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NOVEMBER 2021

G.S PAPER I

1. INDIAN HISTORY, ART & CULTURE

1.1 Barabar Hills - The Earliest Rock-cut Monuments in India

What is the news?

The Barabar hills in Bihar's Gaya district contain a unique group of man-made rock-cut caves (3rd century BCE) of great historical value and architectural and sculptural significance.

What was the ancient association of kings with Barabar hills?

- **Ashoka** - The caves of Sudama and Visvamitra were created in the 12th regnal year of Asoka, and the Karna Chaupar was made in his 19th regnal year.
- But the Lomas Rishi cave remained unfinished and hence also contains no edict of Asoka.
- However, the ground plan of the Sudama and Lomas Rishi caves are nearly identical, and many scholars consider the latter one to be also excavated during the last 20 years of Asoka's reign.
- **Dasaratha** - In the Nagarjuni hill, Asoka's grandson, Dasaratha (232-224 BCE), had excavated three caves on the occasion of his accession to the throne at Magadha with each one bearing his edict.
- These three caves are known as the Gopika, Vadathi and Vapiya.
- Naaga-arjuni points to the divine White Elephant for *naaga* means an elephant (and also a 'serpent'), and *arjuna* means white colour.

What was the relevance of Ajivikas?

- All the caves of the Barabar and Nagarjuni hills were donated as dwellings to Ajivika ascetics.
- It was an ancient Indian religion that however completely vanished after the 14th century.
- The religion was founded by **Goshala Maskariputta**, who was known to be a contemporary of Mahavira and Gautama Buddha.
- Though nothing is known about the religious practices of the Ajivikas, it is said that these ascetics had worshipped the elephant.

What is the uniqueness of Barabar hills?

- The Barabar Hill Caves are the oldest surviving rock-cut caves in India, since the Mauryan Empire
- It is located in the Makhdumpur, Bihar, India and the name "baraabar" means 'on par with one another'.
- These caves are set of seven rock-cut caves carved out from granite.
- The Barabar hilltop is divided into halves and it appears like a pair of elephants that face each other while leaning onto the ground.
- **Lomas Rishi Cave** - Lomas Rishi Cave consists of an elaborately-decorated door (*dwaara-torana*) consisting of a row of elephants that progress towards the 'Stupa' emblems.
- The motif of *makara* (crocodile) has been carved prominently on either end of the torana.
- The architecture used on the entrance door characterizes the form of the Chandrashala or the Chaitya arch.
- The overall shape of the entrance is usually described as like the horseshoe, but more aptly as the *gaja-prista-aakara* (in the shape of an elephant's back).
- The Lomas Rishi cave has no inscription of Ashoka since it is incomplete, most likely because of certain technical problems like the appearance of large cracks in the granite stone.
- The interior of all the caves, including one side of the Lomas Rishi, have been finely polished, a typical feature of Mauryan art.



- **Sudama Cave** - The Sudama cave has a vaulted chamber with a 'Mandapa' within it.
- In the first cave of the series the ceiling of the cave is arched.
- The interior walls of this cave create a mirror effect and the surface of the cave re-echoes sounds to favor the melodies sung by the Ajivika monks who resided.
- **Vishwamitra Cave** - Also called the Viswakarma Cave, it is approachable through the steps of Ashoka.
- The cave consists of two rectangular rooms.
- The inscriptions at the entrance dedicate this segment of the raising to the Ajivikas.
- While the cave was declared sacred by the legendary King, it does not have post-Ashoka inscriptions.
- **Karan Chaupar Cave** - Confining with a single rectangular room with polished walls, the Karan Chaupar cave contains inscriptions of the 3rd Century BCE.
- The inscription, which is located at the entrance to the cave, focuses on the Buddhist practice of retirement (Vassavasa) during the rainy season.
- The scriptures also suggest that this particular segment of the Barabar Caves was reserved for Ajivika monks.

2. SOCIAL ISSUES

2.1 Error Corrected on Interpreting POCSO Act

What is the issue?

