllabus: Biodiversity and Conservation

Prelims: About Indian Rhinoceros and Kaziranga National Park

Context: The Union Ministry of Environment, Forest and Climate Change has asked for a “factual report” on the rhino population enumeration, conducted in the Kaziranga National Park in March 2022.

Indian Rhinoceros



Source: IUCN

- The Indian Rhinoceros (*Rhinoceros unicornis*), also known as the Greater One-horned Rhinoceros, is the largest species of the three known Asian Rhinoceroses, the other two being the Javan Rhinoceros and the Sumatran Rhinoceros.
- Indian Rhinoceros is known for its single black horn along with the gray-brown hide and skin folds.
- Indian Rhinoceros are solitary animals except when adult males gather at wallows or to graze.
- Indian Rhinoceros like the other rhino species is mainly a grazer and its diet consists almost entirely of grasses.
- The Indian rhinoceros once occupied an extensive range across northern India from Assam in the east to the Indus River valley in the west.
 - At present, the species is restricted to about 11 reserves in India and Nepal.
- The Kaziranga National Park and the Pobitora Wildlife Sanctuary in Assam are one of the most well-known Indian Rhino sanctuaries in the country.
 - The population range of the Indian rhino is limited, with 70% of the population occurring at a single site – Kaziranga National Park.
- **IUCN Red List Status:** Vulnerable
- **WPA Protection:** Schedule I protection

14. First synchronized Vulture survey

Syllabus: Biodiversity Conservation

Prelims: Synchronized Vulture survey

Context: Kerala, Tamil Nadu and Karnataka to organise the first synchronised vulture survey in February.

Details:

- The Forest and Wildlife Departments of Kerala, Tamil Nadu and Karnataka are preparing to organise the first synchronised vulture survey in various regions of the Western Ghats.
- Every year the Forest Departments of the three States organise separate surveys but in a tripartite coordination meeting held in Mudumalai Tiger reserve, the departments have decided to organise the first synchronised vulture survey in the Western Ghats to avoid duplications.
- The **Wayanad Wildlife Sanctuary, contiguous to the Nagarhole and Bandipur Tiger reserves of Karnataka and Mudumalai tiger reserve of Tamil Nadu**, is the **only region where vultures thrive in Kerala**.
- The Wayanad Wildlife Sanctuary houses close to 120-150 white-rumped vultures and about 25 red-headed vultures with the occasional sightings of long-billed vultures also being reported.
- Vultures are witnessing a catastrophic decline during the 2000s as these species are being exposed to diclofenac drug which is mainly used as a painkiller for cattle.

15. Great Backyard Bird Count

Syllabus: Biodiversity Conservation

Prelims: Great Backyard Bird Count

Context: Great Backyard Bird Count (GBBC) 2023

Introduction:

- GBBC India is the Indian implementation of the global Great Backyard Bird Count, which runs for 4 days every February.
- India was among 190 countries that participated in the GBBC 2023, an annual event that brings bird enthusiasts, students and nature enthusiasts together for counting birds they see around the places where they live, work or study.
- GBBC was first launched in 1998 in the US.
- The data contributed by citizen scientists are used by scientists and conservationists to better understand and protect bird species.
- Indian birders have participated in the GBBC since the event went worldwide in 2013.
- GBBC India is coordinated by the Bird Count India collective (BCI), a coming-together of a number of groups and organisations that are interested in birds, nature and conservation.

Highlights of the Count:

- West Bengal reported the highest number of species of birds, followed by Uttarakhand and Arunachal Pradesh during the Great Backyard Bird Count (GBBC) 2023 across 35 States and Union Territories.
- While West Bengal reported 489 species, Uttarakhand recorded 426, Arunachal Pradesh 407, Assam 397 and Karnataka 371 species.
- Tamil Nadu and Kerala took the eighth and ninth spots with 349 and 325 species, respectively.
- Kerala, on the other hand, recorded the highest number of checklists of birds by uploading 9,768 lists of birds. Maharashtra with 7,414 lists and Tamil Nadu with 6,098 were placed second and third, respectively.
- Pune birders uploaded more than 5,900 lists, the most among urban centres.
- As per the preliminary report released by the BCI, more than 46,000 checklists and a total of 1,067 avian species were uploaded on e-Bird, an online platform to record bird observations.
- A remarkable increase in participation across the country helped India upload the second-highest number of checklists after the United States and the third-highest species of any country.

16. Aztec hummingbirds and Indian sunbirds

Syllabus: Biodiversity Conservation

Prelims: About Aztec hummingbirds and Indian sunbirds

Key Details:

- Hummingbirds are small, colourful birds found throughout the Americas. They are known for their unique ability to hover in mid-air by rapidly flapping their wings, which can beat up to 50 times per second.
- There are over 300 species of hummingbirds, and they range in size from the tiny bee hummingbird, which is only 2.25 inches long, to the slightly larger giant hummingbird, which can be over 8 inches long.
- Despite their small size, hummingbirds are incredibly active and energetic, and are known for their aerial acrobatics. They are also able to fly backwards, upside down, and even hover in place for extended periods of time.
 - Their wings have very long hand bones but very short arm bones that are connected to the body through exceptionally flexible ball-and-socket joints.
 - These joints allow the wings to rotate after each half-stroke, permitting manoeuvrability and backward flight.
- Hummingbirds feed on nectar from flowers, and are important pollinators for many plant species. Tubular flowers that are bright red or orange (such as lantana and rhododendron) are preferred.
- The energy demands of hovering are very high. Relative to their body mass, hummingbirds have the highest metabolic rate (calories burnt per minute) among vertebrates.
 - Most of this energy comes from nectar. Rapid sugar uptake by their digestive system ensures that they utilise energy from nectar ingested just a few minutes ago.
- Their lungs are 10 times better at absorbing oxygen from air than mammals of similar size.
- During the night or during periods of bad weather, hummingbirds will go into a state of torpor, in which their body temperature and metabolic rate drop significantly to conserve energy.
- Hummingbirds are capable of vocal mimicry similar to parrots.



Source: BBC

Similarities with Indian Sunbirds:



SUNBIRDS OF INDIA



- Indian sunbirds are small, brightly coloured birds found in South and Southeast Asia. They belong to the family Nectariniidae, which also includes other sunbirds and spiderhunters. There are around 15 species of Indian sunbirds, ranging in size from 8-15 cm.
- **Nectar feeding:** Both hummingbirds and Indian sunbirds are nectar feeders, and play an important role in pollinating many plant species.
- **Small size:** Both species are small birds, with hummingbirds ranging in size from 2-8 inches and Indian sunbirds ranging from 3-6 inches.

- **Active and agile flight:** Both species are highly active and agile, and are known for their aerial acrobatics. They can hover in mid-air, fly backwards, and even fly upside down in search of nectar and insects.
- **Brightly coloured plumage:** Both species have brightly coloured plumage, with males of both species exhibiting more vibrant and striking colours than females. The colours are often iridescent and can reflect different hues depending on the angle of light.

17. Rhododendrons

Syllabus: Conservation

Context: Botanical Survey of India publication on rhododendrons.

Key Details:

- Latest publication of the Botanical Survey of India (BSI) reveals that the Darjeeling and Sikkim Himalayas are home to more than one-third of all types of rhododendrons found in India.
- The publication lists 45 taxa of rhododendrons (24 are found in the Darjeeling Himalayas and 44 in the Sikkim Himalayas).
- The two famous Rhododendron sanctuaries in the Sikkim State are Barsey Rhododendron Sanctuary in the West district, covering an area of 104 sq.km and Shingba Rhododendron Sanctuary in Yumthang valley of North district with an area of 43 sq.km.
- Of the 45 taxa documented by the BSI, five are facing a high threat due to anthropological pressures and climate change.
 - Rhododendron edgeworthii, recorded a huge habitat decline in both Darjeeling and Sikkim.
 - Rhododendron niveum, found in north Sikkim is facing threats from rampant construction.
 - Rhododendron baileyi, Rhododendron lindleyi and Rhododendron maddenii are also under threat.
- Rhododendron is considered an indicator species for climate change.
 - The flowering season for rhododendrons starts in March and continues till May. However, recently, flowering was found to begin as early as in January for some species indicating the warming of these areas.
- Rhododendrons are used in local medicines against colds, coughs and chronic bronchitis and diarrhoea.
- There are 132 taxa (80 species, 25 subspecies and 27 varieties) of rhododendrons found in India.
- Arunachal Pradesh is home to the highest number with 119 taxa (74 species, 21 subspecies and 24 varieties) of the Rhododendron.
- The species has been designated as the State tree of Uttarakhand and its blooming in the Garhwal Himalayas is celebrated as 'Phool Sankranti', a festival of flowers.
- Cold, moist slopes and deep valleys of the eastern Himalayas form a conducive habitat for the luxuriant growth of Rhododendron species.

The history:

- Rhododendrons were first recorded by Captain Hardwick in Jammu and Kashmir in 1776 where he spotted the Rhododendron arboreum.
- The first species of Rhododendron from northeast India — Rhododendron dalhousiae — was reported from Sikkim by British botanist Joseph D. Hooker in 1848 in his book 'The Rhododendrons of Sikkim Himalaya'.

HEALTH ISSUES

1. Neglecting the health sector has consequences

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Mains: Budget allocations for the health sector and associated concerns.

Context: Allocations for the health sector in Budget 2023-24.

Details:

- Budgets validate the true intent and vision of the government. They help in furthering the equitable access of all citizens to basic public goods. For instance,
 - In the U.K., the National Health Service was launched soon after World War II to revive society. The social economist William Beveridge envisioned the welfare state and proposed to address 'five giant evils' namely 'want, disease, ignorance, squalor, and idleness'.
- In the context of India, the investments should be prioritized towards basic services like nutrition, health, employment, education, environment, sanitation, and hygiene.
- However, it is argued that there are stagnant allocations in the Budget 2023-24 for health, nutrition, and education. It is also said the majority of investments are focused on highways, speed trains, and airports.

Some provisions of Budget 2023-24:

- The Budget 2023-24 has made the following provisions:
 - Providing free foodgrains to almost 80 crore poor people
 - Development of 500 backward blocks
 - Expanding access to housing, clean water, and toilets
 - Facilitating employment through the rural employment guarantee scheme
 - Providing skill development opportunities to the youth
- However, such provisions can provide only partial gains and do not address the concern of widening inequality. Ensuring universal access to high-quality education, healthcare, and nutrition (not just food grains but essential elements like protein) is imperative for sustainable and long-term growth.

Associated Concerns:

- According to some studies in the U.S., it was found that after the Reagan era, innovation and scientific capability were hampered when public investment in education was decreased to push privatization.
- In Nicaragua, despite an economic downturn, the country invested in education and health.
- It is argued that the budget is disappointing as:
 - It is found that 230 million people slid into poverty due to the COVID-19 pandemic.
 - According to the ASER report, many Class 5 students are unable to read a Class 2 textbook.
 - As per NFHS-5, among the children aged below five years, 35.5% were stunted and 32.1% were underweight.
 - The disease burden is increasing due to non-communicable diseases, mental health, and geriatric care.
- The Budget allocation for midday meals was reduced by 9%, despite the fact that enrolment has shifted from private to public schools due to increasing unaffordability at private schools.
- The COVID-19 pandemic has brought to the fore three major fault lines:
 - Lack of financial risk protection: Due to inadequate risk protection, citizens incurred huge expenses that are estimated to be above ₹70,000 crore.
 - Inadequate primary healthcare system: It resulted in a large number of avoidable deaths, specifically in North India.
 - Absence of district hospitals: It was found that there is a huge absence of well-equipped and operational district hospitals.
- Apart from these, the pandemic also highlighted the need to invest in building disease surveillance systems and strengthening resilience.
- It also displayed the chaotic regulatory framework and infirmities and conflict of interest in various existing laws.

Way Ahead:

- The government should firewall its citizens from any such eventuality by improving its healthcare sector.
- A political leadership adequately backed by funds is required to rebuild the public health system, promote scientific research, and expand health security.
- The lessons learned during the pandemic should be imbibed while taking future actions.

Nut Graf: Adequate allocations for the healthcare sector are crucial as neglecting it and denying critical investments in the sector can have serious consequences. It is thus suggested that the government should infuse more resources into basic public services (health and education being the most important).

2. Supreme Court on Terminally Ill Patients

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Mains: Major Changes in Guidelines of Euthanasia in India.

Context: The Supreme Court of India recently passed a judgement on altering the existing guidelines for 'living wills'.

Background:

- A Constitution Bench of the Supreme Court headed by Justice K M Joseph passed an order to significantly ease the procedure for passive euthanasia in the country by altering the existing guidelines for 'living wills', as laid down in its 2018 judgement in *Common Cause vs. Union of India & Anr*, which allowed passive euthanasia.
- The case had come back to the court after a petition filed by a nonprofit association submitted that the 2018 guidelines on living wills were "unworkable".

2018 Judgement:

- A five-judge Constitution Bench headed by then Chief Justice of India (CJI) Dipak Misra allowed passive euthanasia while recognising the living wills of terminally-ill patients who could go into a permanent vegetative state, and issued guidelines regulating this procedure.
- The Constitution Bench said that the guidelines would be in force until Parliament passed legislation on this. However, this has not happened, and the absence of a law on this subject has rendered the 2018 judgement the last conclusive set of directions on euthanasia.
- The guidelines pertained to questions such as who would execute the living will, and the process by which approval could be granted by the medical board. "We declare that an adult human being having the mental capacity to make an informed decision has the right to refuse medical treatment including withdrawal from life-saving devices," the court said in the 2018 ruling.
- **Directions in the 2018 judgement had several implementation hurdles such as:**
 - An advance medical directive (AMD) required the signatures of two independent witnesses, and also had to be countersigned by a Judicial Magistrate.
 - Also, the treating physician was required to constitute a board comprising three expert medical practitioners from specific but varied fields of medicine, with at least 20 years of experience, who would decide whether to carry out the living will or not. If the medical board granted permission, the will had to be forwarded to the District Collector for his approval.
 - The Collector was to then form another medical board of three expert doctors, including the Chief District Medical Officer.
 - Only if this second board agreed with the hospital board's findings would the decision be forwarded to the Judicial Magistrate of First Class (JMFC), who would then visit the patient and examine whether to accord approval.

New guidelines:

- In its current order authored by Justice Joseph, the court said it needs to be signed by the executor/patient and independent witnesses in the presence of a notary or gazetted officer who would record his/her satisfaction that the AMD was voluntary and executed without coercion.
 - The AMD, if the executor chooses, may be made part of the digital health records.
- Instead of the hospital and Collector forming the two medical boards, both boards will now be formed by the hospital.
- The requirement of 20 years of experience for the doctors has been relaxed to five years.
- The requirement for the Magistrate's approval has been replaced by an intimation to the Magistrate. The medical board must communicate its decision within 48 hours; the earlier guidelines specified no time limit.
- In case the medical boards set up by the hospital refuses permission, it will now be open to the kin to approach the High Court which will form a fresh medical team.

THE CHANGES BROUGHT



	NOW	EARLIER
Living will	An attestation by a notary or a Gazetted officer to be sufficient for a living will	It was necessary that a judicial magistrate attest or countersign a living will
Access to the living will	Living will a part of national health record which can be accessed by Indian hospitals	Living will was kept in the custody of the district court concerned
Primary board to examine patient's condition	Three doctors, including treating physician and two other doctors with five years of experience in the specialty, will comprise the primary board of doctors	Primary board of doctors needs at least four experts from general medicine, cardiology, neurology, nephrology, psychiatry or oncology with overall standing of at least 20 years
Time taken to decide	Primary/secondary board to decide within 48 hours on withdrawal of further treatment	The 2018 judgment did not specify any outer limit on withdrawal of treatment
Secondary board	Hospital must immediately constitute a secondary board of medical experts	The district collector had to constitute the second board of medical experts

Source: Hindustan Times

Passive euthanasia:

- Passive euthanasia is the act of hastening the death of a terminally-ill patient by altering some form of support and letting nature take its course.
- Passive euthanasia can involve turning off respirators, halting medications, discontinuing food and water so the patient dies because of dehydration or starvation.
- Passive euthanasia can include giving the patient large doses of morphine to control pain in spite of the likelihood that the painkiller can cause fatal respiratory problems.
- Passive euthanasia was legalised in India by the Supreme Court in 2018, contingent upon the person having a 'living will' or a written document that specifies what actions should be taken if the person is unable to make their own medical decisions in the future.
 - In case a person does not have a living will, members of their family can make a plea before the High Court to seek permission for passive euthanasia.

Active euthanasia:

- Active euthanasia involves helping the patient to die on the basis of a request by either the patient or those close to him or her, usually direct family members.

Living Will:

- A Living Will is a document that allows a person to explain in writing which medical treatment he or she does or does not want during a terminal illness.
- A terminal illness is a fatal illness that leads ultimately to death.
- A Living Will takes effect only when the patient is incapacitated and can no longer express his or her wishes. The will states which medical treatments may be used and which may not be used to die naturally and without the patient's life being artificially prolonged by various medical procedures.

Arguments For Euthanasia

- According to euthanasia opponent Ezekiel Emanuel, proponents of euthanasia have presented four main arguments:
 - That people have a right to self-determination, and thus should be allowed to choose their own destiny.
 - Assisting a subject to die is a better option than continuing to suffer.
 - The distinction between passive euthanasia (which is frequently allowed) and active euthanasia is not substantive (the underlying principle—the doctrine of double effect is unreasonable)
 - Allowing euthanasia will not necessarily lead to unacceptable consequences. Pro-euthanasia activists often take examples of countries like the Netherlands, Belgium, Luxembourg etc where euthanasia has been legalized to justify that it is mostly trouble-free.
- Arguments based on rights
 - People got an explicit right to die
 - Death is a private subject and if there is no harm done to others then, the state and other people have no right to interfere (libertarian case)

- Other arguments
 - Death is a private subject and if there is no harm done to others then, the state and other people have no right to interfere (libertarian case)
 - Allowing people to die may free up scarce health resources (this is a possible argument, but so far no authority has seriously proposed it)

Arguments Against Euthanasia

- Ezekiel Emanuel argues that there are four major arguments presented by opponents of euthanasia:
 - All deaths are not painful.
 - Termination of active treatment, combined with the effective use of pain relief are available as alternatives to euthanasia
 - The distinction between active and passive euthanasia is morally significant and legalising euthanasia will put society on a slippery slope, which will lead to unacceptable consequences.
- Ethical arguments
 - Euthanasia could weaken society's respect for the sanctity of life.
 - Accepting euthanasia would mean that some lives (those of the sick or disabled) are worth less than others.
 - Voluntary euthanasia could start on a slippery slope that may lead to involuntary euthanasia and the killing of people who are thought undesirable.
 - Euthanasia might not be in a person's best interests.
 - Euthanasia affects rights of other people and not just those of the patient
- Religious arguments - Religions are opposed to euthanasia for a number of reasons.
 - Euthanasia is against the will and word of God.
 - Virtually all religions in their scriptures say 'you must not kill'.
 - According to various religions, human life is sacred. Therefore human life should be protected.
 - Law of karma—Suffering may have value (Freedom from worldly life)
 - Many religions such as Hinduism and Buddhism see mortal life as part of a continuing cycle of birth, life, death, and rebirth over and over again. Thus, shortening life interferes with the law of karma.

Other practical views

- Proper palliative care could make euthanasia unnecessary.
- Euthanasia cannot be properly regulated and permitting euthanasia will lead to less good care for the terminally ill.
- Euthanasia may become in future a cost-effective way to treat the terminally ill.
- Allowing euthanasia could discourage the search for a new mode of treatments for the terminally ill.

Nut Graf: In a recent ruling, the constitution bench of the Supreme Court simplified passive euthanasia rules in cases of terminal illness to reduce red tape such as the time limit for the medical board decision by modifying the existing guidelines it laid down in 2018 on living wills, or advance directives.

3. Tackling Antimicrobial Resistance (AMR)

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Mains: Challenges faced by AMR

Context: This article discusses the threats from AMR and the necessary response against it.

Introduction:

- The COVID-19 pandemic has highlighted the urgent need for governments to prioritise health care and respond quickly to a crisis.
- The silent pandemic of Antimicrobial Resistance (AMR) is thriving with poor response from governments across the globe.
- AMR threatens global public health due to the misuse and overuse of antibiotics in humans and animals.
- India's role is critical in ensuring that AMR remains high on the global public health agenda as it is currently the G-20 president and a country vulnerable to this silent pandemic.

Antimicrobial Resistance (AMR):

- AMR happens when microorganisms (such as bacteria, fungi, viruses, and parasites) develop the ability to continue to grow, even when they are exposed to antimicrobial medicines that are meant to kill them or limit their growth (such as antibiotics, antifungals, antivirals, antimalarials, and anthelmintics).
- As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spreading to others.
- Microbial resistance to antibiotics has made it harder to treat infections such as pneumonia, tuberculosis (TB), blood poisoning (septicaemia) and several food-borne diseases.
- Antimicrobial resistance has become one of the biggest threats to global health, food security, and development today.

- AMR can affect anyone of any age, in any country.
- Antibiotic resistance is the subset of Antimicrobial resistance, it occurs naturally, but the misuse of antibiotics is accelerating AMR in humans and animals.



Source: WHO

Burden of AMR:

- The global epidemic of TB has been severely impacted by multidrug resistance – patients have less than a 60% chance of recovery.
- According to WHO, resistance to ciprofloxacin (an antibiotic commonly used to treat urinary tract infections) varied from 8.4% to 92.9% for *Escherichia coli* (*E. coli*) and from 4.1% to 79.4% for *Klebsiella pneumoniae* (a bacteria that can cause life-threatening infections such as pneumonia and intensive care unit- related infections).
- An Indian Network for Surveillance of Antimicrobial Resistance (INSAR) study indicated a high rate of resistance to commonly used drugs such as ciprofloxacin, gentamicin, co-trimoxazole, erythromycin and clindamycin.
- In 2019, AMR was associated with an estimated 4.95 million human deaths, including 1.27 million deaths attributable to bacterial AMR.
- AMR also imposes a huge health cost on the patient in the form of longer hospitalisation, health complications and delayed recovery.
 - It puts patients undergoing major surgeries and treatments, such as chemotherapy, at a greater risk.
- It is estimated to cause 10 million deaths per year and an overall cost of \$100 trillion to the global economy by 2050.
 - AMR adds to the burden of communicable diseases and strains the health systems of a country.

Global High-Level Ministerial Conference on AMR:

- The Third Global High-Level Ministerial Conference on Antimicrobial Resistance (November 24-25, 2022) held in Muscat, Oman, saw over 30 countries adopt the **Muscat Ministerial Manifesto on AMR**.
- The Muscat Manifesto recognised the need to accelerate political commitments in the implementation of the One Health approach to effectively prevent, predict and detect the health crisis induced by AMR.
- It also recognised the need to address the impact of AMR not only on humans but also on animals, and in areas of environmental health, food security and economic growth and development.
- **The conference focused on three health targets:**
 1. Reduce the total amount of antimicrobials used in the agri-food system at least by 30-50% by 2030.
 2. Eliminate the use in animals and food production of antimicrobials that are medically important for human health.
 3. Ensure that by 2030 at least 60% of overall antibiotic consumption in humans is from the WHO "Access" group of antibiotics.

India against AMR:

- India's bacterial disease burden is the highest in the world.
- A large population in India suffers from diseases like diabetes, heart ailments and cancer, making them prone to infections.
- 40% of children are malnourished and at risk of infection.
- An Indian Council of Medical Research (ICMR) study in 2022 showed that the resistance level increases from 5% to 10% every year for broad-spectrum antimicrobials.
- The National Action Plan on Antimicrobial Resistance (2017-21) emphasised the effectiveness of the government's initiatives for hand hygiene and sanitation programmes such as Swachh Bharat Abhiyan, Kayakalp and Swachh Swasth Sarvatra.

- India has committed to strengthening surveillance and promoting research on newer drugs.
- It also plans to strengthen private sector engagement and the reporting of data to the WHO Global Antimicrobial Resistance and Use Surveillance System (GLASS) and other standardised systems.
- The government has also attempted to increase community awareness about healthier and better food production practices, especially in the animal food industry.
- The National Health Policy 2017 has guidelines to limit the use of antibiotics as over-the-counter medications and restrict the use of antibiotics for growth promotion in livestock.

Way Forward:

- Tackling AMR requires constant monitoring of antibiotic consumption, and identifying the types and quantities of antibiotics being used.
- Government policies also need strong implementation on the ground.
- The use of antimicrobials in the agri-food system must be drastically reduced.
 - Countries such as the Netherlands and Thailand have decreased their usage by almost 50%.
 - In China, the consumption of antibiotics in the agricultural sector has fallen substantially.
 - The use of antibiotics in healthy animals to boost growth has also been reduced in the last decade in many countries.
- Countries should focus on surveillance — both phenotypic and genotypic — of priority pathogens and sharing of data, including through WHO's GLASS platform.
- More government investment in research and innovation for new antibiotics is necessary.
- The scientific community must explore the use of vaccines to prevent certain infections due to AMR organisms in humans and animals.
- Special focus is required to combat TB and drug-resistant TB.
- The various G-20 health summits spread through 2023 offer an opportunity for India to ensure that all aspects of AMR are addressed and countries commit to progress.

Nut Graf: While the world is emerging from the acute phase of the COVID-19 pandemic, the very harmful but invisible pandemic of Antimicrobial Resistance (AMR) is thriving. The rapidly rising AMR rates need an accelerated, multi-sectoral, global and national response similar to the COVID-19 pandemic.

4. Mammalian spread of H5N1 and its pandemic potential

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Mains: Concerns associated with the Outbreaks of H5N1.

Prelims: About H5N1

Background

- The UK faced one of its largest ever outbreaks of avian influenza (H5N1), with cases found around Scotland including a recent outbreak on the remote archipelago of St Kilda and on Bass Rock, the world's largest colony of northern gannets (one of Britain's largest sea birds).
- In India, the latest major avian flu outbreak in 2020-2021 swept through many States causing mass mortality of wild birds.
- Avian flu outbreaks coincide with the peak migratory season leading to post-outbreak surveillance and culling.
- However, recent evidence of outbreaks in the off-season suggests endemic transmission within the poultry sector.
- Unlike in Europe, poultry birds in India are not vaccinated against flu despite being the fastest egg producer in the world.

Avian Influenza/H5N1

- Avian Influenza, also known as the Avian or Bird Flu, is a form of influenza caused by a virus found in birds.
- Avian Flu is similar to variants found in animals and humans-caused strains of influenza that have adapted to specific hosts.
- There are three types of influenza viruses labelled A, B and C.
 - It is the 'A' variant which is found mostly in birds and is commonly referred to as Avian Influenza.
- The H5N1 strain is the most prevalent Avian Influenza virus across the world.
 - Apart from causing severe disease and death in birds, H5N1 has also caused human infections through close contact with infected birds or contaminated environments. It is often fatal.
- Although there are many subtypes of avian influenza viruses, only strains such as H5N1, H7N3, H797, and H9N2 are known to infect humans.
 - Strains like the H10N8 and H10N3 also have been found to infect humans.
- Modes of Transmission: Direct contact between infected and healthy birds is how avian influenza primarily spreads.
 - The disease is transmitted to humans through contact with infected bird faeces, nasal secretions, or secretions from the mouth or eyes.
 - However, Human-to-human transmission of the avian influenza virus is rare.

Associated concerns:

- The H5N1 can potentially impact mammals like ferrets, minks, seals, and domestic cats when during their contact with infected birds or their feces or while consuming the infected carcasses.
- They can further serve as reservoirs. Moreover, the virus could evolve to adapt to new hosts and might lead to further outbreaks.
- Along Russia's Caspian Sea coast there was a mass mortality event that killed nearly 700 seals. Scientists are investigating the potential mammalian spillover as an H5N1 variant was detected in wild birds of the region a few months ago.
- Similarly, in February 2023, Peru registered cases of H5N1 in sea lions and a dolphin. Additionally, a lion in a zoo also died from H5N1.
- The U.K. communicated the cases of otters' and foxes' death due to H5N1 infection.
- Notably, wildlife ranging from foxes, coyotes, and raccoons scavenge on infected birds or bird carcasses.
- It was found that the only recorded incidents of intra-mammal transmission of the virus were among mink in captivity at a farm in Spain (in 2022).
- H5N1 outbreaks cause severe economic impacts like
 - Huge losses to the poultry industry
 - Threatens food and vaccine security (eggs are used for vaccine production)
 - Raises concerns about animal welfare

Details of some outbreaks across the world:

- The first detected case of the H5N1 avian influenza virus was in 1996 on a goose farm in China.
- It was followed by a major outbreak in 1997 among poultry in Hong Kong. It also spread to the human population and left 6 people dead and 18 infected.
- In the year 2004, an outbreak occurred in several countries in Asia which further resulted in a global outbreak.
- Several European and Asian countries reported H5N1 in poultry in 2013 and 2014.
- The virus is majorly spread among countries due to migratory birds.
- Around 800 cases of human H5N1 infections have also been reported (as of February 2023) with a high fatality of 53%.
- A new strain namely 2.3.4.4b emerged in 2020. It spread across Asia, Africa, and Europe and later to North(2021) and South America (2022).
- It was found that H5N1 sequenced from the mink farm in Spain showed several mutations like T271A that increase viral replication in mammalian tissues.