The Supreme Court quashed a Bombay High Court decision to acquit a man charged with assault under the POCSO solely on the grounds that he groped the child over her clothes without 'skin-to-skin' contact.

What is POCSO act?

- The Protection of Children from Sexual Offences (POCSO) Act was enacted in 2012 especially to protect children aged less than 18 from sexual assault.
- It admitted that a number of sexual offences against children were neither specifically provided for in existing laws nor adequately penalised.
- Therefore an offence against children needs to be explicitly defined and countered through proportionate penalties so that it acts as an effective deterrence.
- The **UN Convention on the Rights of the Child** which was ratified by India in 1992 requires sexual exploitation and sexual abuse to be addressed as heinous crimes.

How does POCSO and IPC deal with sexual assault?

- In IPC the definition of assault or criminal force to woman with intent to outrage her modesty is very generic.
- In POCSO, the acts of sexual assault are explicitly mentioned such as touching various private parts or doing any other act which involves physical contact without penetration.
- However it excludes rape which requires penetration; otherwise the scope of 'sexual assault' under POCSO and 'outraging modesty of a woman' under the IPC is the same.
- IPC provides punishment for the offence irrespective of any age of the victim but POCSO is specific as it is for the protection of children.
- **Section 7 of the POCSO Act** says that whoever with sexual intent touches the private parts of the child is said to commit sexual assault & the Section 8 of Act provides minimum imprisonment of 3 years.
- Whereas Section 354 of the IPC lays down a minimum of one year imprisonment for outraging the modesty of a woman.

What were the earlier judgements that stirred debates?

- **Nagpur Bench's judgement** - In 2020, the Bombay High Court's Nagpur bench acquitted a man under POCSO Act and held that an act against a minor would amount to groping or sexual assault **only** if there was "skin-to-skin" contact.



- The High Court had concluded that mere touching or pressing of a clothed body of a child did not amount to sexual assault.
- The accused was sentenced to minimum 3 years imprisonment under Section 8 of the POCSO Act but the High Court reduced his sentence to 1 year under Section 354 (assault of a women to outrage her modesty) of the Indian Penal Code.
- **Gadchiroli special court's judgement** – The special court convicted and sentenced the accused for offences punishable under IPC Section 448 and 354-A (1)(i) and Sections 8 and 10 read with Sections 9(m) and 12 of POCSO Act.
- But the court set aside his conviction under Sections 8 and 10 of POCSO Act.
- It took a lenient view that the act of holding the hands of the prosecutrix and opening the zip of the pant did not fit into the definition of sexual assault.

What is the Supreme Court's interpretation?

- The Supreme Court has set aside the two judgments that acquitted two offenders against children from the graver charge of sexual assault.
- The court has said that narrow interpretation of the words 'touch' or 'physical contact' to 'skin to skin contact' of Section 7 would frustrate the very object of the Act.
- The court ruled that the act of touching the sexual part of body or any other act involving physical contact, if done with sexual intent would amount to sexual assault within the meaning of Section 7 of POCSO Act.

Why is the judgement significant?

- The High Court's understanding was flawed and out of sync with the legislative intent behind the enactment of a stringent law to protect children.
- The Supreme Court judgment sets right the misinterpretation of the statute and underscores that the core ingredient of a sexual offence is the "sexual intent" behind it.
- The Court's decision of holding such an accused guilty is in the spirit of the legislation enacted to protect a child's dignity and autonomy from undesirable intrusions.
- For a country that reported over 43,000 POCSO offences in the past one year and where the conviction rates are very low, the SC observation should accelerate things towards an unmistakably clear-cut and firm view of the situation.

2.2 POC defense: Sonu Kushwaha vs State of U.P.

Why in news?

Recently, Allahabad High Court has said that a penetrative sexual assault on a 10-year-old boy by an offender did not amount to an aggravated form of the crime.

What is the issue?

- A case was registered against Sonu Kushwaha under Section 377, 506 IPC and Section 3 and 4 of POCSO Act for performing oral sex with a minor boy when he was 10 years old (2016).
- The trial court convicted and sentenced him under Section 377, 506 IPC and Section 6 of POCSO Act.
- The court sentenced the appellant to 7 years of rigorous imprisonment along with fine.

(Note: The incident and registration of complaint happened in 2016. Hence the judgment was based on POCSO Act, 2012 and not on the POSCO (Amendment) Act, 2019 as its provisions does not apply retrospectively)

What are the important provisions of POCSO Act, 2012?

- The Protection of Children from Sexual Offences (POCSO) Act was enacted in 2012 especially to protect children aged less than 18 from sexual assault.
- The Act defines a child as any person below 18 years of age and defines different forms of sexual abuse including penetrative, non-penetrative assault as well as sexual harassment and pornography.
- **Section 4** deals with penetrative sexual assault and imposes a minimum imprisonment of 7 years.
- **Sections 5 and 6** of the POCSO Act deals with aggravated penetrative sexual assault punishable with a minimum prison term of 10 years that can go up to life.

- **Section 5(m)** says that whoever commits penetrative sexual assault on a child below 12 years would be punishable with the offence of aggravated penetrative sexual assault.
- **Section 9 and 10** deals with aggravated sexual assault with imprisonment which shall not be less than 5 years but which may extend to 7 years and shall also be liable to fine.
- **POCSO (Amendment) Act, 2019** - The Act has enhanced punishment under various sections including punishment for aggravated penetrative sexual assault to be increased to include death penalty.
- The minimum punishment for penetrative sexual assault has been increased from 7 years to 10 years.
- **POCSO Rules, 2020** - New rules include the provision of
 1. Mandatory police verification of staff in schools and care homes
 2. Procedures to report sexual abuse material (pornography)
 3. Imparting age-appropriate child rights education among others

What was the Allahabad high court's observation?

- The Court observed that the offence committed by the appellant neither falls under Section 5 or 6 of the POCSO Act nor under Section 9(M) of the Act as penetrative sexual assault is involved in the present case.
- The penetrative sexual assault under Section 4 is a lesser offence than aggravated penetrative sexual assault under Section 6.
- So the Court reduced the sentence of the appellant from 10 years of rigorous imprisonment to 7 years and further imposed a fine of Rs 5,000.
- The court has neglected Section 5(m) that penetrative sexual assault on a child below 12 years can be added to aggravated penetrative sexual assault list.

What is the role of NCPCR in this regard?

- The National Commission for Protection of Child Rights (NCPCR) was set up in March 2007 under the Commissions for Protection of Child Rights (CPCR) Act, 2005. It is a statutory body under the administrative control of the Ministry of Women & Child Development.
- It has urged the Uttar Pradesh chief secretary to file an appeal against an Allahabad High Court judgement.
- NCPCR is mandated under sections 109 of the Juvenile Justice Act, 2015 and 44 of POCSO Act, 2012 to monitor the implementation of the Acts.
- It has observed that the high court verdict of commuting the sentence of the accused from 10 years to 7 years and the offence from aggravated penetrative sexual assault to penetrative sexual assault seems to be not as per the letter and spirit of the POCSO Act, 2012.
- The commutation of sentence is observed by the commission to be prejudicial to the justice delivered to the victim in this case.

What does the judgement imply?

- The High Court's view that a particular act amounting to a penetrative sexual act does not attract the punishment prescribed for its aggravated form will have on lower courts trying similar cases.
- The Supreme Court's broader interpretation of the POCSO Act seems to be an error correction made by the High Courts that narrowly interpreted the words 'touch', 'physical contact' and 'skin to skin contact'.
- In this regard, the verdict in Sonu Kushwaha vs State of U.P. has to be reviewed as it seems to be based on an error of law.

What are the other initiatives taken for the protection of children from sexual assaults?