Way Ahead:

- To prevent outbreaks and spillovers, the following measures are required:
 - Vaccination of poultry
 - Safe disposal of dead birds or carcasses
 - Quarantine and culling of affected animals
 - Using personal protective equipment while handling birds
 - Improved surveillance and monitoring of birds and other animals
- Molecular surveillance of H5N1 and its subtypes is important to understand and respond to outbreaks. Thus, Genome sequencing can be employed to keep a close watch on mutations and virulence factors.

Importance of Environmental Surveillance:

- The farms with a diversity of animals or in the vicinity of nearby wetlands increases the potential for the viruses to undergo reassortment that can potentially generate more virulent strains—H5N1 or H7N9—which could then infect humans.
- Wastewater-based epidemiology or pathogen surveillance has become an integral component of environmental surveillance providing near real-time information on health and community exposure to pathogens.
- The transmission of the virus within these wild bird populations is dependent on fecal/oral transmission via contaminated water.
- Avian influenza viruses can remain viable for extended periods of time in surface water and carcasses, suggesting that lakes and wetlands can act as environmental reservoirs at variable temperatures for several months.
 - Birds infected with avian influenza virus shed large quantities of virus in their feces, saliva and nasal secretions for about a week.
 - Wild aquatic birds in the Orders **Anseriformes** and **Charadriiformes** are the primordial reservoir for the virus.
- Having a large-scale influenza A virus surveillance network in place across multiple sites is crucial for improving our understanding on the diversity, seasonal and geographical distributions of the virus in environments associated with poultry and wild birds.
- Therefore, we need an active and passive year-round surveillance network under One Health which connects monitoring of humans and animals in a shared environment
- Currently, virus surveillance is reactive and relies on sampling dead birds. Environmental surveillance would be a great non-invasive tool that can be done without disturbing the birds and can be used to obtain both host and viral genetic material.
- Environmental surveillance should be complemented with effective carcass collection and testing, and better biosecurity on poultry farms to improve preparedness and response in the future.

Nut Graf: Several incidents of the mammalian spread of the H5N1 virus have been reported across the world. Disease and genomic surveillance as an integrated approach are required to keep a close watch on the future outbreak, as it can help prepare for potential pandemics.

5. Polio Vaccine

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Mains: Threats of global resurgence of polio on public health.

Context: Additional polio vaccine dose introduced in West Bengal.

Background:

- An additional dose of injectable polio vaccine has been introduced in West Bengal as part of the Universal Immunisation Programme (UIP) for children in India.
- As per the announcement, additional doses will be given at nine months, in addition to the existing doses in the current UIP.
 - There were four oral doses and two injectable doses before the additional third dose was introduced in January 2023.
 - West Bengal is considered among high risk areas for polio.
- According to a noted virologist, an additional dose of inactivated poliovirus (IPV) at nine months is expected to protect against any Vaccine Associated Paralytic Polio or Vaccine Derived Polioviruses.

What is Polio?

- Polio is a crippling and potentially deadly viral infectious disease that affects the nervous system.
- There is no cure for polio, but there are safe, effective vaccines which, given multiple times, protect a child for life.

How did India achieve its polio-free status?

- Rotary International launched its polio eradication campaign, Polio Plus, in 1985, it was in 1986 that it provided a \$2.6 million grant to Tamil Nadu for a pilot polio vaccination campaign.
- In 1995, the Union government announced the first National Polio Immunisation Day.
- In 2012, the World Health Organisation removed India from the list of endemic countries.
 - The last case of poliovirus type 2 was recorded in India in October 1999 at Aligarh, Uttar Pradesh.
 - The last case of poliovirus type 3 was on October 22, 2010, at Pakur, Jharkhand.
 - The last case of poliovirus type 1 was recorded on January 13, 2011, at Howrah, West Bengal.
- To prevent the virus from coming to India, the government since March 2014, has made the Oral Polio Vaccination (OPV) mandatory for those travelling between India and polio-affected countries, such as Afghanistan, Nigeria, Pakistan, Ethiopia, Kenya, Somalia, Syria and Cameroon.

Recent Global Polio Crisis:

- As of October 2022, only two countries worldwide remain with indigenous transmission of wild poliovirus type 1 (WPV1) — Afghanistan and Pakistan.
- WHO recorded that so far, 33 countries have outbreaks of variant polioviruses, such as in the U.K., the U.S., Israel and Malawi.
- Genetic variants of vaccine poliovirus type 2, imported from an unknown source, were detected in waste waters in Jerusalem, London and New York in early 2022.
- As an unintended consequence, type 2 vaccine virus variants (circulating vaccine-derived polioviruses) that mimic wild viruses' contagiousness and neurovirulence, have been emerging and spreading.
- COVID-19 temporarily halted the Global Polio Eradication Initiative (GPEI)'s immunisation campaigns, putting over 80 million children at risk.
- Consequently, outbreaks of circulating vaccine-derived poliovirus (cVDPV) tripled from 2019 to 2020, with over 1100 children paralysed.
- WHO also expressed concerns about the potential spread of polio in Ukraine as Russian invasion disrupts vaccine programmes and the mass movement of people escaping the fighting presents a risk.

Nut Graf: Covid 19 pandemic have shown how rapidly global progress can unwind if the pressure is not maintained to vaccinate children. A global resurgence of polio would be disastrous on public health. Therefore, the West Bengal government announced the introduction of an additional dose of injectable polio vaccine.

6. How is India addressing sickle cell anaemia?

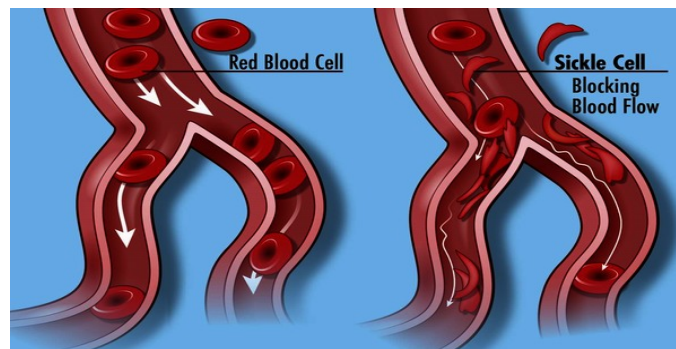
Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Prelims: About sickle cell anaemia

Mains: Sickle cell anaemia – prevalence of the disease in India, efforts to eliminate the disease and key challenges associated with it

Context: The Union Finance Minister while presenting the Union Budget 2023-24 has announced that the government will work in “mission mode” to eliminate sickle cell anaemia by 2047.

Sickle Cell Anaemia



Source: MedLine Plus

- Sickle Cell Anaemia is an inherited blood disorder or red blood cell (RBCs) disorder.
 - Red blood cells contain hemoglobin which is a protein that carries oxygen through the body.
- Usually, the RBCs are disc-shaped and flexible in order to move easily through the vessels. In the case of sickle cell anaemia RBCs are crescent or sickle-shaped thereby slowing or at times blocking the blood flow.
- Haemoglobin normally has four protein subunits which consist of two alpha and two beta.
 - However, in some cases mutations in the gene that creates the beta subunits impact the shape of the blood cell and distort it to look like a sickle.
- The blocked blood flow through the body could cause serious issues such as anemia, pain, fatigue, acute chest syndrome, stroke, eye problems and infections among others.
- Furthermore, such sickle cells usually die early which causes a shortage of RBCs and hence deprives the body of oxygen.
- Sickle cell disease is said to be a lifelong illness and a blood and bone marrow transplant is said to be the only efficient cure for the disease.
- Gene therapies and stem cell transplants are also seen as possible cures for the disease.

Prevalence of the disease in India

- India is said to be the second-worst affected country in terms of predicted births with Sickle cell anaemia.
- Sickle cell anaemia is highly prevalent in tribal children in India.
 - About 1 in 86 births among Scheduled Tribe populations in India have sickle cell anaemia.
- Researchers believe that the prevalence of the disease is higher in communities residing in areas where malaria is endemic.
 - In India, regions or areas with tribal populations account for a significant malaria case load.
- The reports also suggest that the prevalence of sickle cell anaemia is seen to be higher in communities that practice endogamy, as the chances of having two parents with sickle cell trait are higher.
- The prevalence of the disease is higher in central, western and southern parts of India.
- Gujarat has the second highest number of sickle cell anaemia cases in India followed by Maharashtra.

Key challenges for the government to meet the target of 2047

- Since sickle cell disease being a genetic disorder, it is very difficult to bring about complete elimination of the disease.
- Further, the methods for treating the disease are either costly or still in developmental stages.
- Additionally, there is a severe shortage of donors, fears about the safe supply of blood and risk of infection associated with blood transfusion which involves the transfer of RBCs from donated blood and to a patient.

Initiatives undertaken in India

- The Indian Council of Medical Research (ICMR) is undertaking various outreach programmes for better management and control of sickle cell disease.
- Under the National Rural Health Mission (NRHM), States are also undertaking awareness drives and outreach programmes.
- The Ministry of Tribal Affairs (MoTA) has launched a portal that helps collect important data with respect to the prevalence of sickle cell anaemia among tribal communities.
- The Union Health Minister in the Union Budget speech announced that the government plans to distribute “special cards” across tribal areas to people below the age of 40.
 - These cards will be categorized into different categories based on the screening results and the programme will receive funding under the National Health Mission (NHM).
- The government is also required to conduct marriage counselling in areas with high incidences of the disease.

Nut graf: Reports indicate that about 50,000 infants are born with sickle cell anaemia every year which not only adds to the disabled population in India but has also become an economic burden for the Government. This has forced the Union Government to undertake actions in a “mission mode” to eliminate the condition by 2047.

7. Understanding India's Mental Healthcare Act, 2017

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Prelims: India's Mental Healthcare Act and National Human Rights Commission (NHRC)

Mains: Mental Healthcare facilities in India and the associated challenges

Context: The National Human Rights Commission (NHRC) has highlighted the inhuman and unfortunate condition of all 46 government-run mental healthcare institutions in India.

Details:

- NHRC visited all the operational government-run mental healthcare institutions to assess the implementation of the Mental Healthcare Act, 2017 (MHA).
- In its report, NHRC has flagged that these institutions are illegally keeping patients long after their recovery which is a gross violation of the human rights of mentally ill patients.

National Human Rights Commission (NHRC)

- The National Human Rights Commission (NHRC) is an independent entity of the Government of India with the mission of promoting and protecting human rights.
- NHRC was established as a statutory body in 1993 under the provisions of Protection of Human Rights Act of 1993.
- 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.
- NHRC consists of a Chairperson, five full-time Members and seven deemed Members.
 - The Chairperson and the Members of the NHRC hold office for a term of three years or until they attain the age of 70 years, whichever is earlier.
- A Selection Committee will recommend the candidates to the President and the Selection Committee includes: Prime Minister (Chairman), Speaker of Lok Sabha, Union Home Minister, Deputy Chairman of Rajya Sabha, and the Leaders of the Opposition in both Houses of the Parliament.

Mental Healthcare Act, 2017 (MHA):

- Through the Mental Healthcare Act, 2017 (MHA) the government has acknowledged mentally ill patients' right to live as part of a community and focused on the rehabilitation of such individuals.
- As per Section 19 of the Act, the government has been mandated to undertake efforts to create opportunities for patients to access less restrictive options for community living which includes halfway homes, sheltered accommodations, rehab homes, etc.
- The Act further recognises the rights of patients to hygiene, sanitation, food, recreation, privacy, and infrastructure and also recognised that "people have a capacity of their own unless proven otherwise."
- The Act also acknowledged that external factors like income, social status, and education have a significant impact on mental well-being, and hence recovery must involve both psychiatric and social inputs.
- The Act also discourages using physical restraints such as chaining and unmodified electro-convulsive therapy (ECT).
- Section 5 of the Act empowers people to make advance healthcare directives also known as "living will".
- The Act mandates all the States to set up a State Mental Health Authority and Mental Health Review Boards (MHRBs) which can draft standards for mental healthcare institutes, oversee the functioning of institutions and ensure effective implementation of the Act.
- According to mental health experts, this was the first time that a psychosocial approach to mental health was adopted.

Key challenges:

- Despite the fact that the MHA has included measures to protect the rights of people in mental healthcare establishments, the enforcement of such provisions continues to be a key challenge.
- According to reports, about 36.25% of residential service users at government-run psychiatric institutions were seen to be living for one year or more in such institutions.
- Most states are yet to establish State Mental Health Authority and Mental Health Review Boards (MHRBs) and even if established they have remained defunct.
- States have also failed to notify minimum standards required to ensure the quality of Mental Health Emergency Services.
- Lack of budgetary allocations and improper utilisation of funds are also key challenges.
- Additionally, the facilities are under-equipped, and understaffed, and the professionals employed are not adequately trained.

Nut graf: As per WHO, the burden of mental health problems in India is 2443 disability-adjusted life years (DALYs) per 10000 population and the resultant economic loss is estimated to be \$1.03 trillion between 2012-2030. This calls for concrete efforts to ensure the effective implementation of the provisions of the Mental Healthcare Act, 2017 which is currently marred with various challenges.

8. Indian eye drops issue

Syllabus: Issues relating to development and management of Social Sector/Services relating to Health

Prelims: Central Drugs Standard Control Organisation(CDSCO)

Mains: Indian eye drops controversy and Drugs regulations in India

Context: The US drug regulators have alerted consumers not to use EzriCare brand of artificial tear made by a Chennai-based company after an investigation found a suspected link between the eye drop and a drug resistant bacteria, leading to eye infections, vision loss and death.

News in details:

- After the probe done by the Centre for Disease Control, Atlanta, the manufacturer Global Pharma Healthcare Private Limited, at the behest of the US Food and Drug Administration has initiated a “voluntary recall” of all unexpired lots of the Artificial Tear.
- The US FDA recommended such a recall if the company violates the current good manufacturing practice (CGMP), including lack of appropriate microbial testing, formulation issues (the company manufactures and distributes ophthalmic drugs in multi-use bottles, without an adequate preservative), and lack of proper controls concerning tamper-evident packaging.
- In a couple of months, this is the third instance of poor quality medicines manufactured by Indian firms causing adverse health consequences outside India.
 - The previous two incidents were related to children deaths allegedly from the consumption of contaminated cough syrups in the Gambia and Uzbekistan.

Drugs regulations in India:

- The Drugs and Cosmetics Act: The Drugs and Cosmetics Act, 1940 and Rules 1945 have entrusted various responsibilities to central and state regulators for regulation of drugs and cosmetics.
- It provides the regulatory guidelines for issuing licenses to manufacture Ayurvedic, Siddha, Unani medicines.
- It is mandatory for the manufacturers to adhere to the prescribed requirements for licensing of manufacturing units & medicines including proof of safety & effectiveness, compliance with the Good Manufacturing Practices (GMP).

About Central Drugs Standard Control Organisation(CDSCO):

- Prescribes standards and measures for ensuring the safety, efficacy and quality of drugs, cosmetics, diagnostics and devices in the country.
- Regulates the market authorization of new drugs and clinical trials standards.
- Supervises drug imports and approves licenses to manufacture the above-mentioned products.
- CDSCO regulates export of drugs in India, any manufacturer with the certification from CDSCO can export drugs outside India.



Decoding the regulatory norms

Who can export drugs from India?
Any manufacturer with a certification from the Central Drugs Standard Control Organisation (CDSCO) – the apex regulatory body for cosmetics, pharmaceuticals and medical devices.

Do drugs manufactured in India for export need to be tested domestically?
At the time of issuing license, drugs inspectors assigned by the Indian regulator may lift samples in any phase of manufacturing for quality checks. It is, however, not mandatory; and rarely done.

What safety norms need to be adhered to?
First point of testing is at a manufacturer's level, to ensure that the drug adheres to the safety norms prescribed by the Indian Pharmacopoeia, and the regulatory requirement of the country of export. However, generally speaking, destination countries expect nations of origin to strictly follow the norms prescribed by the pharmacopoeia under which the sale is governed.

What are the intn'l drug safety norms?
Drug regulatory norms are usually country-specific and are enforced at the level of individual countries. The US, Japanese, British, European and Chinese pharmacopoeias act as reference points for uniform preparations for the most commonly used drugs — with tests to ensure their quality, potency and purity. The WHO's prequalification programme is another criterion wherein the UN body certifies sale of drugs/vaccines under the UN programmes.

Are destination nations responsible for safety?
Some countries do internal testing at the point of entry, but it is not mandatory and varies by the country.

For sale domestically
What are the checks in place to ensure the safety of drugs in India?
The CDSCO and state drugs regulators are responsible for ensuring quality of drugs that are manufactured, sold or distributed in Indian markets.

Maiden Pharma controversies
KERALA: Maiden Pharmaceuticals' drugs – Metomin, Easiprin, and Malcal-D – were lifted from the markets after they were found to be substandard.
BIHAR: The state health department blacklisted the firm for 5 years in 2011 after six batches of two of its drugs were found “not of standard quality”.

Source: Hindustan Times

HISTORY

1. The significance of the findings in Keeladi

Syllabus: Ancient History – Sangam age

Prelims: About Keeladi excavations, Sangam era and Indus Valley Civilisation.

Mains: Significance of Keeladi excavations

Context: Recently the Archaeological Survey of India (ASI) submitted a detailed report on the findings during the excavations at Keeladi which is a Sangam-era site.

Sangam Period

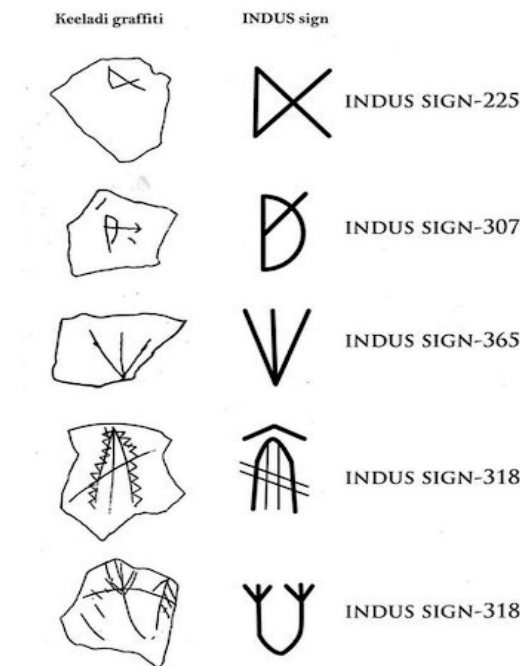
- According to historians, the Sangam age in ancient Tamil Nadu was believed to be from the third century BCE to the third century CE.
- According to legends, 3 Sangams (Academy of Tamil poets) were conducted in ancient South India called Muchchangam. They were held at
 - Madurai
 - Kapadapuram
 - Thenmadurai
- These Sangams prospered under the royal patronage of the Pandya kings of Madurai.
- Three dynasties that ruled during the Sangam Age were the Cheras, Cholas and Pandyas.
- Sangam Literature reflects the earliest literature of South India. It is a group of texts in old Tamil.
 - All the works of the first two Sangams except Tolkappiyam (2nd Sangam work) are lost and only the works of the third Sangam survive.

Sangam Period Dynasty	Modern-Day City	Ancient Capital	Important Ruler	Important Ports	Emblem
Cheras	Kerala	Vanji	Cheran Senguttuvan	Musiri, Tondi	Bow and Arrow
Cholas	Tamil Nadu	Uraiyur, Puhar	Karikala	Kaveripattanam	Tiger
Pandyas	Tamil Nadu	Madurai	Neduncheliyan	Muziris (Muchiri), Korkai, Kaveri	Carp

Keeladi and its links with the Sangam era

- Keeladi is a small hamlet situated along the Vaigai river in the Sivaganga district in south Tamil Nadu.
- Keeladi is located about 12 km southeast of Madurai in Tamil Nadu and has become one of the most important archaeological sites discovered in south India.
- The excavations at Keeladi indicated the existence of a Tamil civilisation that had trade links with other regions in the country and abroad.
 - This civilisation has been described by Tamil poets belonging to the Sangam period.
- However, the recent excavations by the ASI and Tamil Nadu State Archaeology Department (TNSDA) have pushed the Sangam age further back.
- Excavations in 2019 by TNSDA unearthed artefacts from the Keeladi site which were believed to have belonged to a period between the sixth century BCE and the first century BCE.
 - One of the samples collected at a depth of 353 cm was sent for carbon dating in the U.S. which was later dated back to 580 BCE.
- Thus these excavations and findings of Keeladi artefacts have pushed the timelines of the era at least 300 years earlier than the previously believed third century BCE.
 - Furthermore, a recent ASI report has pushed the Sangam age to 800 BCE based on these archaeological findings.
- Additionally, Keeladi excavations might have also provided key evidence for understanding the missing links between the Iron Age (12th century BCE to sixth century BCE), the Early Historic Period (sixth century BCE to fourth century BCE) and subsequent cultural developments.
- The academia based on the Keeladi excavations has described the site as part of the Vaigai Valley Civilisation and is finding similarities or links with the Indus Valley Civilisation.

Links to Indus Valley Civilisation



Source: The Hindu

- Despite there being a cultural gap of 1,000 years between the two civilizations, researchers have shown interest to compare the findings at Keeladi with that of the Indus Valley Civilisation.
- Until recent times, the gap in timelines between the two civilizations was filled with Iron Age material which acted as residual links in the south of India.
- Through recent excavations, similarities in the symbols found in the artefacts of Keeladi and Indus Valley signs have been found.
- TNSDA also says that the Keeladi site has showcased the characteristics of an urban civilisation which includes brick structures, luxury items and proof of internal and external trade and comes across as an industrious and advanced civilisation.
- However, there is a need for further studies and research in order to establish a thorough link between Indus Valley and Vaigai Valley civilisations.

Important artefacts unearthed during the excavations

- The Archaeological Survey of India (ASI) started the first round of excavations in 2015.
- ASI along with the Tamil Nadu State Archaeology Department (TNSDA) has undertaken eight rounds of excavations (the first three by the ASI).
- In the total eight rounds of excavations, more than 18,000 artefacts have been unearthed from the site and the most unique artefacts will be displayed at a museum.
- Some of the artefacts excavated include heaps of pottery, copper needles, terracotta seal, earthen vessels, Gold ornaments, copper articles, semi-precious stones, ivory bangles and ivory combs among others.

Inference from the excavated artefacts

- The finds of pottery indicate the presence of a pottery-making industry that made use of locally available raw materials.
- About 120 potsherds with Tamil Brahmi inscriptions have also been unearthed which sheds light on the script which was in use.
- The excavations of spindle whorls, copper needles, terracotta seals, terracotta spheres, earthen vessels and hanging stones of the yarn reflect different stages of the weaving industry, dyeing industry and glass bead industry.
- Gold ornaments, semi-precious stones, shell bangles, ivory bangles and ivory combs indicate that the people in that era led an artistic and prosperous lifestyle.
- The presence of agate and carnelian beads in some of the artefacts suggests that these stones were imported through some commercial networks.

Nut graf: The excavations and findings at the Keeladi site have gained the attention of researchers and archaeologists across the country as these findings have not just pushed back the Sangam Era by three centuries but have also helped in narrowing down the gap between the South Indian urban settlements and the Indus Valley Civilisation.

2. Banjara community

Syllabus: History

Prelims: Facts about Banjara community and Santh Sevalal Maharaj

Context: The Union government has kick started year-long celebrations to mark the 284th birth anniversary of Santh Sevalal Maharaj who is considered a spiritual and religious leader of the Banjara community.

Banjara community

- The Banjaras were a nomadic tribe that originated from the Marwar region of Rajasthan.
- They claim to belong to the clan of Agnivanshi Rajputs, and are also known as Pindari, Lambani, Gurmarti, etc.
- Historically, they were merchant tribes who traded all over north-western and southern parts of India.
- They were employed by Alauddin Khalji to transport grains to urban areas.
- Under the Mughal empire, Banjaras were important for the economy as they transported grains.
- The caravan of Banjaras was called tanda.
- The population of the Banjara community currently in India is around 10 to 12 crores.
- At present, the Banjara community has been declared a Scheduled Tribe (ST) in five States namely Andhra Pradesh, Telangana, Bihar, Odisha, Jharkhand.
 - Scheduled Caste (SC) in Himachal Pradesh and Karnataka
 - Other Backward Class (OBC) in Chhattisgarh, Daman and Diu, Haryana, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Uttarakhand.

Santh Sevalal Maharaj

- Sant Sevalal Maharaj is a revered symbol of Banjara community.
- Sevalal Maharaj was born on February 15, 1739, at Surgondankoppa in Shivamogga district, Karnataka.
- Sevalal Maharaj was considered a social reformer and spiritual leader of the community.
- He travelled across the country to serve the nomadic tribes and forest dwellers.
- He has extraordinary knowledge, skills, and spiritual background in Ayurveda and Naturopathy and could thus dispel and eradicate myths and superstitions prevalent in the tribal communities.
- The Samadhi Sthal of the Saint is located in Manora Taluka (Washim District), Maharashtra. It is also known as Banjara Kashi.

IAS टेबलेट कार्यक्रम

सर्वोत्तम व्याख्यान की
कहीं भी और कभी भी उपलब्धता



500 से अधिक घंटों का प्रारंभिक और मुख्य परीक्षा के पाठ्यक्रम को आवृत करता हुआ व्याख्यान



हमारे मार्गदर्शकों द्वारा प्रत्येक छात्र हेतु मार्गदर्शन और व्यक्तिगत प्रतिपुष्टि



मानक पुस्तकों सहित समग्र और अद्यतन अध्ययन सामग्री



पुनरीक्षण नोट्स के साथ चर्चित मुद्दों पर सप्ताह में दो बार लाइव वेबिनार व्याख्यान



साप्ताहिक वेबिनार, चर्चित मुद्दे, समसामयिकी पत्र/पत्रिका और प्रैक्टिस सेट का छात्र पोर्टल उपलब्ध

SOCIAL JUSTICE

1. Alienation: the separation of labour from the product, process, humanity, society

Syllabus: Issues relating to development and management of Social Sector/Services relating to Human Resources.

Mains: Theory of alienation by Karl Marx, Forms of alienation and its criticism

Context: This article examines and critically evaluates the applicability of the “theory of alienation” by Karl Marx in the current situation.

Theory of alienation

- The idea of alienation was developed by a young Marx out of his study of Friedrich Hegel.
- Karl Marx explained the idea of alienation for the first time in his book “Economic and Philosophical Manuscripts”. Later, he further elaborated on the idea in his book “Capital”.
- As per Merriam-Webster dictionary, alienation refers to the withdrawal or separation of a person from an object or position of former attachment.
- However, according to Marx, alienation refers to a feeling of separation from one’s own labour and the loss of power over it.

Types of alienation

Karl Marx discussed four types of alienation, which includes:

- **Alienation of the worker from their product of labour:** In this form of alienation, a worker is neither involved in the design and development of a product nor has any kind of control or ownership over the product.
 - Further, the worker usually does not even receive any benefit from the existence of that product other than his wages. The product hence is not made for the worker’s own use but for the purpose of producing a profit for the capitalist.
 - Therefore the worker is said to be alienated from their own product of labour.
- **Alienation of the worker from the process of labour:** This form of alienation is closely related to alienation from the product of labour.
 - As per this form of alienation, despite not being involved in design and development, the workers are often forced to work for long hours, in poor conditions, and perform repetitive tasks for low wages.
 - Workers do not have control over production and are coerced to work as a means of survival.
- **Alienation of the worker from his Gattungswesen (species-essence):** Gattungswesen or species-essence is Marx’s definition of human nature which consists of the person’s inherent potential.
 - As per this form of alienation, the worker loses his inherent identity and the opportunity for self-development.
 - This often leads to psychological dissatisfaction for the worker.
- **Alienation of the worker from other workers:** According to this form of alienation, in a capitalist mode of production, workers become an ever-cheaper commodity the more goods they produce.
 - Further, his/her mental and physical energies are exhausted due to imposed or forced work and he/she is left with no time to interact with others.
 - Workers also start becoming competitive with each other in order to save their jobs.

Other perspectives on alienation

- Writers have further tried to provide a social-psychological perspective to the concept of alienation by linking it to powerlessness, meaninglessness, normlessness, self-estrangement and social isolation.
- According to experts, there can be several causes for these forms of alienation which includes:
 - Bureaucracy and organisational structures
 - Lack of ownership
 - Social disorganisation
 - Lack of technology
 - Poor management
- A few authors opine that assembly-line workers (production line workers) experience the greatest sense of alienation and workers/professionals like physicians or teachers experience the least form of alienation.
- Some authors further believe that alienation would most probably be the lowest in an organisational setup where members have control and opportunities for self-fulfilment in their roles.
 - This idea of alienation is different from that of Marx as this idea is a more reformist view, whereas Marx considered it necessary to abolish private property and change social and economic structures.
- Additionally, the idea of alienation is also used in a political dimension with the alienation of the electorate being one of the key reasons for the disaffection of people over various government policies.