- **Fast Track Special Courts** - The government is setting up 1,023 Fast Track Special Courts including 389 exclusive POCSO courts for expeditious trial and disposal of cases related to rape and the POCSO Act.
- **Special Juvenile Police Unit**- Any person who has received any pornographic material involving a child or any information shall report the contents to the Special Juvenile Police Unit or the cybercrime portal.
- **Periodic training** - The government has been providing orientation programmes, sensitisation workshops and refresher courses to all persons coming in contact with the children to sensitise them about child safety and protection.
- **POCSO e-Box** - POCSO e-Box is an online complaint box for reporting child sexual abuse.

- It is an NCPCR initiative to help children report such crimes directly to the Commission.
- **United Nations Convention on the Rights of the Child** - The Convention which requires sexual exploitation and sexual abuse to be addressed as heinous crimes was ratified by India in 1992.

2.3 A Brief History of India's Poverty Levels

What is the issue?

There have been debates over whether the poverty has gone up during the recent years and the answer depends on whether one looks at the overall incidence of poverty in percentage terms or the absolute number of poor.

What is poverty?

- According to the **Suresh Tendulkar Report 2009**, the concept of poverty is associated with socially perceived deprivation with respect to basic human needs.
- Poverty is a “relative” concept and it is essentially about how you are relative to those in your surrounding.
- Abject poverty or Absolute poverty refers to a state where a person is unable to meet the most basic needs such as eating the minimum amount of food to stay alive.

What is a poverty line?

- Poverty levels refer to some level of income or expenditure below which one can reasonably argue that someone is poorer than the rest of the society.
- It is a level of income or consumption expenditure that divides the population between the poor and non-poor.
- The poverty line suggested by the Tendulkar Committee was **Rs 29** per day per person in urban areas and **Rs 22** per day per person in rural areas.
- The purpose behind choosing a poverty line is two-fold.
 1. To accurately design policies for the poor
 2. To assess the success or failure of government policies over time

Table 1: Unprecedented fall in poverty between 2004 and 2011 has been followed by an equally unprecedented rise between 2012 and 2020

Year	Headcount Poverty Ratio (As a % of total population)	Absolute Number of Poor (in millions)
1973	54.9	321.3
1983	44.5	322.9
1993	36	320.4
2004	27.5	301.7
2004*	37.2	407.2
2011*	21.9	269.8
2019#	20.8	346.3

Source: Planning Commission and Santosh Mehrotra

What has happened in India's fight against poverty?

- **Headcount ratio of poverty**– It is the percentage of population that was designated to be below the poverty line.
- India made rapid strides since 1973 and the incidence of poverty fell quite sharply from 55% in 1973 to under 28% in 2004.
- The Tendulkar Committee recognised that in reality education and healthcare were not being met by the government.
- This raised the poverty line and essentially told us that India was poorer than what it previously believed.
- **Absolute number of poor** - The absolute numbers remained at the same level until the start of economic reforms in the early 1990s.
- Between 2004 and 2011 when close to 140 million people were brought out of poverty in just 7 years.

What has happened to poverty levels since 2011-12?

- **Consumer Expenditure Survey (CSE)** - Poverty levels are updated using the CSE, which is conducted by the National Statistical Office (NSO) once in every five years.
- The last survey that was conducted in 2017-18 showed that for the first time in four decades consumer expenditure in India had fallen.

- This might indicate that poverty levels as well as the absolute number of poor had risen between 2011-12 and 2017-18.
- However, the government claimed that the survey suffered from “data quality” issues.
- **Santosh Mehrotra and Jajati Keshari Paridas’ study** – The two academics have attempted to ascertain the impact on poverty between 2011-12 and 2019-20 by looking at the consumption related questions in NSO’s Periodic Labour Force Survey.
- They cited that even though the incidence of poverty has come down marginally, India has witnessed an increase in the absolute number of poor in the country.
- As against pulling 140 million out of poverty between 2004 and 2011, India has seen more than 76 million fall back below the poverty line between 2012 and 2020.
- **Reasons why poverty has gone up**
 1. India’s GDP growth rate has faltered post demonetization
 2. Unprecedented rise in joblessness where 2017-18 period had touched a 45-year high unemployment
 3. Fall or stagnation of real wages even before the COVID pandemic
- The government’s focus should be on creating more jobs, especially in labour-intensive sectors, such as textiles and food processing etc. as India has lost half of the jobs in its manufacturing sector alone.

G.S PAPER II

3. INDIAN POLITY

3.1 The Constituent Assembly Debates of India

Why in news?

The Constitution Day was celebrated on November 26, marking the adoption of our Constitution on November 26, 1949.

How did the Constituent Assembly evolve?

- In 1934 the seed of forming a Constituent Assembly was first sown by an Indian pioneer of the Communist movement, Mr. M.N. Roy.
- The Constituent Assembly of India came into existence as per the provisions of **Cabinet Mission Plan** of May 1946.
- Its task was to formulate a Constitution for facilitating appropriate transfer of sovereign power from British authorities to Indian hands.
- The Assembly was to have proportional representation from existing provincial legislatures and from various princely states.
- **Rajendra Prasad** was the elected President of Constituent Assembly while VT Krishnamachari and HC Mookerji served as Vice-Presidents.
- The Constituent Assembly of India sat for the first time on December 9, 1946 and held 12 sessions or rounds of sittings.
- The Assembly met for 165 days and spoke about 3.6 million words overall comprising around 8,000 pages of written documents which laid the foundation for our Constitution.
- The Constituent Assembly had precisely taken two years, eleven months, and seventeen days to complete the historic duty of drafting the Indian Constitution.
- Finally, the Constitution was adopted on **November 26, 1949** with a Preamble, 395 Articles, and 8 Schedules.
- The Constitution came into force from **January 26, 1950** which is celebrated as the Republic Day.

How diverse is the Constitutional Assembly?

- The Constituent Assembly was supposed to be a body partly elected, and partly nominated members.



- It comprised of representatives of all sections of the society namely the Hindus, Muslims, Sikhs, Parsi, Anglo-Indian, Indian Christians, SCs/ STS, Backward Classes, and women belonging to all of these sections.
- The total membership of the Constituent Assembly was to be 389.
 - 292 members elected through the Provincial Legislative Assemblies
 - The Indian Princely States was represented by 93 members
 - The Chief Commissioners' Provinces were represented by 4 members
- Almost a quarter of the members came from princely states.
- In terms of gender, there were 15 women and around 90% of the Assembly members were Hindu.
- Despite an overwhelming presence of Congress party members, there was great diversity in their ideological positions.

What is the analysis about the Constitutional debates?

- **Words spoken** - When a Lorenz curve is drawn and the number of words spoken by each member is lined up, the graph exhibits an extremely unequal distribution.
- Less than 6% of members spoke 50% of all the words uttered in the Assembly.
- Women members spoke less than 2%. (Rajkumari Amrit Kaur and Sucheta Kriplani, among others, didn't say anything).
- The most voluble speakers were Rajendra Prasad and Ambedkar (7.5% and 7.2% respectively).
- Prominent national leaders like Nehru and Patel contributed to merely 2.18% and 1.47% of the debate by word-count.
- The Gini coefficient of the number of words spoken in the Constituent Assembly debates is 0.756 which indicates high asymmetry.
- **Constitutional Ideas** – Mapping the frequency of utterance of Constitutional concepts allows us to see which concepts dominated the talks and which ones were hardly discussed.
- 'Rights' came to be the most invoked word.
- Members spoke considerably about ideas involving 'religion', 'caste', 'Hindu' and 'Muslim' much less than 'freedom'.
- More members uttered 'education' as compared to 'health'
- Words like 'secular' were used a lot more than 'dharma' or 'morality' and 'women' was invoked more than 'adivasis'.
- Interestingly, 'liberty' invocations far exceeded 'equality' which in turn was used considerably more than 'socialism'.

What is the relevance of this analysis?