Criticisms

- There have been criticisms over Marx's explanation that it was not worked out in terms of its consequences and how it might be addressed or eliminated.
 - Further, the solution of communism has not yet occurred, and it cannot be expected in the near future.
- Marx's idea of alienation has provided an overview of the labour market, and the living and working conditions of his era. However, most of those have changed significantly in modern times.
 - Currently, labour laws are in place across the world which has led to a greater division of labour.
 - At present, only some of the workers witness poor working conditions and not all. Furthermore, the effects of labour on different segments are dependent on the countries they live in.
- Critics also argue that the concept of Marxism focuses only on class and ignores various other key forms of segregation.
 - Critics point out that Marx studied the idea of alienation only in terms of the exchange of labour and private property. However, the concept of alienation can also be related to the segregation of society based on ethnicity, race, caste and gender.
- Experts like Ricoeur have argued that since the idea of alienation is popular, it is often used in subjective experiences of estrangement diluting the scientific and analytical potential of the concept.
- The theory is also criticised by philosophers such as Althusser, for its essentialism.
 - Modern-day experts also opine that Marx's theory of alienation is underdeveloped and tentative.
- Further, according to experts, this concept of alienation suffers from the danger of paternalism.

Nut graf: *The concept of alienation by Karl Marx is one of the most widely used concepts in social, political and economic theories. However, modern-day theorists believe that the concept is out of fashion in the current social and political philosophy, yet various other experts continue to understand and apply the concept in the contemporary world.*

2. The battle against child marriage

Syllabus: Mechanisms, laws, institutions and Bodies constituted for the protection and betterment of vulnerable sections.

Mains: Issues related to women and children – Child Marriage.

Context: Crackdown against child marriage in different parts of Assam.

Details:

- Even today, a few people of the hill-dwelling Tiwa Tribal community in Assam's West Karbi Anglong district practice *Gobhiya Thaka* (a kind of live-in relationship).
- Several instances of child marriage were cracked down by the police in different parts of Assam.
- According to the Chief Minister of Assam, it was a planned exercise as the police collected data for three years (from 2020) and registered approximately 4074 cases.
- Though the exercise might have some social cost, the State government is keen to control child marriages and has directed the District Magistrates and the Social Welfare Department to take care of the minor married girls.
- Nearly 2763 persons have been arrested (as of 9th February 2023).
- The premises of the National Automotive Testing and R&D Infrastructure Project was turned into a temporary prison for child marriage offenders.
 - Similarly, transit camps set up for foreigners (illegal immigrants from neighbouring countries, specifically Bangladesh) are also being used for judicial custody.
- The exercise is appreciated by many social activists who are hopeful that the fear factor would help in spreading awareness with more authority.

The reason for action

- The National Family Health Survey – 5 report was cited to justify the drive against child marriages in Assam.
- According to the report, about 23.3% of women aged 20-24 years were married before the age of 18 during 2019-21 (it decreased from 27% in 2015-16).
 - However, according to the National Crime Records Bureau (NCRB), only 1050 cases were registered under the Prohibition of Child Marriage Act in 2021.
- Notably, West Bengal, Bihar, and Tripura topped the list with 40% of such cases. Assam registered 31.8%.
- Similarly, teenage pregnancy accounted for 16.8% of more than 6.2 lakh pregnancies in Assam in 2022.
- According to a survey conducted, the median marriage age of women who have completed over 11 years of schooling and are presently aged 25-29 and 45-49 was 23 and 22.5 respectively.
 - This implies that education has long been a controlling factor in deciding a woman's marital age.
- However, the outcomes were surprising, when the wealth of the household was considered. It was found that the median marriage age of women who belonged to the richest 20% of households and are presently aged 25-29 and 45-49 was 22.8 and 19 respectively.
 - This implies that earlier even wealthier families married women at a younger age.
- With respect to caste and location, it was found that the median marriage age for women belonging to SC/ST/OBC was below 20 even among younger generations, while that of non-SC/ST/OBC women was above 20.
- The difference in the median age of rural and urban women was wider among younger generations (25-29 age group).

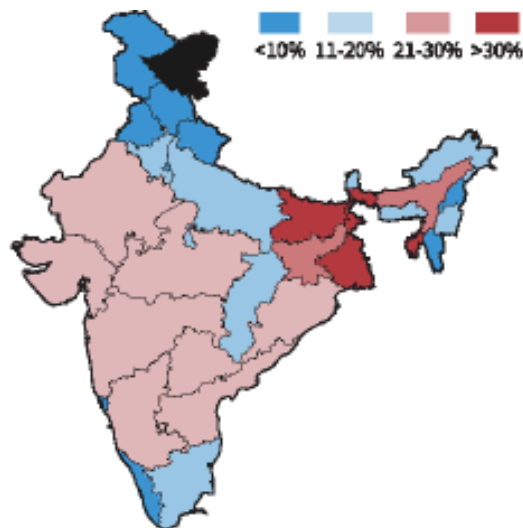


Figure1: Share of women aged between 20 and 24 who were married before their 18th birthday

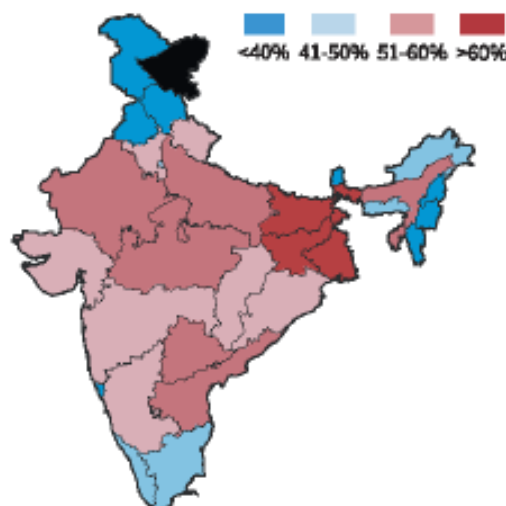


Figure2: Share of women aged between 25 and 29 who were married before their 21st birthday

Source: The Hindu

Raising the minimum age of marriage of women in India

- The Supreme Court (SC) dismissed a petition that sought to raise the minimum age of marriage of women in India from 18 years to 21 years. The Chief Justice of India further stated that the power to amend the law lies with Parliament.
- The Prohibition of Child Marriage (Amendment) Bill was introduced in the Lok Sabha in December 2021.
 - It proposes to raise the age of marriage for women from 18 to 21 years.
- The bill is referred to the Parliamentary Standing Committee.
- The purpose of increasing the marital age of women is to attack the poor labour force participation of young women.

Concerns with the move by the Assam administration

- In many instances, there was an error in the documents while declaring the age of the girls. This implies that the girls were not actually minors during their marriage and their husbands and fathers were wrongly arrested.
- Many tribal people are usually clueless about such laws.
- It is also argued by many local residents that the execution of such a campaign against child marriage could have been better accommodating the concerns of poor people.
- Some officials have also been accused of politicizing or criminalizing the drive.
- Concerns have also been raised over classifying the married minor girls into two groups namely 'below 14 years' and 'from 14 to 18 years'. This is used to book people involved under the POCSO Act and the PCMA respectively.
 - It should be remembered that no such classification is possible under POCSO, especially after the Supreme Court's judgment of October 2017.
 - In the 2017 case, SC upheld every girl's right to bodily dignity and ruled that sexual intercourse by a man with his wife who is below 18 years should be considered rape.

- Legal experts have also raised concerns about interpreting the implementation of cases where the Muslim Personal Law (Shariat) Application Act of 1937 and the Assam Moslem Marriages and Divorces Registration Act of 1935 are followed. Notably, these laws do not bar girls under 18 years from getting married.
- Moreover, it is also argued that the Prevention of Child Marriages Act (PCMA) is not a settled law and is subject to interpretation by the court as there is no Uniform Civil Code.
- Currently, the legal age to marry in India is 18 years for women and 21 years for men and a parliamentary standing committee is deliberating to increase the minimum age of marriage for women to 21 years.
- Child marriage is prevalent among many communities, particularly among Muslim dwellers of the *chars* (shifting sandbars in the Brahmaputra) and the *Adivasi* tea plantation workers.
- The sustained efforts of the government against the evil practice of child marriage have prevented social ceremonies, but marriages still take place as formalities indoors.
- Many cases of child marriages and teenage abortions go unreported.

Way Ahead:

- The Assam government launched the **Arundhati scheme** in 2020 promising to provide 1 tola (11.66 grams) of gold to brides belonging to all communities after attaining the legal age of 18 years. However, the age should be verified through a birth certificate and medical examination and the marriage should be registered.
 - Furthermore, it is intended for people with an annual income below ₹5 lakhs. Such innovative initiatives can be replicated around the country.
- The hard approach of police action should be supplemented by soft measures like ensuring livelihood and education for girls.
- The tea plantation workers should also be convinced against child marriages.
- There should be more conversation and deliberation on the causes and effects of child marriages that are often resorted to in the case of romantic relationships and to avoid the fear of earning social shame.
- All the stakeholders like police, doctors, health workers, panchayat leaders, village headmen, and public representatives should work in close coordination.

Nut Graf: It is found that education has been a major factor in determining the median marriage age of women. It is thus suggested that apart from taking strict action against incidents of child marriage, the government should take enough steps to provide adequate educational opportunities to women and increase their negotiating power in taking marriage decisions.

3. Slow progress to creating a safe workplace for women

Syllabus: Issues related to women.

Mains: Violence against women at the workplace.

Prelims: Vishakha Guidelines.

Context: Allegation of sexual harassment by Indian sportswomen (wrestlers).

Details:

- The allegation of sexual harassment by some female wrestlers has shocked the nation. Those affected sat in a protest in Delhi.
- This shows that wrestlers were either not aware of the internal complaints committee or it was not functional.
- According to the Vishaka guidelines, reporting cases of harassment should be followed equally both in government and private institutions.
- An 'oversight committee' headed by a female Olympic medal holder has been constituted to investigate the matter.
- In a similar case, a leading woman journalist faced accusations of defamation levelled by the accused. However, she was acquitted in February 2021.
- Some provisions against sexual harassment of a woman:
 - Section 509 of the Indian Penal Code (IPC) against insulting the modesty of a woman.
 - Section 354-A of the IPC for offences related to 'sexual harassment' was inserted in 2013.
 - Vishakha Guidelines were framed by the Supreme Court of India in 1997.

Vishakha Guidelines

- The Vishakha Guidelines are a set of procedural guidelines for use in India in cases of sexual harassment.
- Vishakha Guidelines were promulgated by the Supreme Court in 1997 through the Vishakha v/s State of Rajasthan case
- Vishakha Guidelines were superseded in 2013 by the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act.
- The Court while delcaring the Vishakha Guidelines ruled that sexual harassment amounts to a gross violation of their fundamental rights as guaranteed under Articles 14, 19 and 21 of the Constitution.
- The Court defined sexual harassment as any physical touch or conduct, any unpleasant taunt or misbehaviour, showing of pornography and asking for any kind of sexual favours.
- It was held that sexual harassment at the workplace should be informed, produced and circulated. Every act of harassment shall be dealt with in an appropriate manner which shall include criminal proceedings and disciplinary action.
- For the time-bound and effective redressal of complaints, a robust mechanism should be in place at workplaces.
- A complaints committee should be put in place which should be headed by a woman and more than half of its members should also be women.
- In order to prevent any pressure from the higher-ups at the workplace, a third party like an NGO should be involved.
- Moreover, concrete steps must be taken to create awareness at the workplace as to what sexual harassment is and how to approach appropriate people if someone is harassed at the workplace.

Sexual Harassment at Workplace (Prevention, Prohibition and Redressal) Act, 2013

- Seventeen years after the Vishakha Guidelines were pronounced, the Parliament passed the Sexual Harassment at Workplace (Prevention, Prohibition and Redressal) Act, 2013.
- The Act is much wider in application than the guidelines.
- The “aggrieved women” covers a wide range of women irrespective of age and employment status while “workplace” includes corporate and private places as well as both the organised and unorganised sector.
- Specific time limits have been provided for inquiry and redressal of complaints.
- Further, Penalties including fines up to Rs 50,000 have been prescribed for non-compliance with the provisions of the Act.
- The most important feature of the Act is the establishment of the Internal Complaints Committee (ICC) in establishments with 10 or more employees by an order given in writing by the employer.

Statistical details about sexual violence:

- The reporting of direct violence cases has shown improvement due to the enabling environment.
- However, indirect violence still remains poorly addressed as it is embedded deep in our social and economic structures. It is more visible in workplaces like employment imbalance between men and women and fewer women in higher positions.
 - It should be noted that the number of women employees is important as one musters courage to voice grievances when there are sufficient numbers of supporters.
 - Moreover, if there are not enough women in leadership positions it would not generate confidence in subordinate women. They would also feel reluctant to air their grievances.
- According to the Periodic Labour Force Survey (PLFS) 2020-21, the Female Labour Force Participation Rate (LFPR) increased from 17.5% in 2017-18 to 25.1% in 2020-21.
 - LFPR refers to the percentage of persons in the labour force among the persons in the population (employed and unemployed or seeking employment).
- The Worker Population Ratio (WPR) has also risen from 16.5% in 2017-18 to 24.2% in 2020-21.
 - WPR implies the percentage of persons employed among the persons in the population.
- However, it is still much less than the Male LFPR. Furthermore, the LFPR and WPR of women shown in the Quarterly Bulletin of April-June 2022 are not encouraging.

Associated concerns:

- One of the major factors for the low participation of women in the workforce is the absence of an enabling and safe working environment.
- The grievance redressal mechanism is either non-existent or ineffective.
- Women are more vulnerable to exploitation as they can be easily threatened with their job continuity for indecent favours.
- It is observed that whenever allegations are leveled against superior authorities, the accused tries to stall the due process or brings disrepute to the victim on flimsy grounds.

Way Ahead:

- It is important to develop the mindset of treating men and women as equals at an early stage of character formation during childhood.
- According to the theory of criminology called 'nature versus nurture', social conditioning, the environment of the family, and early schooling are crucial during the growth of children. For instance,
 - If both parents do not respect each other or treat their girl and boy children differently, children would learn inequality as a normal phenomenon.
 - It would further lead to the development of criminal tendencies in men.
- It is the responsibility of the employer to ensure a safe and women-friendly working environment.
- Internal Complaints Committee should be constituted and awareness about the law and procedure of grievance redress should be spread.
- In the medium term, the following measures should be taken:
 - Improving female LFPR
 - Increasing the number of women in leadership positions
 - Providing incentives like maternity leave to prevent drop-outs
- In the long run, it is important to bring changes in the existing socio-cultural and economic structures to eliminate indirect violence.

Nut Graf: *Despite various provisions in place to prevent sexual harassment of women in the workplace, there is slow progress in creating a safe working environment for women. Society should work as a whole to address the deep-rooted structural and cultural violence against women.*

4. Menstrual Leave Policy in India

Syllabus: Welfare Schemes for Vulnerable Sections-Women

Mains: Debate on menstrual leave policy in India

Context: The Supreme Court recently refused to hear a petition concerning menstrual leave for workers and students across the country, citing it as a policy issue.

Background:

- A three-judge Bench led by Chief Justice of India D.Y. Chandrachud while hearing a petition, seeking a direction to States to frame rules for granting menstrual pain leave for students and working women asked the petitioner to approach the Union Ministry of Women and Child Development to frame a policy.
- The Supreme Court opined that there are different "dimensions" to menstrual pain leave, which though being a biological process, may also act as a "disincentive" for employers from engaging women in their establishments.

What is Menstrual Leave?

- Menstrual leave is a policy that allows women to take paid or unpaid time off from work when they are suffering from painful menstrual symptoms.
- This means that female employees who are experiencing menstrual discomfort, pain, or other symptoms can take time off work without fear of losing pay or facing disciplinary action.
- It is a new concept that is not widely available yet, but it has gained traction in recent years as more countries and businesses consider its implementation.
- For centuries, the concept of menstrual leave for workers and students has been debated.
- Such policies are uneven and controversial, even among feminists.

Current Status: In India:

- In *S. L. Bhagwati vs. Union of India and Ors* case, 1992, the Supreme Court argued in favour of women receiving menstrual leave to take care of their health and families.
- Currently, Bihar (since 1992) and Kerala are the only states that allow menstrual pain leave.
- Several private companies have also implemented menstrual leave policies voluntarily. However, there is currently no legal requirement for companies to provide menstrual leave.
- Some of the companies that have implemented menstrual leave policies in India include Culture Machine, Gozoop, Mathrubhumi, Zomato, Swiggy and Byjus.
 - The policies typically allow female employees to take one or two days off per month without using their regular leave or taking a pay cut.
- The Higher Education department in February 2023 issued an order to implement menstrual and maternity leaves for students in universities that function under the department.

Global Scenario:

- **Spain:** Spain recently became the first European country to provide paid menstrual leave to employees, in addition to a slew of other sexual health rights. Workers now have the right to three days of menstrual leave per month, which can be increased to five days.
- **Japan:** Following the popularity of menstrual leave among labour unions in the 1920s, the country incorporated it into labour law in 1947. Employers cannot currently ask women who are going through difficult times to work during those times under Article 68.
- **Indonesia:** In 1948, a policy was implemented, which was amended in 2003, stating that workers experiencing menstrual pain are not required to work on the first two days of their cycle.
- Workers in the **Philippines** are allowed two days of menstrual leave per month.
- **Taiwan** has a Gender Equality in Employment Act in place. Every month, employees have the right to request a day off as period leave at half their regular wage. Three such leaves are permitted per year; any additional leaves are considered sick leave.
- **Zambia:** Among African countries, Zambia instituted one day of unpaid leave per month without requiring a reason or a medical certificate, dubbed Mother's Day.
- **Others:** The petition also mentioned that menstrual leave is available in the United Kingdom, China, and Wales.

Arguments in favour of menstrual leaves:

- **Addressing gender equality:** It can help address gender inequality in the workplace by acknowledging the specific needs and challenges faced by women due to their menstrual cycles.
- **Ensure job security:** This type of leave enables women to take time off when they need it without fear of losing pay or facing disciplinary action.
- **Improved productivity:** Allowing female employees to take time off work during their menstrual cycle can help them manage menstrual symptoms and ultimately improve their productivity, increase job satisfaction and reduce stress levels.
- **Reducing stigma and discrimination:** Menstruation is still a taboo subject in many parts of the world, including the workplace. Implementing menstrual leave policies can help reduce stigma and discrimination around menstruation by acknowledging it as a legitimate health concern.
- **Promoting work-life balance:** Menstrual leave policies can help promote work-life balance by allowing female employees to take time off work when they need it without using their regular leave or taking a pay cut.

What are the Issues in Policy implementation?

- Menstrual leave is not supported by everyone, including those who menstruate.
- Create employer discrimination: Some argue that it is either unnecessary or will backfire, resulting in employer discrimination against women.
- Obligation may backfire: If government policy requires employers to provide menstrual pain leave, it may act as a de facto disincentive for employers to hire women.

Arguments against menstrual leaves:

- **Potential for gender discrimination:** If women are given more leave days, they may be perceived as less capable or committed to their jobs than their male counterparts.
- **Concerns about lower productivity:** Opponents of menstrual leave policies argue that allowing women to take time off work during their menstrual cycle will reduce productivity and, as a result, harm businesses.
 - Women may be reluctant to take menstrual leave for fear of it affecting their opportunities for career advancement.
- **Implementation challenges:** Enforcing such policies may be difficult for businesses, particularly small and medium-sized enterprises. If employees take additional leave days throughout the year, these businesses may struggle to manage their workforce effectively.
 - Opponents of menstrual leaves argue that it can be challenging to determine the legitimacy of leave requests.
 - This could create resentment among other employees and cause tension in the workplace.
- They also argue that it may create administrative burdens for employers.

Legislative measures:

- Certain measures in this direction have been introduced in Parliament with no success.
- In 2017, Arunachal Pradesh MP Ninong Ering introduced '**The Menstruation Benefits Bill, 2017**' in Parliament.
- It was represented in the Lok Sabha on the first day of the Budget Session in 2022, but was dismissed as an "**unclean topic**," according to the petition.
- In 2018, Shashi Tharoor introduced the **Women's Sexual, Reproductive, and Menstrual Rights Bill**, which proposed that public authorities make sanitary pads freely available to women on their premises.

Way forward:

- **Education and awareness campaigns** can be carried out to educate employers, employees, and policymakers about the importance of menstrual health and the need for menstrual leave policies.
- **Companies can offer** flexible work arrangements, such as remote work or flexible scheduling, in lieu of specific menstrual leave policies, to accommodate employees who are experiencing menstrual discomfort.
- **Consultation with Experts:** To develop comprehensive menstrual leave policies that meet the needs of both employees and businesses, policymakers can consult with health experts, labour organisations, and other stakeholders.
- **Pilot programmes** can be used to test the effectiveness of menstrual leave policies and assess their impact on businesses and employees.
- **Workplace Culture:** Companies can work to foster a workplace culture that promotes menstrual health and normalises menstrual-related conversations. This can help to reduce the stigma attached to menstruation while also promoting gender equity in the workplace.

Nut Graf: While some companies have voluntarily implemented menstrual leave policies in India, there is currently no legal requirement for companies to provide menstrual leave. The Supreme Court recently suggested that a policy on this issue falls under the domain of the union government.

5. Social security and the story of two Budgets

Syllabus: Welfare schemes for the vulnerable sections of the population and the performance of these schemes

Mains: Pension scheme for elderly people.

Prelims: National Social Assistance Programme.

Context: Allocations for social welfare schemes in Budget 2023-24.

Details:

- It is argued that despite promising 'a better quality of life and life of dignity', the Budget 2023-24 has made severe cuts in various social security and welfare schemes. For example, low allocation to food security and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) has undermined the already precarious lives of many poor people.
- Another major example is the National Social Assistance Programme (NSAP) which has remained constant at around ₹9,000 crores and is steadily reducing in real terms. In 2023-24 itself, it saw a reduction of ₹16 crores (₹9,636.32 crores).
 - Since 2007, social security pension under the NSAP has remained frozen at a low sum of ₹200 for the elderly and ₹300 per month for widows and persons with disabilities.
 - Additionally, only those who are Below Poverty Line (BPL) as per the census 2001 are given pensions.
 - Such a reduction disregards the "inclusive growth" model.
 - The share allotted to NSAP (as a percentage of the total expenditure) in the budget has constantly decreased from 0.58% in FY2014-15 (BE) to 0.21% in Budget 2023-24.

National Social Assistance Programme (NSAP)

- It is a centrally sponsored social security scheme that provides non-contributory income security to the elderly, widows, and persons with disabilities belonging to "BPL families".
- There are three main schemes under this programme:
 - Indira Gandhi National Old Age Pension Scheme (IGNOAPS)
 - Indira Gandhi National Widow Pension Scheme (IGNWPS)
 - Indira Gandhi National Disability Pension Scheme (IGNDPS)
- State governments are also encouraged to match the amount of the central contribution under the NSAP's guidelines.

Case Study of Rajasthan:

- Rajasthan government has proposed (in State Budget 2023-24 presented on 10th February 2023) to enact a Minimum Income Guarantee and Pension law in the State.
- It would provide 125 days of work through the rural or urban employment guarantee, and a minimum social security pension of ₹1000 per month, with an automatic increase of 15% per annum.
- Notably, the state government provides social security pensions to more than 90 lakh people, whereas NSAP covers pensions of only 10 lakh pensioners.
- The total expenditure on pensions in Rajasthan is expected to go up to around ₹11500 crores. This is approximately 30% more than the entire national social security pensions budget under NSAP.
- The number of beneficiaries was expanded by:
 - Changing the eligibility criteria in 2013 and including economically vulnerable women above 55 and men above 58 for old-age pension.
 - Including anyone with more than 40% disability.
 - It also permits widows with adult children to receive a widow pension.

Concerns associated with Social Sector Expenditure:

- Failure to index social sector expenditure to inflation can further lead to the marginalization of vulnerable people.
- The cumulative inflation rate in India from 2007 to 2023 is 193.19% with an average annual inflation rate of 6.95%. This implies that if indexed to inflation, ₹200 in 2007 would have become ₹586.38 in 2023.
- Notably, just the annual increase in dearness allowance and dearness relief for around 1 crore central government employees and pensioners costs nearly ₹12000 crore to the exchequer, which is 30% more than the total expenditure on social security pensions.
- Apart from the amount, another concern is about the number of beneficiaries. Currently, under the scheme, the beneficiaries of pension schemes are based on Census 2001.
- Moreover, the strict criteria of providing disability pensions only to those with a disability level of 80% or more, has excluded lakhs of the disabled.

Way Ahead:

- The Central government and other State governments should emulate Rajasthan and take appropriate measures for providing more credible entitlements, strengthening accountability, and offering the same legal protection as other welfare laws.
- The government should also recognize that pension is a right for work done by unorganized sector workers that contribute to the GDP and the economy of the country.

Conclusion:

The rights-based entitlements for vulnerable sections of the population provide a measure of dignified living which should be the objective of any democracy. It is the compassion and the commitment to meet the basic needs of the most marginalized people that will gauge us as a society and eventually as a nation.

Nut Graf: It is suggested that the share of expenditure on welfare schemes and social sector schemes like the pension scheme is declining. Instead of a charity-based approach, it should be seen as a rights-based approach that is important to ensure minimum conditions for workers to live their retired lives with dignity.

6. Shaping a more disabled-friendly digital ecosystem

Syllabus: Mechanisms, laws, institutions and Bodies constituted for the protection and betterment of vulnerable sections

Mains: Building a disabled-friendly infrastructure.

Background:

- As per the World Health Organization, 16% of the global population is disabled.
- However, 2.21% of the disabled population in India estimated in Census 2021 appears to be a gross underestimation.
- Technology has great potential to level the playing field for the disabled. However, it can also reinforce barriers, if not designed as per their needs.
- It was found in 2020 that India has 750 million Internet/smartphone users.
- If the 16% figure is applied, it implies that there are roughly 12 crore internet/smartphone users with disabilities.

Assessment of the situation through a study:

- For an evidence-based assessment of the situation of technology and its accessibility for the disabled section, a report was prepared.
- In the study, ten widely used apps across five sectors were studied. These apps are Zomato, Swiggy, PayTM, PhonePe, Amazon, Flipkart, Uber, Ola, WhatsApp, and Telegram.
- Moreover, the Web Content Accessibility Guidelines were used to evaluate the app.
 - Web Content Accessibility Guidelines is a set of globally recognized parameters to determine disabled-friendly attributes of an app or website.
- It was found that 4 apps were ranked “low” in accessibility and 5 apps were ranked “medium”.
- The results highlight the immediate need to work on creating a disabled-friendly infrastructure both physical and digital.
- The aim of launching this report and rating index is to start discussions on digital accessibility, product design, and the development process.
- In the second phase of this report, the research group would collaborate with service providers and help them design practices and processes for improving app accessibility and educate the stakeholders about people with disabilities.
- It will further help in changing attitudes around disability, specifically within the business community, as they will move away from a charity-based approach to a rights-based and investment outlook.

Use of Artificial Intelligence:

- Artificial Intelligence (AI) can further help in automating the accessibility testing process.
- It can also help in analyzing the feedback from users with disabilities at a scale to provide insights to developers and manufacturers.

Nut Graf: To make digital ecosystems more disabled-friendly, it is important to incorporate the principles of accessibility and inclusive design into every digital offering. All the stakeholders like organizations, companies, civil society, the government, and the judiciary should come together in this endeavour.

7. Mission Shakti

Syllabus: Welfare schemes for vulnerable sections of the population

Prelims: About Mission Shakti

Context: The Supreme Court has sought more information from the government about Mission Shakti.

Mission Shakti:

- Mission Shakti is an umbrella scheme for the safety, security, and empowerment of women.
- The Ministry of Women and Child Development had issued detailed guidelines for the implementation of the Mission Shakti scheme and it will be implemented during the 15th Finance Commission period i.e. 2021-22 to 2025-26.
- The Mission aims to economically empower women by facilitating them to exercise free choice over their minds and bodies in an atmosphere free from violence and threat.
- The Mission has two sub-schemes which are named **Sambal** and **Samarthya**.
- **Sambal:** Sub-scheme for safety and security of women.
 - It consists of erstwhile schemes such as One Stop Centre (OSC), Women Helpline (WHL), Beti Bachao Beti Padhao (BBBP) along with the new addition of Nari Adalats.
- **Samarthya:** Sub-scheme for empowerment of women
 - It consists of erstwhile schemes such as Ujjwala, Swadhar Greh and Working Women along with the existing schemes such as the National Creche Scheme for children of working mothers and Pradhan Mantri Matru Vandana Yojana (PMMVY)
 - A Gap Funding for Economic Empowerment of women has also been added to the Samarthya Sub-scheme.

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EDUCATION

1. Foundational Literacy and Numeracy Report

Syllabus: Issues relating to development and management of Social Sector/Services relating to Education

Prelims: Foundational Literacy and Numeracy Report

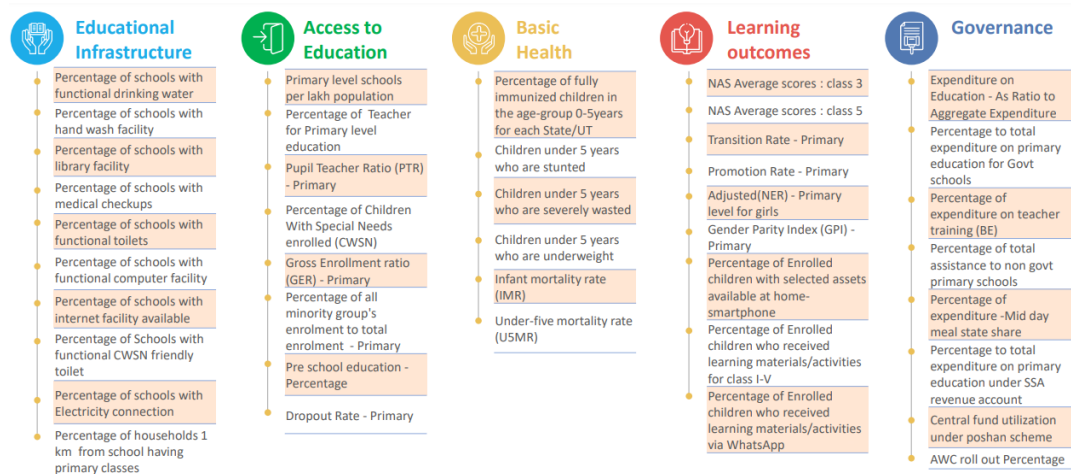
Mains: Key findings and recommendations of Foundational Literacy and Numeracy Report

Context:

- The second edition of the foundational literacy and numeracy (FLN) report was released by Dr. Bibek Debroy, Chairman of the Economic Advisory Council to the Prime Minister (EAC-PM).
- The report was released at #TheIndiaDialog organised by Institute for Competitiveness and US-Asia Technology Management Center, Stanford University, on February 23 & 24, 2023.

Foundational Literacy and Numeracy report:

- The report was released by the **Institute for Competitiveness (IFC)** and the **US-Asia Technology Management Center, Stanford University**.
- In the schooling system, Foundational Literacy and Numeracy refers to the education of a child between 3-8 years of age.
- The Index includes five pillars namely:
 - Educational Infrastructure
 - Access to Education
 - Basic Health
 - Learning Outcomes
 - Governance
- The report focuses on language as a critical foundational skill and its importance in acquiring early literacy.
- The report also highlights numerous initiatives taken at the state and central levels to achieve foundational learning goals as outlined in NIPUN.
- The report further sets a benchmark for states and UTs to track their progress in comparison to each other.
- The report covers the role of nutrition, digital technology, and instructional approaches in assessment.
- A section in the report covers the outcomes of the National Achievement Survey (NAS) and Foundational Learning Study (FLS) 2022.



Key findings of the report:

- The top-scoring regions are **Kerala (67.95)** and **West Bengal (58.95)** among Small and Large states, respectively.
 - **Lakshadweep (52.69)** and **Mizoram (51.64)** are top-scoring regions in the Union Territory and Northeast state category respectively.
- Wide variations across the country: There was a huge gap between Kerala and the rest of the States in the Index on Foundational Literacy and Numeracy scores.
 - **Better performing states:** Kerala, West Bengal and Himachal Pradesh (57.36)
 - **Poor performing states:** Jharkhand(45.28), Odisha(45.58), Madhya Pradesh(38.69), Uttar Pradesh(38.46) and Bihar(36.81)
- Out of the five pillars, it has been observed that states have performed particularly low in the Governance aspect.
- Girl child is at a double disadvantage when compared to her male counterparts.

Recommendations:

- Increase budget allocation, with focused investment on Foundational Literacy and Numeracy
- Alignment of synergies between the Ministry of Women and Child Development (MWCD) and the Ministry of Education (MoE)
- As nutrition and education are both equally important, it may be worthwhile to consider having two Anganwadi Worker (AWWs) per anganwadi.
- There is a need to relook at an academic cadre in the government system that can provide mentoring and support to teachers.
- There is a need for making intensive efforts on Research & Development.
- Undertaking curricular reforms and textbook revision

2. PM – SHRI Yojana

Syllabus: Issues relating to development and management of Social Sector/Services relating to Education

Prelims: About PM SHRI scheme

Context:

- The PM SHRI School scheme will be implemented in over 800 schools in Maharashtra.
- The PM SHRI Scheme will upgrade over 1700 schools in Uttar Pradesh.

PM SHRI scheme:

- PM SHRI (Pradhan Mantri Schools for Rising India) Scheme is a Centrally Sponsored Scheme for the upgradation and development of around 14,500 schools across the country.
- The schools will be selected from among the schools run by the Central Government/State Govt./UT/Local Bodies.
- The selected schools will be equipped with advanced infrastructure like smart classrooms, labs, libraries and sports facilities/equipment.
- Around 14,500 schools will be transformed into model schools which will showcase all the components of the National Education Policy, 2020 (NEP, 2020).
- The selected schools will act as model schools and will offer mentorship to other schools in their vicinity.
- The aim of this scheme is to provide qualitative teaching, learning and cognitive development. Also, to create holistic and all-rounder individuals equipped with 21st-century skills.
- Assessments will be based on conceptual understanding and application of knowledge to real-life situations.

PM SHRI Selection Procedure

- The schools need to apply for the scheme through an online portal which will be open four times a year, once every quarter for the first two years of the scheme.
- The elementary and secondary/senior secondary schools run by the centre/state/UT/local bodies having UDISE+ code would be eligible for selection under PM-SHRI.
- Unified District Information System for Education (UDISE), initiated in 2012-13, integrating DISE for elementary and secondary education is one of the largest Management Information Systems on School Education.
- Geo-tagging of schools for the selection and monitoring of PM-SHRI schools will be done by BISAG-N.
 - BISAG-N (Bhaskaracharya National Institute for Space Applications & Geo Informatics) provides specialised services and solutions in implementing map-based Geographic Information Systems.
 - The institute works in close coordination with GoI ministries and state government departments
- States/UTs/KVS/JNV shall verify the claims reported by schools and recommend the list of schools to the Ministry. (KVS – Kendriya Vidyalaya Sangathan, JNV – Jawahar Navodaya Vidhyalaya).

GOVERNANCE

1. Rural Tourism

Syllabus: Government Policies & Interventions for Development in various sectors

Prelims: About Tourism Working Group (TWG)

Mains: Rural tourism as a means of community empowerment and poverty alleviation

Context: India to showcase success in rural and archaeological tourism at G-20 meeting.

Key Details:

- Rural tourism and archaeological tourism will be the topics at the first tourism ministerial meeting of the G-20 at Rann of Kutch, Gujarat.
- India is expected to highlight the most successful and innovative initiatives of rural and archaeological tourism from various parts of India.
- The Union Tourism Minister launched 'Best Tourism Village Competition Portal', Global Tourism Investor Summit 2023 Portal and Rural Tourism Portal to promote tourism in the country.
- The Ministry of Tourism is also organising 1st Global Tourism Investors' Summit in May 2023 to showcase investible projects and opportunities in the tourism and hospitality sector in India to domestic and international investors.
 - This is being organised in the backdrop of India's G20 Presidency as well as grand celebrations of India@75 Azadi ka Amrit Mahotsav.
- The Ladpura Khas village of Madhya Pradesh, Khonoma village of Nagaland and heritage sites like Dholavira will be showcased as success stories of rural and archaeological tourism by India during the meeting.
 - The Ladpura Khas village of Madhya Pradesh was nominated as the Best Rural Tourism Village by the UNWTO.
 - In this village, the State government developed homestays in villages under the Responsible Tourism Mission of the State.
 - Nagaland's Khonoma Village will present the model of the Ecotourism Management Board that develops rural tourism products and promotes responsible travel.
- India will also present the innovative model of community-based Astro Tourism that involves rural homestays and community spaces that are completely run by villagers and provides travellers with an integrated experience of stargazing along with cultural immersion in the Himalayas.
- India is also observing 'Visit India Year 2023' in order to develop tourism in mission mode.
 - It highlights India's commitment to sustainable & rural tourism and propels India as a seamless, modern and smart tourism destination.

Tourism Working Group (TWG):

- As part of India's G20 presidency, Gujarat is hosting the first Tourism Working Group (TWG) meeting in Rann of Kutch from 7 to 9 February.
- In G20, there are 5 interrelated priority areas for tourism. Accordingly, the thrust will be on these five priority areas i.e. greening of the tourism sector, harnessing the power of digitisation, empowering youth with skills, nurturing tourism MSMEs/startups and rethinking the strategic management of destinations.
- One of the priorities through the G20 platform is to reach a consensus on how the Sustainable Development Goals will be achieved by 2030 with an emphasis on sustainable tourism which is significant for the environment and also to create opportunities for local enterprise.
- India is also planning on live demonstrations of the local arts and handicrafts before the delegates and also to give farewell gifts to the delegates under the One District One Product initiative.

Rural Tourism:

- Rural Tourism is any form of tourism that showcases the rural life, art, culture, and heritage at rural locations, thereby benefiting the local community economically and socially.
- Numerous local traditions like plays, art forms, dances, etc. enhance the cultural wealth of rural areas, making these attractive to tourists.
- The Ministry of Tourism has designated rural tourism as one of the niche tourism sectors for growth in the country.
- The Ministry has developed a Draft National Strategy and Roadmap for Rural Tourism, which focuses on developing and promoting local products through tourism.
- The Central nodal agency, Rural Tourism and Rural Homestays, the coordinating body among the Centre, the States and other stakeholders, have identified six niche experiences for tourists wanting to visit rural India, including agritourism, art and culture, ecotourism, wildlife, tribal tourism, and homestays.
- It focuses on the following key pillars: (a) Model policies and best practices for rural tourism; (b) Digital technologies and platforms for rural tourism; (c) Developing clusters for rural tourism; (d) Marketing support for rural tourism; (e) Capacity building of stakeholders; (f) Governance and institutional framework.

- The Ministry of Tourism has designated the Rural Circuit as one of the fifteen thematic circuits for development under the Swadesh Darshan Scheme.

Significance of Rural Tourism:

- Rural tourism focuses on sustainability, avoiding large-scale infrastructure development, and without much private sector participation.
- Local resources and communities are involved to provide a unique organic experience.
- The U.S.-based market research firm Grand View Research estimates that agritourism alone will develop at a compound annual growth rate (CAGR) of 11.4% from 2022 to 2030.
- It will help redevelop rural areas and rejuvenate rural life, create jobs and new business opportunities.
 - The Ministry of Rural Development is also exploring the possibility of creating assets under the MGNREGS for tourist infrastructure.
 - Exploring organic agriculture areas developed under the Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development in North East Region (MOVCD-NER) for development as rural tourist spots will encourage organic farming and its awareness.
- Rural tourism can revitalise local art and crafts and prevent viable traditional occupations from being displaced.

Nut Graf: *There is a lot of scope for rural tourism, given the vast rural hinterland of India and the growing connectivity between urban and rural centres. The G20 Tourism Working Group (TWG) meeting is expected to help in raising awareness about the tourism potential of India at the global level as the delegates of the meetings at 55 different locations will be exposed to Indian culture and tourist destinations.*

2. India's law and order matrix needs a reboot

Syllabus: Government policies and interventions and issues arising out of their design and implementation

Mains: Reforming India's police and law and order scenario.

Context: Annual All India Conference of Directors General/Inspectors General of Police.

Details:

- The All India Conference of Directors General/Inspectors General of Police is comparatively new and has been held since 1980.
- Earlier All India Conference of Directors General/Inspectors General of Police was held as an annual conference of Heads of Intelligence and CIDs of different States.
- Apart from intelligence, crime, criminal investigation, technology, and forensics, the conference also deals with policy and personnel matters.

Associated Concerns

- It is argued that the presence of an increasing number of delegates and subjects for discussion leaves little scope for any in-depth discussion.
- It should be noted that security threats are becoming more challenging in the present scenario and need in-depth analysis on issues like cybercrime, the dark web, crypto, maritime security, drones, social media, drug trafficking, etc.
- Inadequate time to discuss these issues results in undermining both the quality and outcomes of such conferences.
- The security problems will grow at an exponential rate with swift technological change and the emerging challenges will require more innovativeness, agility, and newer cognitive skills.
- Furthermore, decision-making would require fundamental changes entailing more purposeful discussion at higher levels.
- It is suggested that law and order require newer skills, in both technology and crowd management, and these are not adequately available with security agencies. Notably, the attention of security forces is mostly focused on terrorism.
- A heavy-handed approach to dealing with angry and unruly mobs in present scenarios might lead to a catastrophic divide between law enforcement agencies and the public.
- It is argued that reforms in the selection process of security personnel are not debated by the higher echelons of the forces.
- It is also said by several experts that 'Open Source intelligence' is often neglected by security agencies.
- The techniques and methodologies of different security agencies (intelligence and investigative agencies) are usually different. This results in various contradictions.

Way Ahead:

- Newer practices and skills are required to understand the psychology of agitating mobs and make them realize the dangers of their own predilections.
- Police and security agencies should also be adequately trained. Human skills should be adequately tailored for the Internet, social media, and other breakthroughs, which usually provide protestors/agitators with an upper hand and are detrimental to law and order.
- Moreover, a top-down approach would be required because there will be significant competition for resources (weaponry and technology) within the agencies.

- The selection process of security personnel would also need to be changed.
- Apart from acquiring new skills, a new mindset is also required to employ a variety of skills and tactics.
- Reforms should be brought in intelligence approaches, investigative techniques, ground situations, etc.
- Apex-level meetings of higher authorities like DGPs/IGPs should provide necessary direction and policy imperatives.
- It is also suggested that the annual conference of DGPs/IGPs should be split into two separate conferences. For instance, a higher level conference of DGPs/IGPs that should cover policy-related issues, and a separate conference for intelligence and security agencies (IGs/CID) to discuss the finer points of methodology, techniques, and acquisition of new skills for existing and emerging challenges.

Nut Graf: *With the evolving security challenges, the law and order scenario in the country should be reformed. The high-level conferences should also adequately deliberate on emerging issues and provide appropriate and modern solutions in complex scenarios.*

3. SC steps in for undertrial prisoners unable to furnish surety, bail bonds

Syllabus: Important judicial cases.

Mains: Issues with undertrial prisoners.

Context: The Supreme Court gave several recommendations for poor undertrial prisoners.

Details:

- The Supreme Court of India made several directions for poor undertrial prisoners that are granted bail but are too poor to furnish surety and bail bonds. It has made provisions to ensure that they are released within seven days of the bail.
- Apex court has also suggested “temporary bails” so that the undertrials can go out and arrange for bail bonds and sureties.
- As per National Legal Services Authority’s (NALSA) report (January 2023), approximately 5000 undertrial prisoners were lodged in jail despite courts granting them bail. Around 2357 (out of 5000) were provided legal assistance and 1417 were released.
- However, the fundamental violation of the right to personal liberty of prisoners persists even today.

Other details:

- The NALSA and the National Informatics Centre (NIC) are working together to amend the e-prisons software (used in 1300 prisons in India) in order to digitally recognize a distinct category called “bailed-out- but-not-released”.
- On the basis of NALSA’s report, the SC issued seven directions so that no bailed-out undertrial prisoner suffers because of poverty. Some of these provisions are:
 - The courts should send soft copies of bail orders to the prison authorities on the same or the next day.
 - The jail superintendent is advised to record the date of the bail in the e-prisons software.
 - If the undertrial prisoner is not released within seven days of the grant of bail, it is the duty of the prison authorities to inform the district legal services authorities (DLSA).
- Changes in e-prison software will also be required like sending an automatic mail to Secretary DLSA (if not released in seven days).
- Paralegal volunteers or probation officers should assess the economic condition of prisoners and place it before the courts with a request to relax bail conditions.
- If the bail bonds are not furnished within one month of granting the bail, the court can suo motu take up the case and review the modification/relaxation of the bail condition.
- It was further said that courts need not insist on local sureties, as the ready availability of them has often been a cause of delay in releasing bailed prisoners.

Nut Graf: *On the basis of NALSA’s report, the Supreme Court issued a slew of directions for the poor undertrial prisoners who are granted bail. Suggestions were also made for facilitating temporary bail in order to arrange for sureties and bail bonds.*

4. Jal Jeevan Mission

Syllabus: Government policies and interventions and issues arising out of their design and implementation

Mains: Jal Jeevan Mission and associated concerns.

Prelims: Facts about Jal Jeevan Mission.

Context: Increased budget outlay for Jal Jeevan Mission.

Jal Jeevan Mission:

- The Jal Jeevan Mission was launched in August 2019.
- Jal Jeevan Mission (JJM) aims to provide tap water supply to every rural household by 2024.
- A fully functional tap water connection means a household gets at least 55 litres of potable water per capita per day throughout the year.
- Jal Jeevan Mission (JJM) is being implemented by the Department of Drinking Water & Sanitation working under Jal Shakti Ministry.

Details:

- The Budget 2023-24 has allotted approximately ₹69684 crores for the scheme.
 - It is a 27% increase as compared to the revised estimates of 2022 (₹54808 crores).
- However, it is argued that out of the targeted 19.3 crore rural households, only 3.2 crores had piped water in August 2019. And the JJM dashboard on the official website of the Ministry of Jal Shakti shows that around 11 crore households (57% of the targeted beneficiaries) have access to tap water (as on February 2023).
- With just 12 months remaining, it would be difficult to ensure that the remaining 47% is also covered.
- The state-wise details of the scheme:
 - The states which have reported 100% coverage of eligible households with piped water are Goa, Gujarat, Haryana, and Telangana.
 - Punjab and Himachal Pradesh have coverage of nearly 97%.
 - Apart from the above, only 10 more states have reached 60% coverage.
 - Large and populous states like Uttar Pradesh and Rajasthan have reported only 30% coverage. Madhya Pradesh has covered around 47% of the targeted beneficiaries.

Key benefits of safe drinking water:

- Safe drinking water is an essential non-food factor that positively impacts health and nutrition.
- It also reduces the drudgery faced by women and girl children.
- It will also help in achieving the Sixth Sustainable Development Goal of “availability and sustainable management of water and sanitation for all” by 2030.

Associated Concerns:

- It is suggested that despite having a tap connection, village households depend on their local groundwater resources because of the inadequate quality of supplied tap water.
- According to a sample survey of nearly 3 lakh eligible households (commissioned by the Ministry of Water Resources) only three-fourths reported that water was provided seven days a week. It was also found that on average water was supplied for only three hours a day.
- More than 90% of institutions (Anganwadis and schools) reported access to tap water. However, many of them complained about the high levels of chlorine apart from bacterial contamination.
- It is also found that the current statistics are based on self-reporting and not certified by a third party.
- Some states like Bihar have highlighted that most of their connections were provided through state funds instead of JJM.

Major reasons for the rural-urban divide are:

- It is argued that the disparity between urban and rural areas has grown due to an inherent urban bias among policymakers and institutions.
- Groups in urban areas are able to easily influence institutions like the government in their favour.
- The spillover from markets in urban areas is limited to the rural areas that are closer to urban settlements.
- Thus the rural areas that are far away from the urban core suffer from a lack of development. Furthermore, it also falls behind those rural regions that are closer to urban areas.

Case Study of Tamil Nadu

- Tamil Nadu's progress is better than all other states in the first two quarters of 2022.
- Analysis of JJM in different districts of the state is as follows:
 - In some districts, significant progress was registered. For example, Kanchipuram (100%), Ranipet (98.73%), Kanniyakumari (83.99%), Vellore (80.89%), and Tiruchirappalli (78.55%).
 - Districts like Coimbatore, Thanjavur, and Dindigul districts have also performed well with more than one lakh rural households getting tap water connections.
 - However, in some other districts, the progress was not commensurate with others. For example, Ramanathapuram and Virudhanagar covered only 9% of households in the last three years. In Nagapattinam, it was very low, reaching only 5.97% in three years.
- According to the 2011 census, Tamil Nadu has a total urban population of 48.4%. It is found that districts with low urban populations are lagging behind in the implementation of the JJM.
 - For example among the 10 low-performing districts, 8 have an urban population below 38%.

Way Ahead:

- Instead of aiming for a numerical target, the government should focus on ensuring the quality and consistency of tap water adoption in rural areas.
- Government should prioritize the implementation of the JJM scheme in districts with a high rural population.
 - Moreover, the Centre should also help states with the lowest adoption and largest population, instead of focusing on states that are close to the finishing line.
 - This will help correct the urban bias and meet **Sustainable Development Goal 6 (SDG) 6**: Ensure access to water and sanitation for all
- Apart from data on tap water connections, additional details on the volume of water being supplied per day and its quality would further help in understanding the rate of progress better.

Nut Graf: Jal Jeevan Mission has very well recognized that functional tap water is a basic necessity that must be provided to all households. However, with only one year left to achieve its target, a lot of gaps need to be filled apart from ensuring the quality and consistency of permanent tap water.

5. Transparency in OTT regulation

Syllabus: Government policies and interventions for development in various sectors and issues associated with transparency & accountability

Mains: Issues associated with OTT regulation in India

Context: This article discusses the need for transparency in Over The Top (OTT) regulation.

Introduction:

- The Union government enacted the Information Technology (Guidelines For Intermediaries And Digital Media Ethics Code) Rules, 2021 in February 2021.
- The Rules largely cover OTT platforms and social media. They provide for a grievance redressal mechanism and a code of ethics.
- The Ministry of Information and Broadcasting (I&B) was given the task of regulating content on OTT and online platforms under this rule.

Global Approach:

- The **European Union** has implemented regulations such as the Audiovisual Media Services Directive (AVMSD) which requires OTT services to follow certain rules such as requiring the inclusion of European content in their libraries and allowing parental controls.
- **China** has imposed strict regulations on OTT services, including requiring foreign OTT services to partner with local companies, and subjecting them to content censorship and other regulations.
- In **Singapore**, the Infocomm Media Development Authority is the common regulator for different media. Aside from instituting a statutory framework and promoting industry self-regulation, its approach to media regulation emphasizes on promoting media literacy through public education.
- **India's** approach on OTT regulation can be termed as 'co-regulation' model where there is 'self-regulation' at the industry level and final 'oversight mechanism' at the Ministry level.

Issues with media literacy:

- General public lacks awareness about 2021 OTT rules due to its complexities.
- The rules contain vague and broad definitions of terms such as "offensive content", "good taste and decency", and "harmful". This can lead to confusion and arbitrary enforcement, with platforms potentially over-censoring content to avoid penalties.
- The Rules mandate the display of contact details relating to grievance redressal mechanisms and grievance officers on OTT websites/interface. However, compliance is very low.

- In many cases, either the complaint redressal information is not published or published in a manner that makes it difficult for a user to notice easily. In some cases, the details are not included as part of the OTT app interface.
- There is also a lack of transparency in the appointment of the oversight mechanism, which has been criticized for potentially having a chilling effect on free speech.

Way Forward: Towards Transparency

- The Ministry shall ensure uniformity in the way OTT publishers display key information relating to their obligations, timelines for complaint redressal, contact details of grievance officers for greater media literacy among the general public.
- The OTT industry associations could be mandated to run periodic campaigns in print and electronic media about the grievance redressal mechanism.
- The interpretation of age rating (UA 13+, for example) and the content descriptors (‘violence’, for instance) could be in the respective languages of the video (apart from English) and for a mandatory minimum duration.
- The Rules could also provide for clear guidelines to ensure that a film’s rating is prominent and legible in advertisements and promos of OTT content in print and electronic media.
- A periodic audit of the compliance by each OTT platform may be undertaken by an independent body.
- OTT providers and self-regulatory bodies can upload the details of grievances and redressal decisions on a dedicated website, which will be visible for the public and government authorities. This approach will aid in enhancing transparency.
- Financial penalties on erring entities may also be provided in the rules.

Nut Graf: OTT regulation in India faces numerous issues due to lack of media literacy, vague definitions, and low compliance with displaying contact details. In the present era of media convergence content across platforms must be governed uniformly with an efficacious combination of self-regulation and legal backing.



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DISASTER MANAGEMENT

1. Hill or city, urban planning cannot be an afterthought

Syllabus: Disaster Management and Urban planning.

Mains: Urban planning for hilly regions and flood management.

Background Details:

- A tunnel boring machine in Joshimath (Uttarakhand) accidentally hit an aquifer. As a result, 800 litres of water per second was lost. Such a huge amount of water is sufficient to sustain the daily needs of almost 30 lakh people.
- Gradually, groundwater sources in the region began drying up even as the water flow never stopped. Moreover, Joshimath does not have a robust system to manage water resources and large-scale use of the soak-pit mechanism further increases the chances of land sinking.
- It is argued that the ongoing infrastructure projects (the Tapovan Vishnugad dam and the Helang-Marwari bypass road) would further worsen the situation.

Issues in hilly urban regions:

- The frequency of incidents of land subsidence in hilly urban regions of India is increasing.
- It is estimated that around 12.6% of the land area in the country is prone to landslides, particularly in Sikkim, West Bengal, and Uttarakhand.
- As per the National Institute of Disaster Management and the National Landslide Risk Management Strategy (2019), urban policy is making the situation worse.
- Construction activity in the Himalayas and the Western Ghats bypassing the local geological and environmental factors adds to slope instability. Additionally, tunnel construction further weakens the rock formation.
- Consequently, landslide vulnerability increases exponentially.

Measures for hilly urban regions:

- The first step in improving urban resilience is acquiring credible data.
 - In this regard, the Geological Survey of India has conducted a national mapping exercise with each centimetre denoting 0.5 km.
- The landslide risk should be mapped at the granular level. The urban policymakers should complement it with additional local details.
- Large infrastructure should not be expanded in areas of high landslide risk, the carrying capacity of the region should be adhered to and human interventions should be reduced.
- Any construction activity should be assessed in terms of soil and slope suitability by geologists.

CASE STUDY 1

Aizwal (Mizoram) is built on a steep slope and lies in the 'Seismic Zone V'. An earthquake with a magnitude greater than 7 on the Richter scale can potentially trigger more than 1000 landslides and cause large-scale damages. However, the city has developed a landslide action plan and established City's Landslide Policy Committee. The committee is cross-disciplinary in nature and involves civic societies and students.

CASE STUDY 2

The Amrita Vishwa Vidyapeetham in Gangtok (Sikkim) has helped in setting up a real-time landslide monitoring and early warning system. It assesses the impact of rainfall infiltration, water flow, and slope instability.

Floods:

- There is a rising risk of floods in many regions of the country due to the increasing intensity of seasonal rainfall. Some of the examples of floods in the past few years are Dombivali, Maharashtra (August 2019); Panjim Flood, Goa (July 2021); etc.
- Poor urban planning, lack of concern for natural hazards, and the climate change impact are the major factors behind increasing incidents of urban flooding.
- The UN Intergovernmental Panel on Climate Change (IPCC) report of March 2022 highlighted the risk faced by Kolkata due to the rise in sea levels. In Delhi, 9350 households live in Yamuna floodplains and are vulnerable to floods.

Measures to deal with floods:

- Indian cities should be flood-proofed. Urban planners should avoid filling up water bodies, canals, and drains.
- Sewerage and stormwater drain networks should be improved. Moreover, existing sewerage networks should be reworked and expanded to enable wastewater drainage in low-lying urban geographies.
- Overflowing rivers should be de-silted.
- Expenditure on flood-resilient architecture like river embankments, flood shelters, and flood warning systems should be increased.

- “Blue infra” areas should be protected.
 - “Blue infra” are places that act as natural sponges for absorbing surface runoff, allowing groundwater to be recharged.
- Urban authorities should invest in identifying flooding hotspots and flood risk maps.

Way Ahead:

- Cities should involve environmental planning and expand natural open spaces.
- Urban planning should incorporate the impact of climate change and extreme weather. It should periodically assess and update disaster risk and preparedness.
- A multi-generational process with a disaster management framework in place should be in place in each and every city of the country.

Nut Graf: As the incidents of land subsidence, landslides, and floods are increasing, especially in urban India, it is time to review urban planning. Cities should assess the impacts of climate change and geological factors before taking up any new infrastructure projects.

2. The sophisticated anatomy of heat waves

Syllabus: Disaster and disaster management.

Prelims: About heat waves

Mains: Occurrence of heat waves in India – its causes, factors responsible, impact, and important recommendations

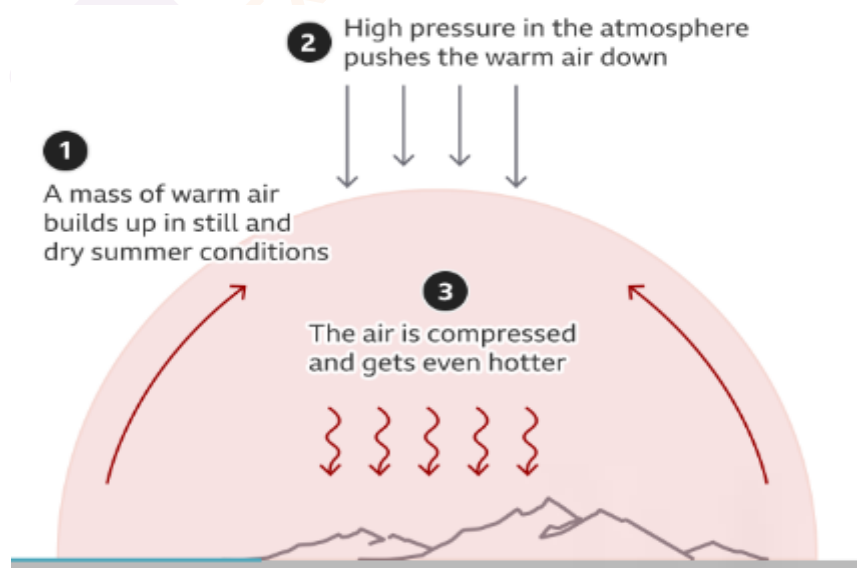
Context:

- The India Meteorological Department (IMD) recently warned that maximum temperatures would be 3-5°C higher than the long-term average over the northwest, west, and central parts of the country.
- Against this backdrop, Delhi recorded its third hottest February day (33.6° C) in more than five decades on 21st of February 2023.

What are heat waves?

- A heatwave is qualitatively a condition of air temperature which becomes fatal to the human body under exposure.
- According to the World Meteorological Organization (WMO) a heatwave refers to five or more consecutive days during which the daily maximum temperature exceeds the average maximum temperature by five degrees Celsius.
- As per the IMD, a region is considered to be experiencing a heat wave if its ambient temperature deviates by at least 4.5-6.4°C from the long-term average.
 - Further, the prevalence of a heat wave can also be confirmed if the maximum temperature crosses 45°C or 37°C at a hill-station).

Occurrence of heat waves



Source: BBC

- Heat waves are formed mainly on account of the warmer air flowing in from other locations or being produced locally.
- Heat wave is basically a phenomenon wherein the air in the local areas is warmed by higher land surface temperature or due to the air sinking down from above is compressed along the way which produces hot air.
- According to a study published in Nature Geoscience in 2023:

- During the spring season in India, the air usually flows in from the west-northwest and since West Asia is warming at a rate faster than other regions in latitudes close to the equator, it acts as a source of the warm air that blows into India.
- Additionally, the air incoming from the northwestern areas flows through the mountains of Afghanistan and Pakistan, and due to the compression that takes place on the leeward side of these mountains, thereby heating up the air entering India.
- Further, the air flowing over the oceans is usually expected to bring in cooler air. However, the Arabian Sea is warming up faster than most other ocean regions which negate the cooling effect.
- Finally, the lapse rate, which is the rate at which temperatures cool from the surface to the upper atmosphere, is declining significantly due to global warming thus producing heat waves.

Other factors that influence heat waves

- The other key factors that influence the formation of heat waves are the age of the air mass and the total distance covered by such air masses.
- The north-northwestern regions in India usually experience heat waves that are formed due to air masses that come from 800-1,600 km away and are around two days old.
 - Heat waves witnessed over peninsular India however arrive from the oceans (around 200-400 km) and are barely a day old. Therefore, the heat waves over southern parts of India are relatively less intense.

Concerns associated with heat waves

- Heat waves are expected to become longer, more intense and frequent over the Indian subcontinent in the coming years and also extend further towards the southern parts of India on account of three consecutive years of La Niña.
- Furthermore, the equatorial Pacific Ocean which experienced an extended phase of La Niña (triple dip La Niña) is gearing up for an El Niño year, in which warmer water spreads west-east across the equatorial Pacific Ocean.
 - Heat waves are expected to be more intense and be confined to the northern and northwestern parts of the country during El Niño years.
- **Health issues:** India faces the largest heat exposure impacts in South Asia.
 - As per available reports, close to 1,40,000 lives have been lost due to extreme weather conditions in India between 1971 and 2019, out of which the loss of 17,362 lives was linked to extreme heat.
- **Impact on livelihood:** India's labour-intensive agriculture and construction work would be significantly impacted due to the heatwaves.
 - As about 33% of South Asia's population depends on outdoor work, heatwaves severely affect the livelihood of the people.
- **Economic consequences:** Worldwide economic losses are expected to reach ₹1.6 lakh crores annually if global warming exceeds 2°C.

Key recommendations:

- The consequences associated and the impact of heat waves depend upon how well we can predict them.
 - Early-warning systems must be equipped to take advantage of the information that we have on the modes of formation, processes involved, location, and age of the air mass which can better the quality of warnings.
- Investments must be made in improving the forecasting skills of human and computational resources in India.
- Along with improving the warning and forecast mechanisms, policymakers must focus on formulating city-wide graded heat action plans in order to safeguard those individuals who are vulnerable to instances of heat waves.
- Furthermore, insurance schemes can help transfer the risks of heatwaves by the industrial, construction and agricultural workers to insurers.
- Water-intensive agriculture in heat wave-prone areas is also not feasible and hence there is a need to promote better agricultural practices.
- The intervening measures of the government to promote climate-resilient policies such as reducing the carbon footprint by adopting renewable sources of energy must speed up its process of implementation to mitigate the harmful consequences of climate change.

Nut graf: In the coming years, the heat waves are expected to become longer and more intense and more frequent over the Indian subcontinent which poses a threat of increased instances of wildfires, drought, and various heat-related illnesses. This looming climate emergency calls for collective actions from the government, academia, earth Sciences and climate change experts.

GEOGRAPHY

1. Lithium Deposits in India

Syllabus: Mineral resources

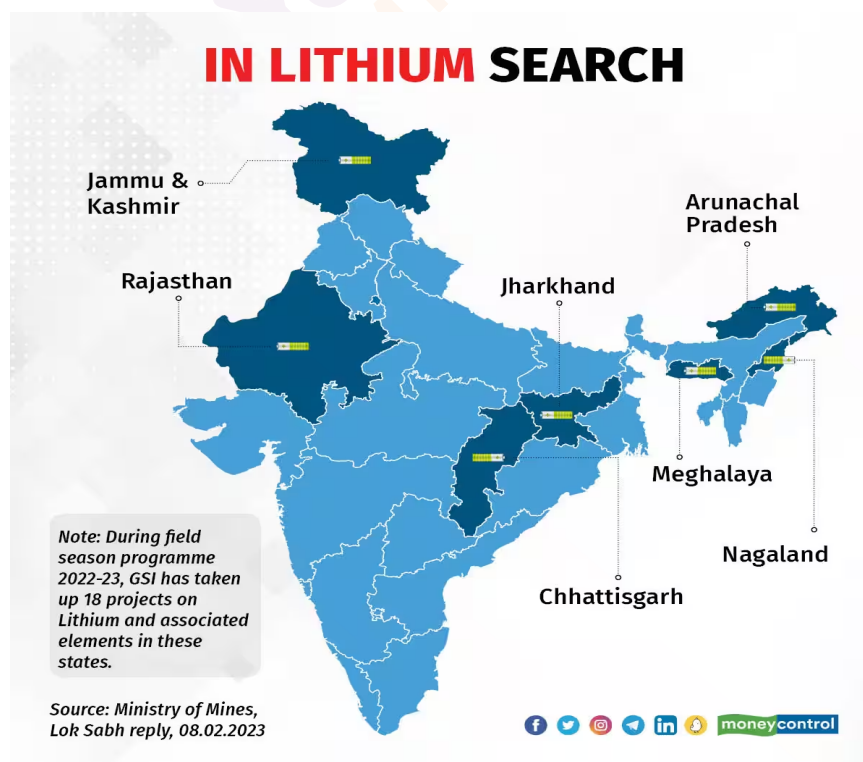
Prelims: Lithium reserves across the world

Mains: Discovery of Lithium reserves in India – significance, geostrategic and socio-environmental, and the way forward

Context: The Geological Survey of India (GSI) has announced that Lithium inferred resources of 5.9 million tonnes have been discovered in the Salal-Haimana area of Reasi district, Jammu & Kashmir.

Lithium:

- Lithium is a non-ferrous, silvery-white alkali metal.
- Under standard conditions, it is the least dense metal and the least dense solid element.
- Like all alkali metals, lithium is highly reactive and flammable, and must be stored in vacuum, inert atmosphere, or inert liquid such as purified kerosene or mineral oil.
- It never occurs freely in nature, but only in (usually ionic) compounds, such as pegmatitic minerals, which were once the main source of lithium.
- Due to its solubility as an ion, it is present in ocean water and is commonly obtained from brines.
- Lithium metal is isolated electrolytically from a mixture of lithium chloride and potassium chloride.
- Lithium can be extracted in different ways, depending on the type of the deposit — generally either through solar evaporation of large brine pools or from hard-rock extraction of the ore.
- In India, Lithium can be recovered from brines of Sambhar and Pachpadra areas in Rajasthan, and Rann of Kutch, Gujarat.
 - The major mica belts are located in Rajasthan, Bihar and Andhra Pradesh, the pegmatite belts in Odisha, Chhattisgarh, alongside rock mining being undertaken at Mandya, Karnataka, are other potential geological domains.
 - The Atomic Minerals Directorate for Exploration and Research (AMD) under the Department of Atomic Energy, had earlier conducted preliminary surveys that had shown the presence of lithium resources of 1,600 tonnes in the igneous rocks of the Marlagalla–Allapatna region of Karnataka's Mandya district.



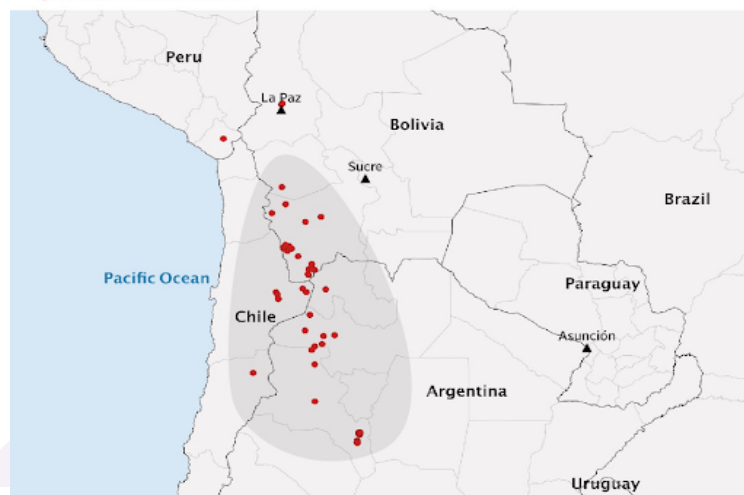
Significance of Lithium Discovery in India:

- Lithium is one of the most important components for manufacturing Lithium-ion batteries which are extensively used in wind turbines, solar panels, and electric vehicles, all of which are critical for the green economy.
- As per the World Bank, the demand for critical metals like lithium (Li) and cobalt is expected to increase by almost 500% by 2050.
- Further, the global electric vehicle market is estimated to cross the \$823.75 billion mark by 2030, achieving a compounded annual growth rate (CAGR) of 18.2% from 2021 to 2030. India's market is also estimated to achieve a CAGR of 23.76% by 2028.
 - In this context, the discovery of lithium would help India secure its critical mineral supplies and ensure self-sufficiency in this sector.
- At present, India imports all of its lithium from Australia and Argentina and about 70% of its Li-ion cells from China and Hong Kong.
 - Lithium resources are concentrated in a few places. Around 50 percent of the world's lithium deposits are found in the salt flats of Argentina, Bolivia, and Chile. Australia also has around 2.7 million tonnes of lithium resources.
 - The discovery of lithium reserves in India provides a much-needed boost to the domestic battery-manufacturing industry and plays a crucial role in import substitution.
- China controls 60% of the world's capacity for processing raw lithium products into batteries.
 - It is critical as India is trying to wean itself off dependence on China for crucial battery materials and position itself as an alternative in the electric vehicle supply chain.
- Additionally, domestic lithium reserves will help provide momentum to the Government's ambitious plan of 30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three-wheelers by 2030 for the automobile industry and help strengthen India's National Mission on Transformative Mobility and Battery Storage.

The Lithium Triangle

53% of the world's lithium ore reserves are located in a geographical area that encompasses northern Argentina, northern Chile and southern Bolivia.

● Proven deposit of lithium ore



Source: IADB

Steps taken by the Indian government to secure access to Lithium reserves:

- The government has directed three state-owned mineral companies (National Aluminium Company (Nalco), Hindustan Copper (HCL) and Mineral Exploration Corp. Ltd (MECL)) to team up for a new venture tasked with scouting and acquiring strategic mineral assets abroad.
- Khanij Bidesh India Ltd., (KABIL), a consortium of three PSU companies mentioned above is also prospecting to secure minerals from Argentina and Chile.
- Also, high-level visits like the President of India visiting these South American countries demonstrate a proactive and aggressive stance to secure lithium sourcing.
- India has leveraged its way into the Bolivian lithium reserves after signing a Memorandum of Understanding (MoU) in Bolivia for the development and industrial use of lithium.
- India has set up a National Mission on Transformative Mobility and Battery Storage.
- An inter-ministerial steering committee has also been set up which is chaired by NITI Aayog CEO Amitabh Kant.
- The government set up R & D and technology development centres for indigenous lithium-ion battery manufacturing plants: BHEL and LIBCOIN to build India's first Lithium-Ion Giga Factory.
- In the first phase, Rs 165 crore will be invested to produce li-ion cells having a total storage capacity of 200,000 Ah (Ampere hour) per day.

Geostrategic concerns

- Dependencies on critical mineral resources are still a major geostrategic concern in the transition to net-zero carbon energy systems.
- A high level of reliance on China for lithium and other critical resources poses significant energy security risks.
- To overcome Chinese dominance in the industry, countries such as the U.S., Canada, India, and the EU countries are undertaking efforts to leverage alternative supplies that can challenge China's geopolitical dominance.
- The increasing geopolitical tensions with China in the wake of escalations in territorial disputes make it much more important for India to act immediately in this regard.
 - In order to dilute its dependence on China, the Indian government and domestic industries are trying to push for a "Rare Earths Mission" which helps in exploiting critical mineral reserves in the country.
- However, the new discovery of lithium reserves in India comes with geostrategic implications considering the geopolitical sensitivity of its location.
 - The J&K region has historically been a site of cross-border tensions between India and Pakistan. The region has also been affected due to domestic insurgency and terrorism.
 - Further, there are concerns about the risk of a socio-environmental conflict if the local populations are not engaged in the lithium extraction project.

Environmental consequences

- The viability of applications of lithium in renewable energy infrastructure has often been debated as concerns have been raised over its environmental consequences.
- The extraction of lithium from hard rock mines involves open-pit-mining followed by the roasting of the ore using fossil fuels.
 - According to experts, this process requires over 170 cubic metres of water and releases nearly 15 tonnes of carbon-di-oxide for every tonne of lithium extracted.
- Furthermore, the disposal of waste generated in processes of open-pit mining and refining degrades the environment.
 - Such wastes contaminate waterways and groundwater, degrade biodiversity, and release significant amounts of air pollutants.
- Also in the geological context, there is a huge difference in mining in J&K from mining in Australia (which has the largest lithium stock in hard rock mines).
 - In Australia, lithium-bearing pegmatite deposits are found in the ancient geological regions of the Pilbara and Yilgarn cratons, whose continental rocks have been stable for over a billion years.
 - However, the lithium reserves found in the Himalayan region which is one of the youngest mountain ranges in the world are very unstable.

Case study: Lithium mining in South America

- In South American countries such as Bolivia and Chile, 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 2019, policymakers in Chile approved a \$25-million compliance plan for lithium miner SQM which was charged with overdrawing lithium-rich brine from the Salar de Atacama salt flat.
 - In 2022, Chilean authorities approved an updated compliance plan worth \$52 million and proposed that the lithium miner should work with both the regulator as well as local communities to address environmental infractions.
- Furthermore, the indigenous resistance and increased awareness of the environmental consequences of lithium mining have forced automobile manufacturers such as Mercedes-Benz and Volkswagen to look for lithium mined with the lowest socio-ecological impact.
- These case studies show that strong regulatory apparatus is required to address the environmental and social consequences associated with lithium mining.
- It is important for India to learn from such experiences in the South American countries, especially the "lithium triangle" which consists of Bolivia, Chile, and Argentina.
 - The Lithium triangle accounts for close to 50% of the world's known Lithium.

Safeguarding the local interests

- Acknowledging the importance of involving local communities in mining as well as protecting the local interest, the Lok Sabha in 2015 amended the **Mines and Minerals (Development and Regulation) Act 1957** and introduced provisions to set up the **District Mineral Foundation (DMF)**.
 - The DMF is a non-profit statutory trust set up in every district of the country which is affected by mining-related operations.
 - DMF is mandated to work for the interest and benefit of persons, and areas affected by mining-related operations.
- Officials of the State government in J&K have announced that plans are underway for involving local communities who will be prioritised for jobs in exploration and mine development.
 - However, critics still believe that providing employment opportunities in the mining sector may not fully negate the consequences of mining on local agriculture, animal husbandry, and tourism sectors.

Nut graf: The domestic exploration and extraction of lithium are of extreme geostrategic significance. However, it is equally important to ensure that the extraction of resources is done in the public interest and there are no serious environmental and social problems as the socio-environmental effects of mining can be extreme in densely populated countries such as India.

2. Turkey-Syria earthquake

Syllabus: Important geophysical phenomena like earthquakes.

Mains: Earthquake.

Prelims: Earthquake in Turkey and Syria.

Context: Earthquakes in Turkey and Syria on February 6, 2023.

Details:

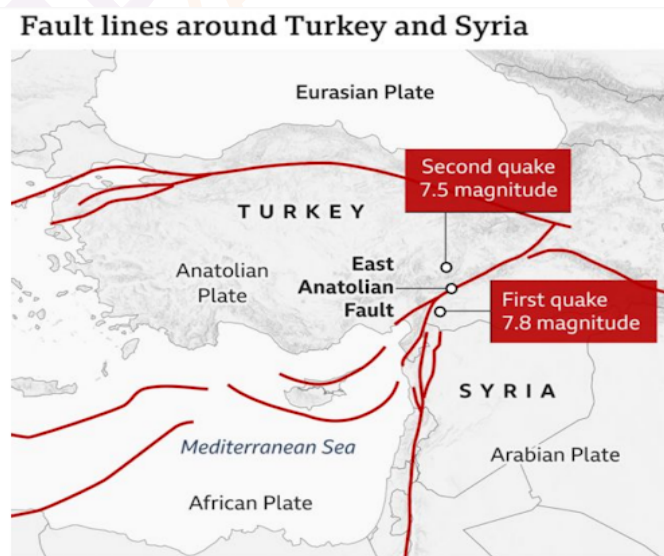
- Turkey and Syria were hit by two large earthquakes of magnitude 7.8 and 7.5. More than 17000 lives were lost.
- It was further followed by nearly 200 aftershocks, even registering an earthquake of magnitude 6, three days after the first incident.

Earthquakes:

- Earthquakes are caused when energy is released along the faultlines of constantly moving tectonic plates.
- An imbalance in pressure causes rocks on either side of the fault to re-adjust and release energy.
- The released energy travels as waves that cause the ground to shake.
- The point where the energy is released is called the focus of an earthquake or hypocentre.
- The point on the surface of the earth which is vertically above the focus is called the epicentre. It is the first place to experience the waves.
- All earthquakes are different in their intensity and magnitude. The instrument for the measurement of vibrations is known as Seismograph.
- Richter scale is used to measure the magnitude of the earthquake (expressed in absolute numbers of 0-10).
- The Mercalli scale is used to measure the intensity of an earthquake (expressed in the range of 1-12).
- Scientists can deduce the latent pressure building along a fault on the basis of “slip” or “strain” that accumulates every year. However, predicting the day of the incident is beyond knowledge.

Earthquake in Turkey and Syria:

- Notably, Turkey and Syria lie at the confluence of three tectonic plates viz. the Arabian Plate, the Anatolian Plate, and the Eurasian Plate. This makes it an extremely seismically active zone.
- A major part of Turkey is on the Anatolian Plate between two major faults namely the North Anatolian Fault and the East Anatolian Fault.



Source: BBC

- It is observed that the Arabian Plate is inching north into Europe further causing the Anatolian Plate to be pushed towards the west.
- As per the geologists, the earthquakes in the region are from “strike-slip fault”.
- The fault system in the region runs along around 190 km. This is the reason for such a far-ranging impact in the region of the earthquake that occurred on 6th February 2023.

- Another earthquake (7.5 magnitude) occurred on an adjacent fault system called the Sürgü Fault.
- The huge magnitudes of the two earthquakes (7.8 and 7.5) suggest several aftershocks will be registered in a wide radius. Shocks have also been experienced in Cairo (950 km away) and Istanbul (815 km away).
- It is highlighted by an expert that in the Turkey-Syria earthquakes, energy from nearly 300 years of accumulated strain was released.

Earthquakes in India:

- The earthquakes in the Himalayan region of India are due to reverse faults. It is due to compressive forces generated due to the collision of Indian and Eurasian plates.
- Scientists have warned of a massive, overdue earthquake in the Garhwal-Kumaon range of India.

Earthquake preparedness across the world

- Chile has a long history of devastating earthquakes, with magnitudes even above 9 is considered to be the best model for earthquake preparedness.
 - The casualties were minimal in the country in 2014 and 2015 (magnitudes above 8) as they strictly follow building codes.
- Japan is also known for earthquake-proofing its structures. For instance, the 9-magnitude earthquake that caused a tsunami and a radiation leak in the nuclear power plant in Japan's Fukushima prefecture in 2011, could not damage the stability of the structures.
- A lack of enforcement of building codes and inadequate earthquake-proofing in Turkey and Latur, India (1993) are majorly responsible for large-scale death and devastation.

Nut Graf: *The earthquake in Turkey and Syria has resulted in large-scale deaths and devastation. It is highlighted that the region lies at the confluence of three tectonic plates (the Arabian Plate, the Anatolian Plate, and the Eurasian Plate). It is recommended that such tectonically sensitive regions should be well-prepared through measures like strict building codes and earthquake proofing.*

3. Earth's inner core spinning has slowed down

Syllabus: Physical geography

Prelims: Interior of earth

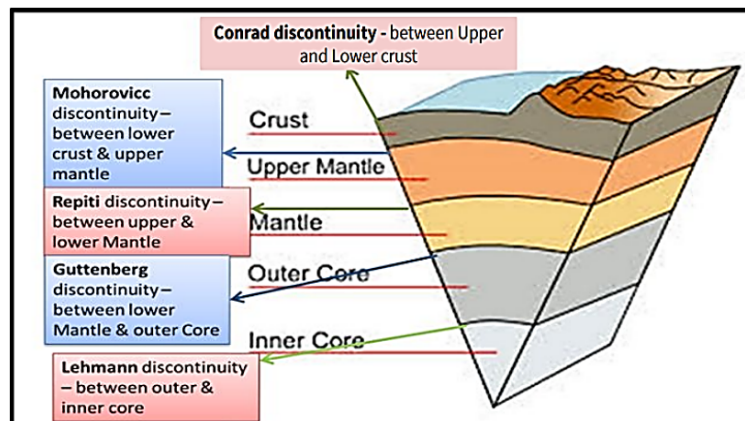
Context: According to new research, the Earth's inner core has stopped spinning faster than its surface and may now be rotating slower.

About the research:

- **Methodology:**
 - The study looked at seismic waves from repeated earthquakes over the last six decades.
 - They could estimate the rotation of the inner core, which is thought to move independently of the mantle and the rest of the planet, by analysing changes in the time and propagation of these signals.
- **Findings:**
 - In the early 1970s, the inner core began rotating slightly faster than the rest of the planet. However, it had been slowing down before synchronising with Earth's rotation around 2009.
 - A "negative trend" has occurred, indicating that the inner core is now rotating slower than the surface. The next shift could occur in the mid-2040s.
 - The findings appear to indicate that the Earth's inner core's rotational speed changes every 60-70 years on average.
- **Significance:**
 - The study may inspire some scientists to develop and test models that treat the entire Earth as an integrated dynamic system.
 - The slowing could affect how quickly the entire planet spins, as well as how the core evolves over time.

What are the Three Layers of Earth?

- **The crust** is the earth's outermost layer and is composed primarily of solid rock, primarily basalt and granite.
- **Mantle:** The mantle is located beneath the crust and can be up to 2900 km thick. It is made up of hot, dense solid rock that is rich in iron and magnesium.
- **Core:** The core of the earth is made up of two parts, the liquid outer core and the solid inner core. Nickel, iron, and molten rock make up the outer core.



How is the Earth's Inner Core?

- **About:**
 - It is the Earth's deepest layer. It's a massive hot iron ball the size of Pluto.
 - The inner core is solid because of the pressure exerted on it by the Earth's other top layers.
 - It differs from the outer core, which is liquid.
 - The inner core, which is about 5,000 kilometres (3,100 miles) below the surface we live on, can spin independently because it floats in the liquid metal outer core.
- **Radius:**
 - The inner core has a radius of 1220 km on average.
 - The boundary between the inner and outer cores is approximately 5150 km below the Earth's surface.
 - The Lehman Seismic Discontinuity is the name given to this boundary.
- **Temperature:**
 - Between 7,200 and 8,500°F (4,000 and 4,700°C).
- **Properties:**
 - Its thermal and electrical conductivity are expected to be extremely high

4. Eastern Rajasthan Canal Project (ERCP)

Syllabus: Water resources

Prelims: About Eastern Rajasthan Canal Project (ERCP)

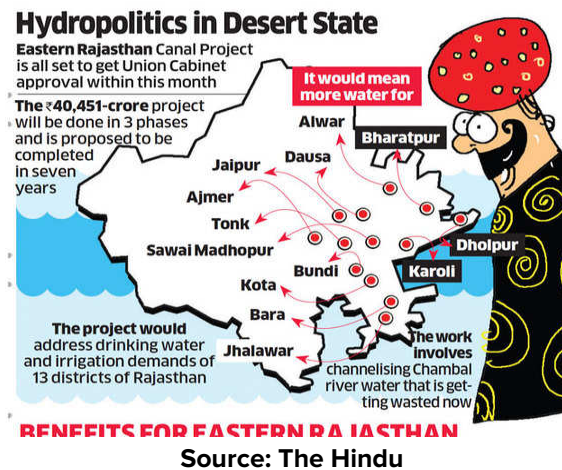
Mains: The interlinking of rivers as a solution to inter-related problems of droughts, floods, and interrupted navigation.

Context: Madhya Pradesh government has approached the Supreme Court seeking a stay on the Eastern Rajasthan Canal Project's (ERCP) execution.

Introduction:

- The state government of Madhya Pradesh has approached the Supreme Court seeking a stay on the project's execution.
- Rajasthan has also been demanding the national project status for ERCP.
 - The national project status will fix the share of the Centre and the State in the expenditure in the ratio of 90:10 for the project, the cost of which has been estimated at ₹37,200 crore.
- The Supreme Court has issued notices to the Union Jal Shakti Ministry and the Environment Ministry, the Central Water Commission (CWC) and the Rajasthan and Uttar Pradesh governments in the case.
- Madhya Pradesh has also sought a stay on the construction of the Navnera barrage on the Kali Sindh river in the Kota district, Rajasthan.

Eastern Rajasthan Canal Project:



- The ERCP is a large-scale irrigation project aimed at providing irrigation water to the arid regions of eastern Rajasthan. The project involves the construction of a canal system that will draw water from the Chambal River and its tributaries and distribute it to the fields in the region.
- The project was first conceived in the 1950s and work on it began in the 1960s.
- The project covers an area of about 2 million hectares interlinking the rivers Parvati, Kali Sindh and Chambal.
- It has the potential to transform the region's agricultural landscape and improve the livelihoods of millions of people in the area.
- However, critics have raised concerns about the environmental impact of the project, including the displacement of local communities, loss of forests and wildlife habitats, and the depletion of groundwater resources.
- There have also been concerns about the project's cost-effectiveness and sustainability, given the high cost of maintaining the canal system and the uncertain water supply in the region.

Madhya Pradesh v/s Rajasthan:

- Madhya Pradesh has raised objections in view of the Chambal river flowing 376 km in that State.
- However, the Rajasthan government has maintained that any of the two States could use water from its catchment area as well as 10% of the water received from the other after an agreement reached by the Inter-State Water Control Board in 2005.
- According to the state Water Resources Department, Rajasthan, the largest state of India with a geographical area of 342.52 lakh hectares which amount to 10.4 percent of the entire country, holds only 1.16 per cent of India's surface water and 1.72 percent of groundwater.
- Among the state's water bodies, only the Chambal river basin has surplus water but this water cannot be tapped directly because the area around the Kota barrage is designated as a crocodile sanctuary.
 - As per CWC data for 36 years, an average of 19,000 million cubic metres of water is wasted every year in Chambal and flows into the sea.
 - The ERCP requires only 3,500 MCM of water to meet the drinking and irrigation needs of the people of Rajasthan.
- Madhya Pradesh has itself built the Mohanpura dam on the Newaj river, a tributary of the Parvati river, and the Kundalia dam on the Kali Sindh river which irrigates 2.65-lakh hectares of area in that State.

Nut Graf: The Supreme Court has issued notices to concerned parties after the Madhya Pradesh government seeks a stay on the execution of the ERCP, which aims to provide irrigation water to arid regions of Rajasthan and positively influence the socio-economic conditions of the people.

5. Upper Bhadra project

Syllabus: Water resources

Prelims: About Upper Bhadra Project and Tungabhadra River

Context: The Finance Minister recently announced a Rs.5300 crores grant for the Upper Bhadra Irrigation Project.

About Upper Bhadra Project:

- It is a major lift irrigation Scheme under implementation in the central region of Karnataka State.
- Micro irrigation will be used to irrigate an area of 2,25,515 hectares in the drought-prone districts of Chikkamagalur, Chitradurga, Tumkur, and Davangere.
- It plans to lift up to 17.40 TMC of water in the first stage from the Tunga river to the existing Bhadra reservoir, and 29.90 TMC in the second stage from the Bhadra reservoir to the Tunnel near Ajjampura in the Krishna basin's Tungabhadra sub-basin.

● Objectives of the project:

- To provide a long-term irrigation system during the kharif season.
- It also proposes to recharge ground water tables and provide drinking water in drought-prone taluks by filling 367 tanks with six tmcft of water.
- The “Upper Bhadra Project” was designated a **national project** by the Central Government in 2022.

Tungabhadra River:

- It is a sacred river that flows through the southern Indian states of **Karnataka, Andhra Pradesh, and Telengana.**
- The river's original name was Pampa.
- It is formed by the meeting of two rivers, the Tunga and the Bhadra.
- The Tunga and Bhadra rivers both originate on the **eastern slopes of the Western Ghats.**
- The Tungabhadra River flows east, joining the Krishna River before draining into the Bay of Bengal.
- The temple of **Sangameshwaram** is situated at the confluence of the **Tungabhadra and Krishna rivers.**
- ‘Hampi,’ the historic city, is located on the banks of the Tungabhadra River.
- **Tunga, Kumudvati, Varada, Bhadra, Vedavathi, and Handri** are the major tributaries.

National Project Status:

- The following are the eligibility criteria for inclusion of a project under this Ministry's National Projects (NP) scheme:
 - International projects where the use of water in India is required by a treaty or where planning and early completion of the project is required in the national interest.
 - Inter-State projects that are stalled due to non-resolution of inter-State issues such as cost sharing, rehabilitation, aspects of power production, and so on, including river interlinking projects. **Or**
 - Intra-state projects with additional irrigation potential of more than two lakh hectares, no water-sharing disputes, and established hydrology. **Or**
 - Extension, renovation, and modernization (ERM) projects involving the extension/restoration of 2 lakh hectares of irrigation potential.
- However, mere eligibility does not entitle a project to inclusion in the NP scheme.
- Inclusion is also subject to approval by the Advisory Committee on Irrigation, Flood Control, and Multipurpose Projects of DoWR, RD&GR in accordance with the established procedure, investment clearance, recommendations by the High Powered Steering Committee, availability of funds, and government priorities at the time, among other things.
- Only the balance works component of the project pertaining to irrigation and drinking water receives central assistance in the form of a grant under the NP scheme.

Funding Pattern:

- Projects in 8 North-Eastern, 2 Himalayan States (Himachal Pradesh and Uttarakhand) and Union Territories of Jammu & Kashmir and Ladakh – 90 (Centre) : 10 (State)
- Projects in other states – 60 (Centre) : 40 (State)

6. Antarctica Thwaites Glaciers

Syllabus: Salient features of the world's physical geography.

Prelims: About Doomsday Glacier

Mains: Causes and implications of glacier melting

Context: According to the new research, even small amounts of melting can potentially push Thwaites glacier further along the path to extinction.

About Doomsday Glacier:

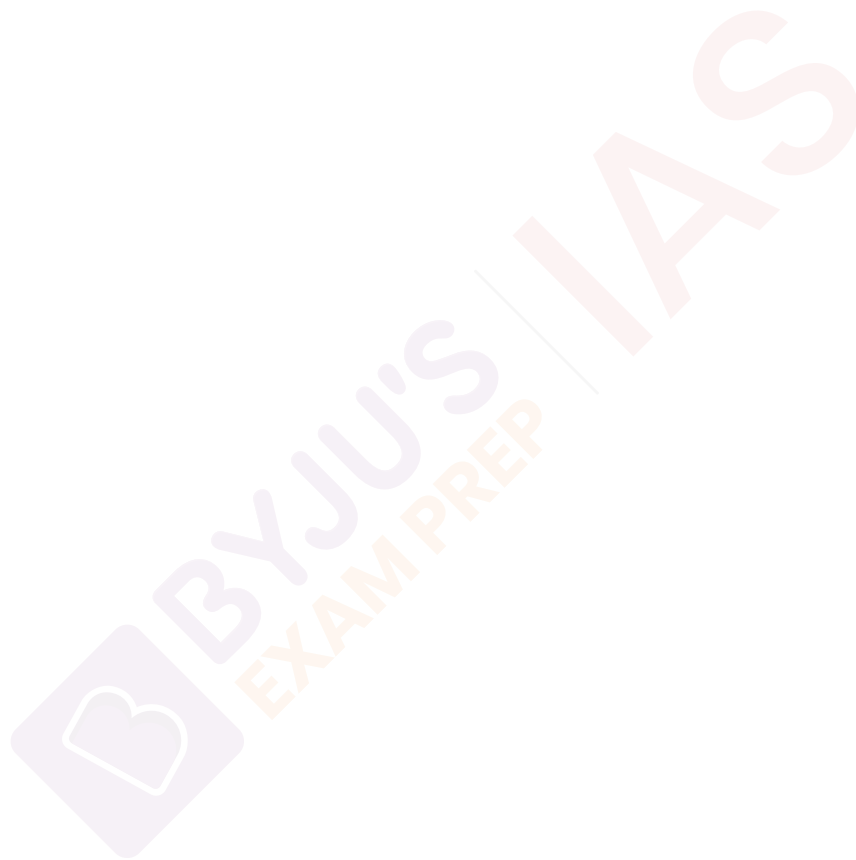
- The Thwaites Glacier is 120 km wide at its widest point, fast-moving, and melting rapidly over time.
- It contains enough water to raise the global sea level by more than half a metre due to its size (1.9 lakh square kilometres).
- According to studies, the amount of ice flowing out of it has nearly doubled in the last 30 years.
- Each year, Thwaites' melting contributes 4% to global sea-level rise. It is predicted that it will sink into the sea in 200-900 years.
- Thwaites is important for Antarctica because it prevents ice from flowing freely into the ocean behind it. Thwaites is known as the Doomsday Glacier because of the dangers it faces and poses.

How is Thwaites glacier melting?

- Thwaites Glacier is melting as a result of warming ocean currents and the thinning of the ice shelf that serves as a barrier between the glacier and the ocean.
- The melting is thought to be caused by an influx of relatively warm bottom water drawn in from the larger ocean.
- It was losing slightly more than 10 billion tonnes of ice per year in the 1990s. It is now closer to 80 billion tonnes.

Why is this glacier so important?

- Thwaites is nearly the size of Great Britain, flowing off the west coast of the Antarctic continent.
 - It is one of Antarctica's largest and most important glaciers, serving as a gateway to a vast area of the continent.
- It's a **magnificent sight**, with its buoyant front, or "ice shelf," pushing far out to sea and launching massive icebergs.
 - However, satellite data show that this **glacier is melting at a rapid pace**.
- **Sea level rise:** Thwaites glacier ice loss contributes about 4% of the annual rise in global sea levels, with the potential to add 65cm if the entire glacier collapses.
 - Its melting could also destabilise the entire West Antarctic Ice Sheet, causing sea levels to rise even further.



INDIAN SOCIETY & SOCIAL ISSUES

1. Dawoodi Bohra Practice

Syllabus: Diversity of India and developmental issues

Prelims: Doctrine of essential practices

Mains: Judiciary on essential religious practice doctrine

Context: Larger Bench to hear plea against Dawoodi Bohra practice.

Background:

- A Constitution Bench of the Supreme Court referred to a larger Bench of nine judges a series of petitions challenging the authority of Dawoodi Bohra community leaders to excommunicate their members.
 - Excommunication refers to the act of excluding or expelling from membership or participation in any group, association, or religious institution.
- The five-judge Bench led by Justice Sanjay Kishan Kaul was dealing with the question of whether the practice of excommunication in the Dawoodi Bohra community could continue as a “protected practice” despite the introduction of the **Maharashtra Protection of People from Social Boycott (Prevention, Prohibition and Redressal) Act of 2016**.
- The reference to the five-judge Bench led by Justice Kaul was based on a 1962 judgement in the **Sardar Syedna Taher Saifuddin vs The State Of Bombay case**.
- Based on the **doctrine of essential practices**, the Supreme Court through a 4:1 judiciary struck down the law that prohibited excommunications made by the Dai of the Dawoodi Bohra community.
- The Court had held that the religious faith and tenets of the Dawoodi Bohra community gave its religious heads the power of excommunication as part of their “management of religious affairs” under **Article 26(b)** of the Constitution.
 - **Article 26(b)** of the Constitution grants the freedom to manage religious affairs Subject to public order, morality and health, every religious denomination or any section thereof shall have the right to manage its own affairs in matters of religion.

Maharashtra Protection of People from Social Boycott (Prevention, Prohibition and Redressal) Act of 2016:

- The Maharashtra State legislature unanimously passed the prohibition of social boycott bill (Maharashtra Protection of People from Social Boycott (Prevention, Prohibition and Redressal) Act of 2016.
- The Act disallows social boycott of any individual or groups by caste panchayats or groups of individuals.
- The key objective of the Act is to take legal measures to root out oppression in the name of traditions, caste and religion.
- It has made boycott a criminal offence, bailable offence which can attract imprisonment up to 7 years and a fine of Rs 5 Lakh or both
- To ensure time-bound results, the Act has indicated speedy trial within six months of filing charge sheet
- To ensure monitoring, social boycott prohibition officers will be recruited to detect offences and assist the magistrate and police officers in tackling cases.

Doctrine of essential practices:

- The doctrine of “essentiality” was invented by a seven-judge Bench of the Supreme Court in the **‘Shirur Mutt’ case** in 1954.
- The court held that the term “religion” will cover all rituals and practices “integral” to a religion, and took upon itself the responsibility of determining the essential and non-essential practices of a religion.
- The essential religious practice test is a contentious doctrine evolved by the court to protect only such religious practices which were essential and integral to the religion.
- The essential practices doctrine owes its existence to a speech made by B.R. Ambedkar in the Constituent Assembly.
- Ambedkar was striving to distinguish the religious from the secular, by arguing that the state should be allowed to intervene in matters that are connected to religion but are not intrinsically religious.

Reconsideration of the judgement:

- The Supreme Court agreed that it merited reconsideration, for at least two reasons.
- First, the original ruling had failed to examine whether the rights of religious denominations ought to be balanced with other fundamental rights, particularly the rights of its individual members to be treated with equal care and dignity.
 - A person who had been excommunicated would be disintegrated from using the communal mosque and burial ground, and would practically be regarded as an outcast.
- Second, since the 1962 judgement, The law in India has developed to the point where any act of excommunication must pass muster with constitutional morality.
- In referring Sardar Syedna to a larger Bench, Justice Oka makes clear that morality today must be understood to mean “constitutional morality”. The essential principles that uphold the Constitution, such as those of liberty, equality, and fraternity, must be incorporated into it.
 - Therefore, the effect and consequences on the person excommunicated needs to be considered in the context of justiciable constitutional rights.

Group Right v/s Individual Freedom in India:

- Because of the close relationship between religion and society, which is particularly pronounced in India, denominational rights usually clash with both general laws and the personal freedoms of group members.
- The Supreme Court, in the Shirur Mutt case, 1954 held that it was only those aspects of religion which are “essential” to faith that deserve constitutional protection.
 - ‘Essential practices’ would depend on what devotees to the faith deem as integral to that religion.
- Later the Court, through a series of rulings, assumed theological authority and interpreted religious scriptures to determine which practices were, in fact, central to faith and deserve constitutional protection.
 - However, this approach undermined the elementary rationale behind the guarantee of religious freedom: that members of religious groups must enjoy an ethical autonomy to determine for themselves how best to lead their lives.
- A law that favours autonomy of the group over the autonomy of the individual will have the harmful effect of favouring the view of the association proffered by the powerful over the views proffered by less powerful members of the group that is, traditionally subordinate members such as women, children, and sexual minorities.
- The fundamental principles of the Constitution will be undermined if the authority granted to groups over religious affairs is prioritised over the rights provided to individual members.

Who are the Dawoodi Bohras?

- The Dawoodi Bohras are Shia Muslims whose leader is known as the Al-Dai-Al-Mutlaq. According to members of the community, there are around 1 million Dawoodi Bohras spread around the world.
- For over 400 years, the leader of the community has been based in India, including the current and 53rd leader, His Holiness Dr Syedna Mufaddal Saifuddin.
- The leader of the community is recognised by the members as having the right to excommunicate its members. The practice was claimed to be essential to the Dawoodi Bohra faith.
 - In practical terms, excommunication means not being allowed to access a mosque belonging to the community or a burial dedicated to the community.
- Among the members of the community who have faced excommunication in the past are those who contested the headship of the leaders.

Nut Graf: A Constitution Bench of the Supreme Court referred a series of petitions to a larger Bench of nine judges to consider the broad issues on the interpretation of Articles 25 and 26 and the issue of challenging the constitutionality of the practice of excommunication of Dawoodi Bohra members by its community leaders.

2. India needs a Budget for its young

Syllabus: Population and associated issues

Mains: Provisions in the budget for the young population.

Prelims: Budget 2023-24.

Context: Budget 2023-24.

Details:

- India accounted for 20.6% of the global population of 15 to 29-year-olds in the year 2020.
- This implies that in the coming years, one out of every five workers in the world could be an Indian.

Demographic Dividend

- As per the United Nations Population Fund (UNFPA), the demographic dividend is the economic growth potential resulting out of changing population age structure with a large section of people in the working-age group of 15 years to 64 years as compared to the non-working age population of below 14 years and above 65 years.
- It is basically the potential for economic gains when the share of the working-age population (15 years – 64 years) is higher than the non-working age group.
- Demographic dividend occurs when the proportion of working people in the total population is high because this indicates that more people have the potential to be productive and contribute to growth of the economy.
- **Demographic Dividend – Causes:**
 - Falling birth rate
 - Lower fertility rate
 - Increased longevity
- Falling birth rate and lower fertility rate will contribute to a reduction in expenditure, increased longevity will lead to an increase in the size of the working-age population.

Key Proposals in Budget 2023-24:

- There is a considerable increase in capital expenditure. It is expected to be 3.2 lakh crore higher than the revised estimate of 2022-23.
- The government's expenditure will fall for various social sector schemes and subsidies. For instance, food subsidies will reduce by ₹0.9 trillion, fertilizer subsidies by ₹0.5 trillion, and Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) by ₹0.3 trillion.
- There are marginal increases in the budget allocations for health, education, agriculture, and the Angwandi scheme.

Associated concerns:

- An increase in capital expenditure is important to reinvigorate the economy. Investment as a proportion of income or GDP rose constantly during the mid-2000s and peaked at 42% in 2007 (even better than China).
- It further increased the economic growth in India which lasted till early 2010.
- However, the global financial crisis in 2007-08 had been a turning point. On one hand, China increased its domestic investment whereas India restrained its expenditures (due to fear of the rising fiscal deficits).
- As a result, public expenditures nosedived and private investors lost confidence. Investment as a proportion of GDP fell from 33.8% in 2013-14 to 27.3% in 2020-21.
- Though subsidies and social sector spending are considered to be 'wasteful' for economic growth, the reduction in these segments worsens the existing social inequalities and dampens the long-term growth prospects.
- There are serious issues of unaffordable education (both basic and higher education), and lack of employment opportunities. For example, in 2022, only 2.6% of the around 1.9 million appeared candidates for the National Eligibility cum Entrance Test (NEET) could secure admission to a government college.
- Apprehensions about the fiscal deficit and government debt can be counterproductive for a country like India which possesses huge reserves of untapped human resources.
 - It should be noted that only 4.2% of GDP in 2022 is owed to external agencies.
 - Moreover, it is largely held by domestic financial institutions like public sector banks, insurance companies, and provident funds.

Way Ahead:

- Notably, public expenditures on the social sectors are an investment for the future, particularly for the young population. For instance, the income a woman receives through MGNREGA can ensure education and nutrition for her children.
- Increased government expenditure on sectors like health and education can provide a boost to both the supply and the demand fronts in a knowledge-driven economy.
- Increased government borrowing to strengthen human resources that generate new jobs and incomes would set off a virtuous cycle. For instance, higher incomes and higher levels of development will also lead to fresh savings that will help to pay off debts.

Conclusion: The share of the population aged 30 years and above in India will rise to 58.6% in 2040 (from 37.5% in 2000). It is important to increase government expenditures to provide food security, health, and education as it will inspire millions of India's youngsters to grow into bright stars that illuminate the world.

Nut Graf: India is currently in a demographic sweet spot, with a large share of the young population. The government should make use of this opportunity and increase its public spending on sectors like education and health to build a strong army of scientists, engineers, and nurses to fulfil its global ambitions.

3. Irula tribe

Syllabus: Diversity of India

Prelims: Facts about Irula Tribe

Context: Vadivel Gopal and Masi Sadaiyan of the Irula community recently received Padma Shri at a civil investiture ceremony at Rashtrapati Bhavan.

Irula Snake Catchers' Industrial Cooperative Society:

- In 1978, Romulus Whitaker (wildlife conservationist) established a venom centre in the form of a cooperative society with the help of a group of Irulas people.
 - His vision was to turn Irula's traditional skills into sustainable employment-generating opportunities for the community through a cooperative society.
- The cooperative started with 11 Irulas members, and now has 350 members, including 160 women.
- Irulas people know the places where snakes hide, from experience and instinct and can find snakes by their track, smell and droppings.
 - They treat snake bites with pachai elai marundhu, a herbal medicine, and avoid going to the hospital in most cases.

Society's working model:

- People from the Irulas community capture snakes from farmland, scrub forests, houses and lakes and bring them to society. The snakes are weighed, measured and checked for injuries by the cooperative members.
- Only snakes that pass the health check are used for venom extraction. Venom extraction exercises are done once a week, and after 28 days the snakes are released back into forests.
- After the extraction, the venom is then powdered and stored at a specific temperature to be sold to pharmaceutical companies.
- The society members are allowed by the government to catch snakes only between August and March.

About Irula tribe:

- Irula tribe is a Dravidian ethnic group settling in the state of Tamil Nadu, Kerala and Karnataka. In the Tamil language, the Irula means "people of darkness." This could refer to their dark-coloured skin or since all important events of the tribe traditionally took place in the darkness/night.
- A study conducted by Yelmen et al (2019) found that the Irula people were the closest likely proxy for the indigenous Ancient Ancestral South Indian, one of the presumed founder and autochthonous original Indian populations. The DNA analysis (2018) of a skeleton from the Indus Valley Civilisation found in Rakhigarhi showed a greater association with the Irula people than any other modern ethnic group in India.
- According to the Census 2011, the tribe population is around 220,000, living majorly in 3 states:
 - 189,621 in Tamil Nadu
 - 23,721 in Kerala
 - 10,259 in Karnataka
- The people of the Irula tribe are called Irular and they speak the Irula language, which belongs to the Dravidian family. They are categorised under scheduled tribes.
- Irular believes in life after death. In general, the Irula are Hindu, but many of them have retained their own tribal beliefs that revolve around the spirit world.
- Traditionally, the main occupation of the Irulas has been snake, rat-catching and honey collection.
 - They also work as labourers in the fields of the landlords during the sowing and harvesting seasons or in the rice mills.
 - Fishing and cattle farming is also a major occupation.
- Rats destroy a quarter of the grain grown on Tamil Nadu-area farms annually. To combat this pest, Irula men use a traditional earthen pot fumigation method.
- Their knowledge and use of herbal medicines, tracking and digging skills, and unusual diet (which includes rats) have been written about, filmed, studied and lauded.

Some unique customs:

- Generally, marriage is fixed for girls within the age limit of 12 -18 whereas boys' age is from 14-24. People from the same clan within the Irula tribe do not intermarry.
- Marriages are fixed within the family by the parents. Bride's prize has to be given to the girl's house in the form of cash or cattle.
 - Marriages that do not have the acknowledgement of a local panchayat are considered invalid.
- During childbirth, a tent is erected near the pregnant woman's house. When the child is born nobody will go out of the tent and none will be allowed to enter the tent for seven days.
 - On the 7th day, the child will be named during a big ceremony. The name will be the name of a grandfather or grandmother.
 - For three months relatives other than the immediate parents, should not touch the child. During this period the mother will not do any work.

MISCELLANEOUS

1. Marconi Prize

- Dr. Hari Balakrishnan has been awarded the 2023 Marconi Prize. He is a Professor in the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT).
- He has been cited “for fundamental contributions to wired and wireless networking, mobile sensing, and distributed systems”.
 - He graduated with a computer science B.Tech from IIT Madras in 1993.
- The Marconi Prize is an annual award that recognizes individuals who have made significant contributions to the field of communications and information technology.
 - It is named after Guglielmo Marconi, an Italian inventor and pioneer in the development of wireless communication.
- The Marconi Prize is one of the most prestigious awards in the field of telecommunications and is often referred to as the “Nobel Prize of Telecommunications.”
- The prize is administered by the Marconi Society, a non-profit organisation that promotes awareness and understanding of important scientific and technical issues in the field of communications.
- The Marconi Prize consists of a cash award of \$100,000 and a commemorative medal.
- The Marconi Society also awards other prizes and scholarships, including the Marconi Society Paul Baran Young Scholar Award, which recognizes young researchers who have demonstrated exceptional technical and leadership abilities in the field of communications and information technology.
- Previous winners of the award include Sir Tim Berners-Lee, Google co-founder Sergey Brin and sci-fi author Arthur C. Clarke

2. Teja Red Chilli

Context: Teja red chilli has become a hot property in many nations and the export of this variety of red chilli is estimated to increase from the present ₹2,000 crores per annum to ₹2,500 crores in the coming year.

Teja Red Chilli:

- Teja Red Chilli which is also known as S-17 is one of the hottest varieties of red chillies produced in India.
- Teja chilli is a fine variety of Guntur chilli which is mostly produced in the southern states of India.
- Khammam district of Telangana is the largest producer of the Teja variety of red chilli.
- Teja red chillis are famous for their culinary, medicinal and other wide-ranging uses such as being the main ingredient in making pepper spray.
 - The paste extracted from this variety of chilli is also in demand for its use as a protective layer beneath ships in some Asian countries.
- Teja red chilli is being exported extensively to China, Bangladesh and a few other south Asian countries from Khammam.

3. Withdrawal of French troops from Burkina Faso



Source: World Atlas

- Burkina Faso has announced that the operation led by France in the country has come to an end.
- France had, in 2018, signed a military agreement with Burkina Faso to bring about stability against the threat of Islamist militant groups.
- The French troops were asked to withdraw from Burkina Faso after it pulled out its troops from Mali and the key reason for the withdrawal is the failure of its counter-insurgency operations in the Sahel region against Islamist groups.
 - Further, the Islamist insurgency has intensified in recent times and France's military presence in Burkina Faso has come under scrutiny and anti-France demonstrations have increased in Burkina Faso.
- The French President however has said that victory against terror is not possible if it is not supported by the state itself and France has also been critical of the growing Russian influence in Africa.
 - It is said that the Russian private military company Wagner Group is working closely with the military governments in West Africa.

4. Sinthan Pass

Context: The National Highway leading to Sinthan Top was reopened.

Sinthan Pass:

- Sinthan Top is a mountain pass located in the Anantnag district of Jammu and Kashmir.
- The Sinthan Pass connects Kashmir to the Chenab Valley in the Jammu region.
- The pass is located between South Kashmir's Breng Valley in the Anantnag district and Chatroo in the Kishtwar district of Chenab Valley.
- Sinthan Top is also an offbeat tourist destination that attracts tourists from all over the country, especially in the winter months.

YOJANA FEBRUARY 2023 - YOUTH AND SPORTS

1. Initiatives for New India

Introduction

- India has one of the youngest populations in the world, as 27.2% of the country's population belongs to the age group of 15-29 years.
- The youth of the nation is not only crucial for economic development but also for social and societal change and technological advancement.
- The government is taking several steps to involve youth in nation-building and skilling them to compete in global job markets.
- The government of India has often asserted "Jan Bhagidari se Jan Andolan", which is incomplete without the active participation of youth.

Several initiatives taken by the government for the Youth

- The Nehru Yuva Kendra Sangathan under the guidance of the Ministry of Youth Affairs and Sports (MoYAS) organized various activities of the Swachh Bharat 2.0 programme.
- MoYAS is trying to engage the youth volunteers for personality-building and nation-building.
- A Capacity Building Training Programme was also launched for 14000 youth volunteers of NYKS to improve their skills.
- A new National Education Policy 2020 was also brought for strengthening the education system in India.
- Universities and educational institutions are upgrading their sports infrastructure to enable the active participation of youth in the FIT India campaign.

Sports, Education, and Youth development

- Sport is a great unifier and equalizer. It is a key component for societal harmonization irrespective of cultural, language, and geographical differences.
- It is high time that society realizes sports as an attractive and rewarding career option.
- Khelo India Scheme was launched to boost the sports ecosystem of the country and support athletes. It organizes annual Khelo India youth games, winter games, etc.
 - Khelo India schemes established district-level Khelo India Centres, Khelo India state centers of excellence.
- Additionally, the scheme has a robust early-stage talent identification and development mechanism. Financial assistance is also provided for training, travel, diet, medical expenses, and out-of-pocket allowances.
- Moreover, Khelo India Scheme is also promoting rural and indigenous games to revive India's culture and tradition.
- To identify sports talent at a young age, nearly 23 lakh school students (in the age group of 5 to 18 years) are assessed through Khelo India Mobile App.
- As a part of Azadi ka Amrit Mahotsav, the FIT India quiz (the biggest quiz on sports) was organized.

Way Ahead

- States can be encouraged to take up initiatives like "One State, One Sport" and prioritize one game based on the available infrastructure, talent pool, and interest of the residents.
- Sporting culture should be embedded in Indian society.
- More leagues/tournaments/competitions should be organized at local, district, and state levels.
- Government should handhold the youth towards International platforms.
- All required facilities and training services should be put in place.

Conclusion: A youthful mind, body and soul is the key to a healthy and fit India. The youth of a nation is the most progressive section and has the most crucial role in the vision of New India.

2. Nurturing Excellence of Our Yuva Shakti

Introduction

- The demographic dividend of India, comprising the working age population (between 15 to 64 years) is 67% (or 80 crores) of the total population.
- The period from 2020 to 2050 is considered to be the golden period of the Indian Economy due to its demography.
- With an average of 1.2 crore new entries to the workforce every year, the Government's role and responsibility have become all the more important for creating opportunities.

India's Startup Ecosystem

- India is the 3rd largest startup ecosystem in the world.
- One in every 10 global unicorns is claimed by India. Notably, India had only 4 unicorns in 2014 which has increased to more than 100 unicorns in 2022.
- Around 4000 patents were globally filed by India in 2014. It has reached approximately 15000 in 2022.
- In the 'Global Innovation Index', India improved its position from 81 in 2015 to 40th rank in 2022.
- The reasons behind a successful and sustainable startup ecosystem in India are the availability of data, outreach and marketing services, ease of doing business, and reduced compliance.
- The technological revolution supported by the Digital India Mission has further contributed to the smooth, modern, and rapid transition of Indian markets.

Government interventions

- **Schemes launched by the Government to improve the skills and employability of youth are:**
 - Skill India Mission
 - MUDRA scheme
 - Digital India Mission
 - PM Kaushal Vikas Yojana to lay a foundation of proficiency, knowledge, and market-centric skills.
 - Production Linked Incentive scheme to boost the manufacturing sector (second largest employable sector).
- **Access to holistic education:**
 - A modern era of education reforms was ushered in for the holistic development of society. The most significant reform in this direction was NEP 2020.
 - The medical education system was improved by opening new AIIMS and introducing the National Medical Commissions Act.
 - Eklavya Model Residential Schools have been established for the Scheduled Tribes.
 - New IITs and IIMs were added.
 - Navodaya Vidyalayas were also increased.
 - Cheaper education loans and scholarships are also provided.
- **Interventions for enhancing Ease of Living:**
 - Modern infrastructure and seamless service have a positive impact on enhancing the quality of life. It boosts the academic, vocational, and entrepreneurial integration of the young generation.
 - To improve the quality of living, the government has launched various schemes in multiple domains. For example,
 - Swachh Bharat Mission (2014) to build 11 crore toilets.
 - Ujjawala Yojana to provide cooking gas and make homes smoke-free.
 - Deendayal Upadhyay Gram Jyoti Yojana and SAUBHAGYA scheme for providing electricity.
 - PM Awas Yojana for construction of houses.
 - Jal Jeevan Mission to provide functional tap water connection.

Conclusion

- **Swami Vivekananda** once said that “Give me hundred energetic youngsters and I shall transform India”.
- It is the youth of the country that will enable India to realize its full potential and dreams.
- Ways and means should be formed to tap the energy and ambition of the youth.

3. FIT India: Towards a Healthy Future

Introduction: Significance of Sports

- Sports foster holistic development by improving physical and psychological well-being. It also improves cognitive abilities.
- Through sports, students learn fundamental principles like teamwork, fair play, respect for the rules, cooperation, discipline, and tolerance.
- It further promotes social cohesion among communities and cultures. It is also essential for future engagement in group activities and professional life.
- It helps in social and personal growth.
- According to the World Health Organization, Physical activity can promote good mental health and cognitive development.

FIT India Movement

- The FIT India movement was launched on 29 August 2019 to make fitness an integral part of daily life.
- The vision of FIT India is to bring about behavioural changes and move towards a more physically active lifestyle.
- **The goals and objectives of this are:**
 - To promote fitness as an easy, fun, and free activity.
 - To spread awareness on fitness and various physical activities that promote fitness through focused campaigns.
 - To encourage indigenous sports.
 - To make fitness reach every school, college/university, panchayat/village, etc.
 - To create a platform for citizens of India to share information, drive awareness, and encourage sharing of personal fitness stories.

Initiatives undertaken to bolster FIT India Movement

- **Samagra Shiksha Scheme:** Under this scheme, a sports grant is provided to all government schools annually.
- **FIT India School Movement:** It encourages schools to organize a FIT India School Week in the month of November/December.
 - Fit India School week was launched in 2019 to raise fitness awareness among children, parents, and teachers.
 - It includes events like Yoga, dance, debate, symposiums, etc.
- **FIT India Quiz:** It was introduced in 2021, as a part of “Azadi ka Amrit Mahotsav”. It encourages children all over the country to join fitness mission and live a healthy life.
- **FIT India Freedom Run:** All schools were urged to take part in the run and achieve a FIT India 3- or 5- Star grade.
- **Football for Schools Programme:** It is an ambitious FIFA-UNESCO programme with the aim to increase access to football for both boys and girls around the world. It further intends to help 700 million students around the world with their education, development, and empowerment.

Conclusion

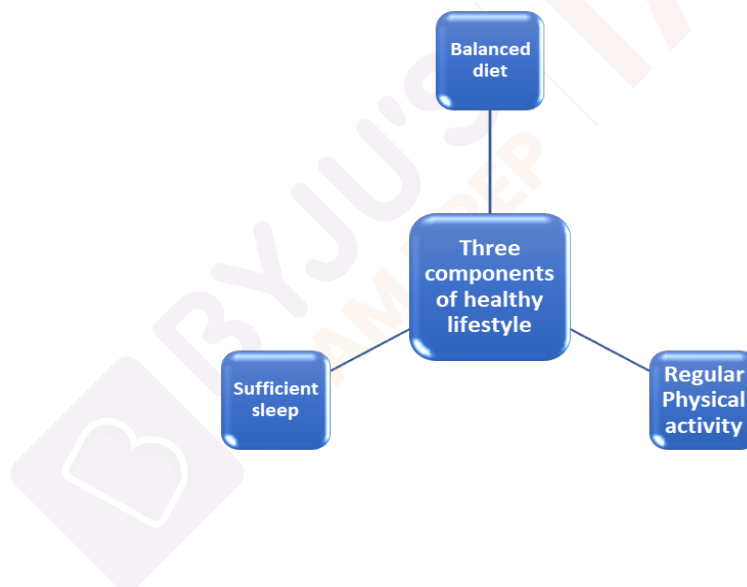
- The sporting landscape of India has changed due to various efforts of the government. Sports has become an important component of socio-economic development.
- All the initiatives in the past few years have changed the mindset around sports and are promoting lifelong learning and leadership qualities among young kids.

4. Youth and Health**Background**

- Being the most productive age group, youth contributes immensely to the economic growth of the country.
- However, the younger generation faces many health issues due to their physiological state, behaviours, diet, work, etc.
- India has been ranked 8th among countries with the lowest physical activity globally.
- Moreover, reports show that 3 out of 4 adolescents and young individuals are not physically active enough as per the given recommendations.

Health Issues faced by the Youth

- **Mental Health:** It is a major challenge for the population of this age group. The reasons behind mental health issues are scholastic or workplace performance, violence, poverty and unemployment, stigma, marginalization, discrimination, humanitarian crises, etc.
- **Alcohol and Drug Use:** It is majorly associated with several high-risk behaviors that can also cause other diseases.
- **Tobacco Use:** It can cause cancer and increase the risk of other lifestyle diseases like diabetes, hypertension, heart disease, etc.
- **Physical Inactivity:** It is estimated that only 20% of the young population exercises adequately. Inactivity is extremely common in females.
- **Diabetes and Hypertension:** Diabetes is becoming a potential epidemic in India with every 1 in 10 adults suffering from it. Hypertension is also prevalent in one among five individuals.



Sl. No	Programmes/Initiatives	Features
1.	Rashtriya Kishor Swasthya Karyakram (RKSK)	<ul style="list-style-type: none"> The programme's main strength is its health promotion approach. The focus of the programme is shifted from the clinic-based approach to prevention and promotion and reaching the adolescents in their own environment which includes their communities or families or schools.
2.	Adolescent Friendly Health Clinics (AFHC)	<ul style="list-style-type: none"> It includes all health issues from sexual and reproductive health to injuries, violence, substance abuse, nutrition, NCDs, etc. The components of AFHC are acceptable, equitable, accessible, appropriate, comprehensive.
3.	Peer Education Programme	<ul style="list-style-type: none"> The selected peer educators have to ensure that the adolescents benefit from RKSK. These peer educators are called 'Saathiya'. Four peer educators (two boys and two girls) are selected per village/1000 population/ASHA habitation to reach out to adolescents.
4.	Menstrual Hygiene Scheme	MoHFW launched a scheme for promotion of menstrual hygiene in adolescents. It mainly focuses on increasing the awareness, increasing access and usage of sanitary napkins along with its safe disposal.
5.	Health and Wellness Centres under Ayushman Bharat Programme	The HWCs promote a comprehensive health approach by preventive and promotive interventions.
6.	FIT India	This initiative is aimed at adoption of healthier lifestyle in youth by getting involved in sports and other related activities.
7.	Other Health Programmes	Various health programmes like National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke. (NPCDCS), Reproductive, Maternal, Newborn, Child Plus Adolescent Health (RMNCH+A), National AIDS Control Programme (NACP), National Mental Health Programme (NMHP) and others also strive in improving youth health.

Source: Yojana February 2023

Way Ahead

- The stigma associated with mental health issues should be addressed.
- As per the WHO, people should engage in 150 minutes of moderate-intensity aerobic physical exercise or 75 to 150 minutes of high-intensity aerobic exercise per week
- It is also found that 6 to 8 hours of regular sleep boosts immunity, reduces stress, and keeps away mental health issues. Thus, the sleep cycle of an individual should be kept sound.

Conclusion: "Healthy Youth today will make a Healthy Nation tomorrow".

5. Enablers for Employment

Background:

- In April 2022, the Ministry of Youth Affairs and Sports (MoYAS) released a Draft National Youth Policy with a 10-year vision for youth development. The policy is aligned with the Sustainable Development Goals (SDGs).
- **The five focus areas of the policy are:**
 - Education
 - Employment and entrepreneurship
 - Youth leadership and development
 - Health, fitness, and sports
 - Social justice
- National Cadet Corps (NCC), National Service Scheme (NSS), and Nehru Yuva Kendra Sangathan (NYKS) are some organizations working in this direction.
- During the pandemic, young people faced numerous mental health issues like academic stress, peer pressure, anxiety, depression, eating disorders, and learning difficulties.

Government interventions for students

- Prime Minister Shri Narendra Modi engages with students through an interactive session on '**Pariksha pe Charcha**' creating a stress-free environment for exams.
- **Swayam Prabha** is an initiative of the Government of India that helps learners in remote areas to get access to quality educational programs 24x7 through a group of 22 DTH channels.
- **PM e-VIDYA** enables multimode access to education by unifying all efforts related to digital/online/ on-air education.
- The Ministry of Education has established the **National Education Alliance for Technology (NEAT)**, implemented by the All-India Council for Technical Education (AICTE) to serve as a bridge between edtech businesses, academic institutions, and students.
- To bridge the digital divide, students can take online courses from class 9 till post-graduation on the **SWAYAM portal**.

Government interventions for career opportunities

- The **Make in India** initiative launched in 2014 is helping foster innovation, build world-class infrastructure, and make India a hub for manufacturing and design.
- **Rozgaar Mela**, a recruitment drive for 10 lakh personnel was launched in a mission mode.
- **Karmayogi Bharat** was launched as a Special Purpose Vehicle (SPV) under the administrative control of the Department of Personnel and Training (DoPT) for capacity building of all government employees. It operates the iGOT (Integrated Government Online Training) Karmayogi platform.
- **Karmayogi Prarambh** is an online orientation course for all new recruits in various Government departments.
- **Pradhan Mantri National Apprenticeship Mela (PMNAM)** is a part of the Skill India Mission that provides apprenticeship opportunities.
- **Agnipath Scheme** is launched by the government to recruit 46000 young people as 'Agniveers' in the armed forces for a four-year term.

Conclusion: Apart from government efforts, private and non-profit organizations should also contribute to increasing the participation of young people in nation-building.

6. Youth for Environment Sustainability

Introduction

- Immediate action is required to deal with climate change and declining biodiversity, and to create pathways for environmental conservation.
- Youth-driven climate action initiatives could help augment the overall quality of education and attain net-zero emissions by 2030. It would further help in ensuring the quality of life for future generations on this planet.
- Innovative and focused approaches would be required to develop and prepare strategic frameworks, policies, and procedures; monitor land management, crisis, and disaster management; and conserve biodiversity.
- Presently there are 1.8 billion people between the ages of 10 and 24. The ability, ambition, and creativity of the younger generation should be utilized for sustainable cities and livelihood.

Role of Youth and SDGs

- **Critical Thinkers:** Youth can analyze and confront current power systems, challenges, biases, and inconsistencies.
- **Change Makers:** They can take action and mobilize others.
- **Innovators:** Youth can provide fresh perspectives and unique solutions.
- **Communicators:** They can spread the agenda among their peers both locally and internationally.
- **Leaders:** They are drivers of change if empowered with rights and responsibilities.

Significance of Youth in environment sustainability

- Youth can play a crucial role in promoting Sustainable Development Goals(SDGs), particularly SDG 15: Life on Land.
- They can actively contribute in preserving and enhancing the environment by sustainably altering their lifestyle and positively impacting the environment.

LiFE Movement

- In the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26), Glasgow, the Indian Prime Minister proposed the concept of LiFE.
- It promotes an environment-conscious lifestyle that focuses on 'mindful and deliberate utilization' instead of 'mindless and wasteless consumption'.
- It seeks to encourage people to take small and regular steps toward a more sustainable future.
- The mission plans to create and nurture a global network of individuals, namely 'Pro-Planet People' (P3). These individuals will have a shared commitment to adopt and promote environment-friendly lifestyles.

Way Ahead

- Social Media is a major source of information for youths. Thus it can be used to encourage a wider social learning process for sustainable development.
- A sustainable lifestyle should be promoted. For instance, reusing and recycling resources.
- A strong commercial environment must be incorporated into an ecosystem that supports young social entrepreneurs.
- There is a need for strengthening job placement procedures and educational programs for green careers.

7. Youth Icons of India

Few of the Youth icons of India are mentioned below

- **SUNDAR PICHAI**
 - He is the CEO of Google. He was honoured with Padma Bhushan Award in 2022.
- **SATYA NADELLA**
 - He is Microsoft's CEO and was also honoured with Padma Bhushan in 2022 for his contribution in trade and industries.
- **NAVEEN TIWARI**
 - He founded a consumer internet company that has highly disruptive digital platforms including Glance and Roposo.
- **NIKHIL KAMATH AND NITHIN KAMATH**
 - They built a full-service discount brokerage business Zerodha with zero external capital.
- **RIFATH SHAROOK**
 - India broke a global space record in 2017 due to the contribution of Rifath Sharook and his six teammates who developed the world's lightest satellite called 'KalamSat'.

Some of the Youth icons in the field of Sports

- **Sharath Kamal Achanta:** He is one of the most outstanding table tennis players of India who was awarded the Major Dhyan Chand Khel Ratna Award 2022.
- **Seema Punia:** She received the Arjuna Award 2022 for her brilliant performance in the field of Athletics.
- **Neeraj Chopra:** He created history by winning India's first-ever athletics gold in men's javelin throw at Tokyo Olympics in 2020.
- **Rameshbabu Praggnanandhaa:** He is a teenager who created history by defeating the noted world chess champion Magnus Carlsen of Norway.

8. Leading India towards Techade

Introduction

- Approximately 66% of the total population in India is below the age of 35. This can be pivotal in propelling economic and societal growth.
- It is imperative to involve youth in participatory governance because they are the future of the country. This will help in building civic capacity and long-term community sustainability.
- To place people at the centre of development, MyGov was launched in 2014.

MyGov

- MyGov is a citizen engagement platform that works with various government organizations and ministries to solicit the opinion of the general public.
- MyGov has used technology to reach out to the masses. The youth is the backbone of MyGov's outreach platform.
- **It facilitates 'Jan Bhagidari' or public participation by:**
 - **Information Dissemination:** It helps to reach out to beneficiaries and acts as a one-stop platform for citizens. Effective dissemination of information increases awareness and fosters cooperation.
 - **Two-Way Communication:** It provides two-way communication through social media and innovative platforms.
 - **Transparency:** Through MyGov, the selection process for various awards and schemes has become transparent. Increased transparency fosters accountability and enhances the trust and confidence of the citizens.
 - **Fact Check:** False information can quickly spread and have terrible consequences. MyGov can help citizens to know about facts and government announcements.
 - **Infusing collaborations:** It enables citizen-citizen and government-citizen collaborations.
- It can act as a great networking platform for individuals who want to bring positive change.
- It facilitates creative disruption and out-of-box ideation.
- The government has involved youth in preparing songs, taglines, jingles, logos, etc.

Way Ahead

- The young generation should also understand their value and know their role in nation-building.
- They should perform essential duties like sharing information, building capacity, seeking knowledge, and serving as ambassadors of change.
- They should also work with the local Governments to ensure the upliftment of the masses.

Conclusion: Dr. APJ Abdul Kalam once said that "I would like to put forth that the ignited mind of the youth is the most powerful resource on the earth. I am convinced that the youth power, if properly directed and controlled, could bring about transformational changes in humanity for its progress, meeting its challenges, and bring peace and prosperity."

KURUKSHETRA FEBRUARY 2023 - COOPERATIVES

1. Sustainable Development through Renewable Resources

Energy Sector:

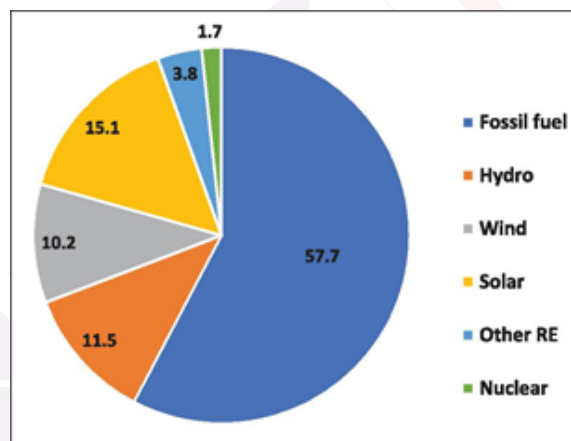
- The use of renewables has scope in the energy sector primarily due to the fact that energy is the main driver in automation, and in any other fields which demand inputs beyond human efforts.
- As of today, India is consuming about 9000 billion units of energy for various purposes.
- About 47% of the total energy is sourced from coal and lignite, 31% from crude oil, about 15% from electricity (hydro, nuclear and other renewable sources) and 8% from natural gas.

Impact of Fossil Fuels:

- Fossil fuels pose many strategic and health challenges apart from the fear of extinction and carbon emission.
- The turbulence in oil supply nations caused distress in oil consumer countries. The recent conflict between Russia and Ukraine has also prompted many countries to explore alternate energy options to fossil fuels.
- The 2022 report of the Lancet Countdown on Health and Climate Change says that the changing climate is affecting the spread of infectious diseases, putting populations at higher risk of emerging diseases and co-epidemics.
- These facts clearly indicate the necessity to explore renewable energy options.
- In view of this, in August 2022, India updated the Nationally Determined Contributions (NDCs) as stipulated in the Paris Agreement.

Renewable Energy:

- Today, India is a power surplus nation with a total installed electricity capacity of over four lakh Mega Watt (MW).
- Keeping in mind the sustainable development goals, India's power generation mix is rapidly shifting towards a more significant share of renewable energy.
- Today, India is the world's third largest producer of renewable energy, with about 42 per cent of our installed electricity capacity coming from non-fossil fuel sources.
- Estimated renewable energy potential of India (other than large hydro) is about 1.5 million MW, of which 50 per cent is from solar, 46.7 per cent from wind, and the remaining from small-hydro, biomass and waste to energy.



Source: Kurukshetra

Solar Power:

- Solar energy has many advantages among which the abundance in supply, ability to generate power on a distributed basis, and ability for capacity addition in short time leads are prominent.
- The last decade has witnessed a surge in the use of solar energy based decentralised and distributed applications.
- Millions of Indians are now using solar power for lighting, cooking, mobility and other energy needs which has significantly improved the quality of life.
- Estimates by National Institute of Solar Energy suggest that covering three per cent of the waste land area with solar photovoltaic modules can generate about 748 GW power.
- In 2010, Government of India launched National Solar Mission (NSM) with active participation of States to promote sustainable growth while addressing the energy security challenges.

Wind Power:

- The study conducted by National Institute of Wind Energy (NIWE) identified seven states viz. Gujarat, Maharashtra, Rajasthan, Tamil Nadu, Madhya Pradesh, Karnataka and Andhra Pradesh with significant potential for power generation from wind.
- The Government has been promoting wind power projects by incentivising the investments through Accelerated Depreciation Benefit.
- Government has also introduced a waiver of Inter State Transmission System (ISTS) charges for inter-State sale of solar and wind power, for projects to be commissioned by 30 June 2025.
- India, having a natural advantage of a 7500 km long coast line, has the potential of harnessing offshore wind energy.

Hydropower:

- Since March 2019 Government of India has been recognising Large Hydro Power Projects (LHPs) including Pumped Storage Projects (PSPs) having capacity of more than 25 MW as part of renewable energy.
- According to the assessment made by Central Electricity Authority (CEA), India has the potential of economically exploitable hydro-power to the tune of 1,48,700 MW.
- However, only less than 30% of this is presently exploited despite having long life, low cost and high efficiency among many other advantages.

Bio Fuels:

- Ethanol and biodiesel are the two most common types of biofuels in use today.
- The Government has been implementing Ethanol Blended Petrol (EBP) Programme wherein the Oil Marketing Companies (OMCs) sell petrol blended with 10% ethanol.
- The National Policy on Biofuels announced in 2018 is aimed at accelerated promotion of biofuels with indicative targets of achieving 20% blending in Petrol and 5% blending in diesel by 2030.

Ocean and Geo-thermal:

- Ocean energy refers to energy derived from Wave Energy, Tidal Energy, and Ocean Thermal Energy Conversion. The technology development in these areas is at the research and development stage.
 - The estimated theoretical power potentials for Tidal and Wave energy are 12,455 MW and 41,300 MW respectively.
- Geothermal Energy is a source of heat stored in the earth's crust, which is manifested on the surface as hot springs. In India, Geological Survey of India (GSI) has estimated that a tentative power potential of 10 GW could be extracted from geothermal energy.

Food Security and Renewables:

- Ensuring food security is the fundamental pre-requisite for catalysing human centric development.
- Ratio of volume of groundwater extracted every year to the annual ground water recharge, referred to as stage of groundwater development, in the country is 61.6%.
- These trends clearly establish the huge reliance on energy by way of lifting the ground water for irrigation purposes.
- The decline of the ground water table leads to the consumption of more energy every year to meet the irrigation requirements. Use of renewables plays a major role in ensuring gains for the waterenergy-food nexus.

Way Forward:

- Renewable energy sources are in a less competitive position in terms of ease of maintenance and useful life as compared to conventional energy sources.
- Research and development have to be augmented in the direction of generating more energy with less space.
- International cooperation, synergy and harmony in tapping the renewable resources by way of exchange of technology, sharing the benefits of advancements in scientific research and space technology, in assessing the global risks and making informed choices is significant.
- The upcoming G20 summit under India's presidency shall hopefully witness conceptualisation of robust pathways in this direction.

2. Powering Growth in Agriculture Sector

Introduction:

- Agriculture is the mainstay of the Indian economy contributing nearly 15% to the GDP.
- It provides livelihood to around two-third of the total working population in the country
- Further, agriculture is the primary source of raw materials for some of the major industries such as textile, sugar, food, pharma (mainly Ayurveda) and new age health and fitness products.
- Recently, agriculture has jumped to the 7th position as net exporter, across the globe.

Energy Demand:

- Agriculture also demands high energy inputs in many of its activities, mainly irrigation.
- According to estimates, agriculture consumes nearly 20% of the electricity consumed at national level.
- Additionally, farmers have installed around nine million diesel pump sets to harvest groundwater for irrigation purposes.
- Energy consumption at this high level has raised concern in view of India's commitment to reduce the carbon intensity by less than 40 per cent by 2030 (COP-26).
- Recently, the Government has set a target to make the agriculture sector diesel free by 2024. In this context, renewable energy (RE) has emerged as the most viable and sustainable option.
- The Government has taken a series of steps to empower farmers with RE systems to make them energy self-sufficient, particularly in irrigating their fields.

Resources at Work:

- **Biogas:** Biogas plants generate the high calorific value (5,000 kcal per cu.m.) gas by decomposition of organic materials such as cattle dung, agricultural wastes, poultry droppings, night soil and municipal wastes.
 - Currently, over five million biogas plants of various capacities are operational in the country
 - It is used in diesel engines to substitute diesel up to 80 per cent, however, 100 per cent replacement of diesel may be achieved by using Biogas Engines.
 - The Government of India is promoting installation of biogas plants by providing subsidies through two major schemes namely **New National Biogas and Organic Manure Programme (NNBOMP)** and **Biogas Power Generation (off-grid) and Thermal Energy Application Programme (BPGTP)**
 - Government of India has launched a dedicated **GOBARdhan (Galvanising Organic Bio-Agro Resources Dhan)** scheme with an aim to make the villages clean and generate clean power from organic wastes.
- **Biomass:** Biomass materials used for power generation primarily include bagasse, rice husk, straw, crop waste and agricultural residues.
 - MNRE has been implementing biomass power/ cogeneration programs since the mid-nineties.
 - Over 800 biomass power and bagasse/ non-bagasse cogeneration projects aggregating to over 10,206 Mega Watt capacity have been so far installed in the country with central financial assistance from Government of India.
- **Solar Energy:** Addressing the energy concerns in the agriculture sector, a large number of solar devices/ equipment have been developed and deployed that include solar water pumps, solar dryers, solar dusters etc.
 - The **PM-KUSUM scheme** is one of the largest initiatives of the world to provide clean energy to more than 35 lakh farmers and also enhance their income. The scheme is being implemented through its three components.
 - Due to the immense potential and scope of renewable energy in the agriculture sector, the Government is focusing on decentralised RE systems and products.
 - MNRE has recently released a framework (2022) to promote RE based applications that are used for earning livelihoods. A special focus on engaging all stakeholders, skill development and capacity building would scale up RE-based livelihood applications.

3. Decarbonisation of Transport Sector

Green technologies in Transport Sector:

- India's transport demand is expected to increase by 2.7 times in over 30 years.
- Electric vehicles (EVs) are as green as the electricity powering them and the sustainable supply chain of batteries.
 - Lifetime emissions from EVs today are 19-34% lower than ICE cars.
- In India, mass mobility relies on public transport, two-wheelers, and three-wheelers. Therefore, FAME India Scheme Phase II was focused on these three segments.
 - Bus transport in India accounts for 38% of passenger km, though its share in overall registered vehicles in India is just around 3.5%.
 - Two-wheelers account for 76-80% of the total registered automotive in India.
 - Last-mile connectivity mainly depends on three-wheelers and sub-seven-metre buses.
- India is already the biggest manufacturer and most significant market for 2 wheelers globally. However, electric two-wheeler vehicle manufacturing is being led by startups and first-time entrants. Traditional players are also now switching to electric models.
- Electric two-wheelers will also see Mobility on Demand (MoD) and Mobility as a Service (MaaS) models to develop. This is because the upfront cost of fixed-battery electric two-wheelers is still higher than ICE vehicles.
- India has a chance also to become the global hub of manufacturing for the entire EV Value chain (except raw material mining). Therefore, billion-dollar incentive programs such as the advanced chemistry cell program with an outlay of 2.5 bn USD over five years were rolled out and received an overwhelming response from the industry.
- Several states have also rolled out the incentives for battery manufacturing.

Road Ahead:

- India needs to have million-plus fast chargers to cater to the needs of EVs. However, fast chargers are imported into India and only a few players are manufacturing locally developed/manufactured fast chargers.
 - Government-led companies such as BHEL / BEL can join hands to develop the local supply chain for chargers manufacturing.
- Research institutions such as IISc and labs CPRI/ CSIR/ARCI can provide further technical support.
- The battery swap stations in rural areas will change the EV adoption and Battery storage landscape.
- India also needs a comprehensive mission plan to deal with advanced chemistry cells (ACC) recycling as >95 per cent of the original critical minerals can be recovered from these ACC batteries and reused in cell manufacturing.
- Government should focus on capacity building at all levels, along with upskilling and reskilling with respect to EVs.
 - NITI Aayog is working with IITs to nudge them to start EV-specific courses.
 - "Shoonya - Zero pollution Mobility" is a consumer and corporate-facing campaign hosted by NITI Aayog.

4. Mitigating Environmental Issues

Introduction:

- Energy consumption accounts for 60 per cent of the total greenhouse gas emissions. As per World Energy Outlook 2021 of International Energy Agency (IEA), the current share of India in global primary energy consumption is 6.1%.
- Over 80% of India's energy needs are met by three fuels: coal, oil and solid biomass.
- In the energy sectors (both for developing and developed countries) widespread use of renewable energy is important for achieving sustainability.
- A transition to cleaner forms of energy has already begun in many countries, with the fast rate of technological innovation and cost reduction.

India's efforts towards mitigating the effects of climate change:

- Long-Term Low-Carbon Development Strategy submitted by India under United Nations Framework Convention on Climate Change (UNFCCC) focuses on the rational utilisation of national resources with due regard to energy security.
- The Ministry of Environment, Forest and Climate Change has two central sector schemes that address climate change.
 - The **Climate Change Action Plan (CCAP)** launched during the 12th Five Year Plan with an outlay of Rs. 290 Cr. to build capacity and support implementation of relevant climate change related actions at the national and State level.
 - The **National Adaptation Fund for Climate Change (NAFCC)**, established in August 2015, with the aim of meeting the cost of climate change adaptation for states and union territories in India which are vulnerable to the impacts of climate change.
- India at the COP 26-UNFCCC presented '**Panchamrit**' of India's climate action.
- The Union Cabinet has also given its approval to introduce the **Production-Linked Incentive (PLI) Scheme in High Efficiency Solar PV Modules for Enhancing India's Manufacturing Capabilities and Enhancing Exports**. It aims to reduce import dependence in the area of energy sector.
- **Green Energy Corridors** is another programme implemented by MNRE in the country to promote renewable energy sources, to create an intra-state transmission system for renewable energy projects.
- Recently, Modhera, a village in Gujarat was declared as **India's first solar-powered village**.
- The **Energy Conservation (Amendment) Bill, 2022** has been passed which focus on the use of non-fossil energy (biomass, ethanol, green hydrogen) to decarbonise Indian economy. It will also allow carbon credit trading.

5. Public Awareness About Renewable Energy Sources

Public Awareness about RE:

- Public awareness can be defined as the improvement of the public understanding of environmental issues with various aims, including building environmental awareness and getting public, financial and/or scientific support for solving issues.
- Studies have found that public understanding, communication, and knowledge concerning climate actions positively impact public engagement.
- Public awareness can be seen as a measure of how well-informed the public is about renewable energy, and it can be influenced by various factors such as media coverage, public education campaigns, and personal experiences.
- Public awareness of renewable energy encompasses information, attitudes, and behaviours related to consuming energy services that have a beneficial impact on the sustainability of the environment.
- By raising awareness about renewable energy options, individuals can be motivated to engage in activities such as supporting policy measures that promote the deployment of renewable energy.

Renewable Energy Promotion: The Indian Context

- To promote the use of renewable energy sources, an exclusive institution, the Department of Non-Conventional Energy Sources (DNES), was created in the Ministry of Energy in 1982.
- In 1992, the Department was upgraded into a separate Ministry of Non-Conventional Energy Sources (MNES) in 1992 and was re-named as Ministry of New and Renewable Energy (MNRE) in October 2006.
- The Ministry is being supported by five institutes, namely, (i) **National Institute of Solar Energy** (ii) **National Institute of Wind Energy** (iii) **Sardar Swarn Singh National Institute of Bio Energy** (iv) **Indian Renewable Energy Development Agency (IREDA)**; and (v) **Solar Energy Corporation of India (SECI)**.
- To enhance efficiency and responsiveness to people and to make people aware, the Ministry has brought out a Citizens'/Clients' Charter (CCC), incorporating its mission, main services/transactions and commitment to its clients and the people of India in general.

6. Transition to Clean Energy

Clean Energy:

- Since, emissions of greenhouse gases are one of the primary causes of climate change, nations all over the globe are making concerted efforts to transition to cleaner forms of energy by altering the processes by which energy is generated.
- The term “energy transition” refers to the change that is taking place in the global energy sector away from fossil-based systems of energy production and consumption, such as oil, natural gas, and coal, and toward renewable energy sources such as wind and solar, as well as lithium-ion batteries.
- Renewable energy technologies are called “clean” or “green” since they generate very few pollutants, if any.

Energy Scenario:

- India is the world's third-largest consumer of energy. Since 2000, energy consumption has doubled, with coal, oil, and solid biomass still supplying 80 per cent of the demand.
- Coal's dominance as an energy source is supported by its strong position in power production and as a commercial fuel (especially heavy industries such as iron and steel).
- In the year 2000, coal met 33 per cent of India's primary energy needs; in the present day, it fulfils 44 per cent of that requirement.
- Traditional biomass was India's second-most important energy source in 2000, accounting for a quarter of the major energy mix.
 - Traditional biofuels include fuelwood, animal waste, and charcoal.
- The increase in automobile ownership as well as road travel has increased oil consumption across the country.
 - Transport energy consumption climbed 3.5 times since 2000 while building demand grew 40 per cent due to increasing appliance ownership and the availability of contemporary cooking fuels.
- India has made great progress in electricity access in recent years through the Saubhagya scheme, and government data indicate that more than 99 per cent of households were connected to electricity in 2019.

Future of the Energy Sector:

- As per IEA, within the next two decades, solar power is projected to see great development in India, eventually equalling the amount of coal in the mix of power generation in India.
 - Currently, solar energy is responsible for less than 4 per cent of India's total electricity output, whereas coal is responsible for close to 70 per cent.
- Solar power, along with other forms of generation technology and energy storage, is encouraged to be combined in order to provide a “round-the-clock” supply, which is one of the driving forces behind the growth of renewable energy projects on a utility scale.
- Between 2014 and 2019, there was approximately a 55 per cent increase in the amount of money invested in renewable energy.
- Wind and solar photovoltaic electricity currently account for 7 per cent of total output, which is twice as much as their proportion in 2014.
- Nevertheless, there are still major structural, legislative, and institutional impediments that might hamper further expansion, and the level of success has been variable among the many forms of renewable technology.
- Congestion on the grid, concerns regarding the development of grid infrastructure, and the weak financial status of many state distribution businesses are some of the challenges that need to be addressed and overcome.

India to lead the Global Energy Sector:

- Between 2019 and 2040, India will have the highest rise in energy demand of any country, accounting for about one-quarter of the total global increase.
- India, which is currently a major player in solar photovoltaics (PV), will take on a similar role in battery storage, attracting more than a third of global investment between 2019 and 2040.
- India's power system will grow larger than the European Union's by 2040, and it will be the world's third-largest in terms of electrical generation.
- Furthermore, India's installed renewable energy capacity will be thirty per cent greater than that of the United States.
- To capitalise on India's position as a leader in the deployment of battery storage and other clean energy technologies the government intends to capture a larger share of this demand through domestic production.
- India's policymakers will have the critical responsibility of managing the risks and geopolitical hazards connected with these increasingly crucial value chains.
- By the year 2040, the solar PV module, wind turbine, lithium-ion battery, and water electrolyzer businesses in India are expected to generate a combined annual revenue of over \$ 40 billion.
- With a total yearly trade volume of over \$ 3 billion, India is now a net importer of goods such as solar photovoltaics (PV) and batteries.

7. Renewable Energy Transforming Rural Women

Distributed Renewable Energy (DRE) Spurring Rural Women's Micro-Entrepreneurship:

- DRE is a renewable energy-based system that can generate and distribute energy independent of a centralised electricity grid and provides a wide range of services like lighting, cooking, space heating, and cooling.
- In India alone, CEEW estimates a market upwards of USD 53 billion for using clean energy for productive enterprises in rural areas such as cold storage, looms, rice mills, and sewing machines.
- Each solar cold storage could augment the incomes for 50-100 farmers. Each agro-processing unit could help a group of farmers, or as in India, farmer producer organisations (FPOs).
- Additionally, there is significant potential in textile value chains and small, petty shops, especially for small refrigerators, including in value chains like dairy and fisheries.
- In February 2022, MNRE released a draft policy framework for promoting DRE livelihood applications with an explicit gender emphasis.
- A women-led initiative, Hariyali Green, was implemented by the Association of Renewable Energy Agencies of States (AREAS) under MNRE (AREAS-MNRE) along with the Natural Resources Defense Council (NRDC) and the Self-Employed Women's Association (SEWA).

Access to Clean Energy Equals Access to Better Education and Health:

- Women, because of gender-based division in household work, are involved in collecting fuel for cooking and transporting them over long distances.
- Rural Indian women, on average, spend five to eight hours every day on cooking, and 20 per cent of this time is used in securing fuel wood alone. This has, in turn, reduces their time for study, schooling, or paid employment. Further, biomass fuel causes severe and long-term health problems such as respiratory diseases.
- The World Health Organisation (WHO) reports that 500,000 deaths occur yearly due to unclean cooking fuels in India. The International Energy Agency (IEA) estimated that the average firewood load carried by women for several miles daily varies from 25-50 kg.
- Providing clean energy access can reduce the drudgery among rural women, giving them time for education or skill upgradation and improving their health.

8. India: A Green Hydrogen Global Hub

Background

- The Union Cabinet on 4th January 2023 approved the National Green Hydrogen Mission with an initial outlay for the mission is Rs.19,744 crore.
- The mission seeks to promote development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonnes) per annum with an associated renewable energy capacity addition of about 125 GW in the country by 2030.
- Indian Oil Corporation aims to replace at least a tenth of its current fossil-fuel-based hydrogen at its refineries with carbon-free green hydrogen.
- In the long run, it envisages an investment of over Rs. 8 lakh crore and creation of over 6 lakh jobs by 2030.
- The Ministry of New and Renewable Energy (MNRE) will formulate the scheme guidelines for implementation.
- The Mission will also help India export high-value green products making it one of the first major economies to industrialise without the need to 'carbonise'.
- India's distinct advantage in terms of low-cost renewable electricity, complemented by rapidly falling electrolyser prices, can enable green hydrogen to be not just economical compared to fossil-fuel based hydrogen but also compared to the green hydrogen being produced around the globe.

The Story So far:

- Top industry leaders such as Reliance Industries Limited (RIL), Gas Authority of India Limited (GAIL), National Thermal Power Corporation (NTPC), Indian Oil Corporation (IOC) and Larsen and Toubro (L&T) plan to foray into the green hydrogen space.
- India has declared its ambition to become an exporter of hydrogen to Japan, South Korea, and Europe.
- Various hydrogen powered vehicles have been developed and demonstrated under projects supported by the Government of India.
- Government policy in India is also extremely supportive of new investments in the hydrogen ecosystem and recently Indian enterprises can satisfy their renewable purchase obligations (RPOs) by purchasing green hydrogen.
- In India, the production cost of green hydrogen is around Rs. 500 per kg. The government expects to reduce the cost of manufacturing green hydrogen by 40-50 per cent through its policy initiatives.

SCIENCE REPORTER - FEBRUARY 2023

1. Substance and shadow of COP27

Background of UNFCCC COP

- The population on earth has crossed eight-billion inhabitants on our planet, and so is the pressurizing demand for adequate food, water, and energy supply.
- It took the earth 1+ million years to add 300+ million people, while a billion were added in the last 13 years.
- The industrial revolution of 1850 was the starting point of fossil fuel rapid consumption. In the next 10 years, we will cross the 1.5 degree Celsius (Paris agreement), from the current 1.2 degrees Celsius of global warming.

Why addressing climate change is important?

- By 2030 our need for global grain production will be 3 billion tons, from the current 2.7 billion tons, while for the first time this year, we have reduced production by 4%.
- We need to adapt mitigation steps to fight the factors endangering our planet and which could have cross-cutting implications for safety and stability.
- Energy-based catastrophe is eating the fabric of our society. The world has witnessed unprecedented extreme weather events that have dramatically affected and penalized the lives and livelihoods of the most vulnerable communities.

COP 27 at Sharm el-Sheikh in Egypt

- During 6-20 November 2022, at Sharm el-Sheikh in Egypt, 112 world leaders gathered to pledge for COP 27, to discuss and deliberate "Together for Implementation" to tackle the global climate crisis by taking adaptive steps, and to translate commitments into action.
- At COP 27, the leaders discussed and agreed with the necessity to implement systemic changes to move away from a fossil-driven economy.

Key takeaways from COP27

- **Pledges to implementation:** The time has come to move from pledges to rapid, robust, and impactful implementation.
- **Approach:** Multi-stakeholder high-level roundtable to chart a path to overcome climate crisis and financing, resources, and tools to effectively deliver action.
- **Polluter pays:** It is imperative to develop innovative strategies and mobilize appropriate and adequate finance, tech-transfer, resource building, and major climate investments from developed to developing countries, to ensure the progress of the marginalized communities.
- **Climate finance:** In line with the convention and Paris agreement, public finance remains the main source of funding for adaptation, mitigation, and capacity-building projects in developing countries.
- Reforms and scope scaling of a multilateral development bank to boost financing for climate action. Reduction in the disparity in interest rates between developing and developed countries.
- **Clean energy:** Global cooperation in unlocking the full potential of green hydrogen production and banks should facilitate low-carbon hydrogen in their green financing and bond.
- **Food security** is one of the most vulnerable to climate change, nevertheless the contributor to GHG emissions and the main driver of deforestation.
- **Water security:** To gratify the basic human need for adequate quantities and quality of water requires a multi-stakeholder cross-sectoral approach, i.e. policies on transboundary water management.
- **Loss and damage fund:** Establishment of loss and damage fund and make it operational in the coming period.
- **Target the vulnerable:** Change in viewpoint, the development of vulnerable communities should no longer be seen as a charity.

Conclusion:

Our planet is fast approaching tipping points that will make the climate crisis enduring. Emissions anywhere are a threat to humanity everywhere. We have to ensure to convert pledges and promises into action and this needs adequate public financing. We have the collective capacity to transform through science-based activities.

2. Stripping CO2 of its villainy

Introduction

Carbon dioxide is considered as the greatest contributor to global climate change because it may cause unprecedented damage to the environment in the near future which would take hundreds or even thousands of years for the earth to recover from.

Effects of carbon dioxide on global warming

- Scientists predict that many of the coastal cities will get submerged, there would be frequent droughts and heat waves, increased frequency of wildfires, and the frequency of hurricanes and tornadoes will increase manifold due to the El Nino effect.
- In the worst scenario, global warming may lead to a reduction in biodiversity and even mass extinction in which more than fifty per cent of the species will be wiped out.
- The earth may require hundreds of thousands of years to recover.

Importance of Carbon dioxide

- Carbon dioxide is an essential component in the flow of energy in the biosphere.
- It is an essential component of photosynthesis. Carbon dioxide thus is essential for life on the Earth.
- Besides, if the amount of carbon dioxide in the atmosphere goes low beyond a level, it could lead to an ice age and more importantly. It may lower the efficiency of photosynthesis which will affect the biosphere negatively resulting in lower productivity of plants, lower throughput of animals and even loss of biodiversity.
- **The invention of fire and food security:** Since the invention of fire, humans have contributed to the addition of carbon dioxide to the atmosphere by burning wood which releases carbon dioxide. Fire makes us human, without cooking, we might not have received the extra calories that our brain needs. Human resources could be freed for developmental activities because agriculture and cooking gave food guarantees. Availability of food ensured human settlements.
- **Infrastructure development** too is closely related to the economic development of society and quality of life. Important components of the infrastructure are power, transport and real estate which are the biggest emitters of carbon dioxide. Vehicles also burn fossil fuel in combustion engines or electric power which indirectly is associated with the release of carbon dioxide into the atmosphere.
- **Building factories and real estate** are dependent upon the production of steel and cement which are both carbon dioxide-intensive processes.

Conclusion:

- There is a high correlation between population growth and the concentration of carbon dioxide in the atmosphere.
- As the population began to increase so did economic activities. In ancient times, with the growth of agricultural activities, carbon dioxide emissions increased due to land usage. Advances in pottery, cloth making, mass manufacturing of weapons, utensils, jewellery and cooking all added to the release of carbon dioxide to the atmosphere
- Over the years the concentration of carbon dioxide in the atmosphere would have increased and it is highly likely that GDP and the concentration of carbon dioxide in the atmosphere are correlated and have a causal relationship

3. Front of Pack Nutrition Labeling (FOPNL)**What is Front-of-Pack Nutrition Labeling (FOPNL)?**

- According to the Food Safety and Standards Authority of India (FSSAI), the Front-of-Pack Nutrition Labeling (FOPNL) is a form of supplementary nutrition information that is presented on the front-of-pack of pre-packaged foods.
- Front-of-Pack Nutrition Labeling (FOPNL) can include symbols/graphics/text or a combination that provides data on the total nutritional value of the food

Types of Front-of-Pack Nutrition Labeling (FOPNL)

The FOPNL have been classified into two categories namely

- Summary Indicators
- Nutrient Specific Nutrition Labels

Summary Indicators

- **Nutri-Score:** this type of FOPNL was launched in France in 2017 and has been in use in Belgium, Spain, and Portugal.
 - Nutri-score has five alphabets wherein each of these alphabets indicate the nutrition quality of the food.
 - A – very healthy, B – healthy, C – medium, D – unhealthy, E – very unhealthy.
 - The quality of nutrition in food can also be identified by the colours where in Dark green indicates very healthy, whereas Red indicates very unhealthy.



- **Health Star Ratings:** This type of FOPNL was adopted in New Zealand after being introduced by the Australian government in June 2014.
 - Health Star Rating gives packaged foods a star rating which ranges from half a star to five stars based on their overall nutritional quality.
 - 5 stars imply very healthy whereas 1 or half a star indicates very unhealthy.



- **Choices Programme:** Introduced in the Netherlands in 2006 and such type of FOPNL is also adopted in Czech Republic, Argentina and Nigeria.
 - The Choices logo conveys a good health message and aids consumers in choosing the healthiest alternative.



Nutrient Specific Nutrition Labels

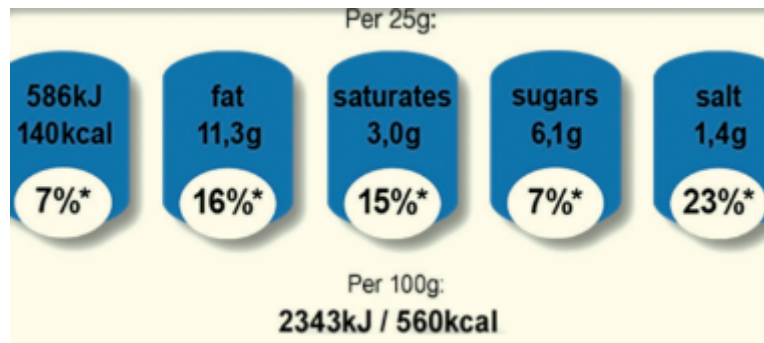
- **Multiple Traffic Lights:** This Colour-coded system which is also called as the traffic-light labeling system was introduced in 2006, but
 - This label gives nutrient-specific information which is colour coded similar to traffic signals
 - Red colour indicates danger whereas green is safe.
 - If nutrients of concern such as sugar, salt and fat are in above the normal range such food items are accorded red colour.



- **Warning Labels:** Such type of label was introduced in 2016 by the Chilean government.
 - This label focuses only on the negative aspect of the food product.
 - Such a label provides information whether the product is high in sugar, high in salt and/or high in fat (also high in saturated fat and trans fat).



- **Reference Intakes:** Such kinds of label were first introduced in 2016 under the European Union Food Information for consumers regulation.
 - These provide Energy-only or energy-plus-fat-saturates-sugars-and-salt information.



The need for FOPNL

- The prevalence of non-communicable diseases (NCDs)
 - While deaths caused due to communicable, maternal, neonatal, and nutritional diseases have reduced in India there is a huge concern about non-communicable diseases (NCDs) linked deaths.
 - In 2016, NCDs accounted for 55% of premature death and disability in the country
 - According to latest reports NCDs account for 60% of all deaths in the country
- Excessive fat levels among Indians
 - Indians are found to have excessive fat around the stomach and abdomen which increases the risk of cardiovascular diseases and type 2 diabetes.
 - As per the National Family Health Survey-5: 47.7% of men and 56.7% of women have a high risk waist-to-hip ratio.
- Increase in the consumption of packaged and junk food
 - It is found that increased consumption of packaged and junk food has increased the burden of undernutrition and overnutrition among children.
 - Consumption of highly processed foods increases the risk of obesity, diabetes, hypertension, heart diseases, stroke, and kidney disease.
- As per the Comprehensive National Nutrition Survey in India (2016-2018), about 50% of children and adolescents are at a risk of cardiovascular diseases.

4. Council of Scientific & Industrial Research (CSIR)

About Council of Scientific & Industrial Research (CSIR)

- Council of Scientific & Industrial Research (CSIR) is the country's premier R&D organisation.
- The Council of Scientific and Industrial Research (CSIR) is an autonomous body established in 1942.
- The Council of Scientific & Industrial Research (CSIR) is known for its cutting edge R&D knowledge base in diverse S&T areas such as oceanography, geophysics, chemicals, drugs, genomics, biotechnology and nanotechnology.
- The headquarters of the Council of Scientific and Industrial Research (CSIR) is located in New Delhi.
- **CSIR Vision:** Enhance quality of life of the citizens of India through innovative Science and Technology, globally competitive R&D, by developing sustainable solutions and capacity building to fulfil dream of Atmanirbhar Bharat
- **Mission:**
 - Technology innovation
 - Developing advanced technology solutions for National aerospace programs and development of small and medium sized civil aircraft
 - Meeting international benchmarks
 - Creation and demonstration of scalable and sustainable green technologies
 - Ensuring sustainable agriculture
 - Capacity building – Knowledge Base, Human Resource & National Facilities

● **Some of its notable achievements of CSIR:**

- The CSIR has over 2971 patents filed internationally with 1592 patents filed in India. Since its inception in 1942 over 14000 patents have been granted worldwide.
- CSIR has been ranked 37th among 1587 government institutions worldwide and is the only Indian organization among the top 100 global government institutions.
- Development of the indigenously developed synthetic drug, methaqualone
- Design of the first India Tractor – Swaraj – in 1967
- First organisation in India to analyse the genetic diversity of the tribes of Andaman and Nicobar islands.
- Designed India's first-ever parallel processing computer, Flosolver.
- Upgradation of one of India's oldest refineries at Digboi using modern distillation technology
- Establishment of the 'Traditional Knowledge Digital Library' which can be accessed in five languages – English, German, French, Japanese and Spanish
- Successfully challenged the grant of patent in the US for use of Haldi (turmeric) for wound healing and neem as insecticide.
- Successfully completed the sequencing of the Human Genome in 2009



DOWN TO EARTH - FEBRUARY 2023

1. Jharkhand drought

Context: The monsoon season in Jharkhand has recently been the worst in a century. More on the story The monsoon rains in Jharkhand have never been this bad in the previous 122 years.

News in detail

- The rainfall recorded over Jharkhand between June and August was 371.9mm compared to a normal of 627.6mm, a 41 percent seasonal deficiency.
- According to IMD rainfall data, this is the driest June to August on record for Jharkhand since 1901.
- In the last 122 years, Jharkhand has only twice seen rainfall this bad.

What's causing the drought?

- There were merely three low-pressure systems that formed in the Bay of Bengal this season, most of which were off the coast of Odisha.
- None of these systems had an effect on Uttar Pradesh, Bihar, or Jharkhand.
- As a result, one of the two sources of rain continued to be unfavourable for these states.

Monsoon trough

- The monsoon trough, an east-west low-pressure region that extends from the heat low over Pakistan to the head of the Bay of Bengal, was also present this year.
- Most days in July and August so far have seen the sun staying south of its usual position.

What impact does the Monsoon trough have?

- The position, oscillation, and duration of the monsoon trough over a particular area all have a direct impact on the amount of rainfall that occurs in the areas directly to its south.
- This means that most of central and peninsular India experience active or intense rainfall when it is placed to the south of its normal position.
- Uttar Pradesh, Bihar, Jharkhand, West Bengal, and the northeastern states profit when it moves north of its usual position or is located in the foothills of the Himalayas.
- Those unfavorable circumstances resulted to significant seasonal rainfall deficits.

Storage for reservoirs

- The water reserves in Jharkhand's six major reservoirs were 0.594 billion cubic metres (BCM) as of August 11, according to the Central Water Commission's reservoir storage report, which compares to a 10-year average of 1.18 BCM.
- In other words, just 30% of the total storage capacity is made up of usable water stocks. Comparatively, 78% of the total storage capacity was occupied by the same stocks at the same time last year.
- The UP reservoirs have filled up to 28% of the eight dams' combined storage capacity. In 2021, it will be 53%. Compared to a 10-year average of 3.09 billion cubic metres, the present water reserves are 2.15 billion cubic metres.

Impacts of Drought

- Economic, environmental, and societal effects result from drought.
- A sizable share of the effects of the drought is attributable to its immediate effects on agriculture and water supplies.
- Others include long-term effects on the population that is directly impacted by droughts, such as farmer earnings and the state of drought-affected communities' health, nutrition, and educational standing.
- The downstream sector includes industries dependent on agriculture and water as its third level.
- Then there are more general and long-term effects on things like fiscal balance, GDP, trade, and foreign exchange.
- An inter-ministerial mechanism called the Crop Weather Watch Group (CWWG) assesses the information and data provided by IMD and other scientific and technical organizations to ascertain the expected effects of meteorological occurrences and other environmental factors on agriculture.

Way forward

- In the key rice-producing states of the nation, food and water scarcity will be the main problems, which could have an impact on this year's kharif harvest in India.
- The Agricultural Meteorology division in Uttar Pradesh has recommended rice transplantation and the usage of short-duration rice cultivars.
- Intercropping is a further recommendation for farmers.
- The Agri meeting has recommended that farmers in Jharkhand take steps to preserve soil moisture.
- It is not recommended to sow until there has been 50 to 60 mm of rain and adequate moisture for at least three days.
- The remaining crops of the year should be considered for cultivation, including short-duration rice, millet, maize, and arhar.

2. New energy source

Context: Sand batteries have a large capacity for thermal energy storage and can help with clean energy solutions.

News in detail

- In the village of Kankaanpää, Finland has built the first fully functional “sand battery” capable of storing green energy for several months. The issue of year-round supply can also be resolved with the batteries.

About sand batteries

- Sand or sand-like materials are used as the storage medium in “sand batteries,” which are high-temperature thermal energy storage systems. In the form of heat, sand retains energy.
- Sand is a particularly efficient heat-storage material that can hold heat for months at a time.
- Its major function is to act as an overflow wind and solar energy storage with high power and high capacity. The energy is converted to heat, which can be used to heat buildings or to supply hot steam and high-temperature process heat to sectors of the economy that are frequently dependent on fossil fuels.
- By ensuring that there is always a method to benefit from clean energy, even if there is a significant surplus, the sand battery aids in the ambitious upscaling of renewable energy production.

How does a sand battery work?

- The heat is kept in a steel silo that holds 100 tonnes of sand.
- With conventional ovens and an air-to-water heat exchanger, resistors are utilized as an electric air heater.
- Water and a mechanical pipe make up the heat exchanger.
- Sand traps heat at a temperature of about 500 Celsius (the same process that makes electric fires work).
- Sand is at the centre and far from the boundary, preventing the loss of heat from the core.
- It may persist for days or weeks.
- The reservoir can hold temperatures up to 600 degrees Celsius and prevent heat losses over time since it is so well-insulated from the outside environment.
- It has a heat storage capacity of up to 8 megawatt-hours.

3. Bid for bio-CNG

Context Recently The largest Gobar-Dhan Bio-CNG Factory in Asia was inaugurated by Prime Minister Narendra Modi in the Indore neighborhood of Devguradia via virtual means from Delhi.

About Bio CNG

- Around 95% of the methane gas in bio-CNG is pure methane.
- Its composition (97% methane) and energy potential are identical to natural gas.
- Bio-CNG, which is created from food and agricultural waste, is a renewable alternative to natural gas, which is a fossil fuel.
- A biogas purification unit, a compressor, and a high-pressure storage system are typical components of a bio-CNG station.
- Being considered as an environmentally suitable substitute for diesel is bio-CNG.

About SATAT

- Sustainable Alternative towards affordable transportation (SATAT) was launched in 2018 by Ministry of Petroleum and Natural Gas (MoPNG).
- By 2023, it intends to produce 15 MMT of CBG from 5000 plants.
- Oil and gas marketing firms are required by SATAT to purchase ready gas from CBG firms.

Advantages

- Less reliance on imported crude oil
- Economic decarbonization
- Handling of waste
- Creating jobs

What difficulties does bio-CNG technology face?

- Feedstock availability - The businesses are having trouble producing enough and reliable feedstock.
- Waste segregation: If waste is not properly segregated, it may enter the digester along with other hard particles that not only decrease its energy efficiency but also harm it.
- Investing - Small investors are being kept out of the CBG market by high capital requirements.
- Limited technical capacity of municipal authorities - In the Municipal Solid Waste division, just one person is typically in charge of several duties, which is too much to manage.
- Also in its early stages, CBG technology lacks local industry knowledge.
- Distribution Issues - The city gas distribution (CGD) network can be injected with CBG using the SATAT CBG-CGD synchronization method.
- Yet gas distributors have a barrier to using this programme because of the difference tax treatment of CNG and CBG.
- Infrastructure problems - A lack of infrastructure causes the user to be hesitant while making a buying decision.

- Manure market - As part of Integrated Nutrient Management, it is required by SATAT that fertiliser firms offtake fermented organic manure from CBG companies.
- But no sales have been made.
- Also, compared to the heavily subsidised chemical fertilisers, farmers find it expensive to purchase.

4. Invasive species

Context The Gulf of Mannar (GoM) island of Valai includes coral reef regions, and the invasive seaweed *Kappaphycus alvarezii*, which suffocates and kills coral reefs, is poised to spread to new coral colonies in the Marine National Park.

About Gulf of Mannar

- It is an inlet of the Indian Ocean located between western Sri Lanka and southeast India. Rameswaram (island), Adam's (Rama's) Bridge (a chain of shoals), and Mannar Island form its northeastern boundaries.
- The gulf measures 100 miles (160 km) in length and 80-170 miles (130-275 km) in width. Many rivers, including the Tambraparni (India) and the Aruvi, are received there (Sri Lanka).
- On the seaside is the port city of Tuticorin. The gulf is renowned for its sacred chank and pearl banks (a gastropod mollusk). Habitat: The Indo-Pacific region is the seaweed's native habitat.
- For commercial uses, it has been widely introduced and grown in tropical areas.

About Marine National Park.

- Under the guidelines of the Wildlife (Protection) Act, 1972, the Maritime National Park was created in 1982. About 162.89 km² is the whole area of the National park.
- The Marine (Gulf of Kutch) National Park contains 42 islands off the coast of Jamnagar, the majority of which are encircled by reefs.
- Coral reefs, mangroves, mudflats, creeks, seagrass, and seaweed are just a few of the major ecosystem types that can be found. There are also estuaries, sandy beaches to saline grasslands, marshy areas, and rocky shoreline. Rich avian and marine life are supported by all habitats.

About *Kappaphycus alvarezii*

- The IUCN has identified the invasive seaweed *Kappaphycus* as a red-listed species.
- It is employed in the creation of the commercially successful Carrageenan polymer.
- Carrageenan is a chemical that is derived from red and purple seaweeds and utilised in food items as a thickening or emulsifying agent.

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