- These estimates may not signal anything concrete, but they do offer a window into what occupied the Assembly's collective mind.
- This project aims for deeper research on how we the people came to where we've reached as the path is not as linear as one would think.
- If India is breathing the air of sovereignty, democracy, and freedom along with the rights and duties, it is because of the relentless efforts by notable personalities who had come together to gift India its biggest asset, the Constitution of India.

3.2 The Law on General Consent

What is the issue?

The Supreme Court has expressed concern over a CBI report that stated that since 2018, around 150 requests for sanction to investigate have been pending with 8 state governments that have withdrawn general consent.

What is general consent?

- The CBI is governed by **The Delhi Special Police Establishment (DSPE) Act, 1946**, and must **mandatorily** obtain the consent of the state government concerned before investigating a crime in a state.
- The consent of the state government can be either case-specific or general.
- A “general consent” is normally given by states to help the CBI in seamless investigation of cases of corruption against central government employees in their states.
- In the absence of general consent, the CBI would have to apply to the state government in every case, and before taking even small actions.
- According to **Section 6 of The DSPE Act**, nothing contained in section 5 shall be deemed to enable any member of DSPE to exercise powers and jurisdiction in any area in a State, (not being a Union territory or railway area), without the consent of the Government of that State.

Which states have withdrawn general consent?

- Eight states have currently withdrawn consent to the CBI - Maharashtra, Punjab, Rajasthan, West Bengal, Jharkhand, Chhattisgarh, Kerala, and Mizoram.
- At the time of withdrawing consent, all states alleged that the central government was using the CBI to unfairly target the opposition.

What is the view of the judiciary in this aspect?

- Calcutta High Court recently ruled that the central agency cannot be stopped from probing an employee of the central government in another state which has been challenged in the Supreme Court
- In Vinay Mishra vs the CBI, Calcutta HC ruled that corruption cases must be treated equally across the country, and a central government employee could not be distinguished just because his office was located in a state that had withdrawn general consent.
- The court also said that withdrawal of consent would apply in cases where only employees of the state government were involved.
- In 2018, Delhi High Court ruled that the agency could probe anyone in a state that has withdrawn general consent, if the case was not registered in that state.

What are the powers of CBI in these states?

- The withdrawal of general consent means that the CBI will not be able to register any fresh case involving officials of central government or a private person in the state without the consent of state government.
- But the CBI retained the power to investigate cases that had been registered before consent was withdrawn.
- The agency can use the Calcutta HC order to its advantage.
- A case registered anywhere else in the country, which involved individuals stationed in these states, allowed the CBI's jurisdiction to extend to these states.
- Also, the CBI has the option to get a warrant from a local court in the state and conduct the search in connection with an old case.
- In case the search requires an element of surprise, Section 166 of CrPC allows a police officer of one jurisdiction to ask an officer of another to carry out a search on their behalf.
- The consent of state governments does not apply in cases where someone has been caught red-handed taking a bribe.

To what extent is the CBI “its master’s voice”?

- After the **2018 amendments to the Prevention of Corruption Act, 1988**, the Centre has come to exercise power over the CBI not just administratively, but also legally.
- In 2018, the amendments to Section 17A of the Act, made it mandatory for the CBI to seek the Centre's permission before registering a case of corruption against any government servant.
- This means that the 2018 amendment virtually means the agency can investigate only the officers that the government of the day wants investigated.
- In fact, corruption cases registered by the CBI dropped by over 40 % between 2017 and 2019.

3.3 Transfer as Punishment

Why in news?

Chief Justice of the Madras High Court Sanjib Banerjee has been abruptly transferred to head the Meghalaya High Court.

What is the issue?

- In September 2019, Justice Vijaya K. Tahlramani resigned after being shifted from Madras to the Meghalaya High Court at a time when she was the country's senior-most Chief Justice.
- The transfer of Chief Justice of the Madras High Court Sanjib Banerjee is the second such instance of the head of a court with a sanctioned complement of 75 judges being asked to take over a court with a strength of 4.

What is the legal provision regarding the transfer of judges?

- **Article 222** of the Constitution deals with the transfer of judges and states that the President may, after consultation with the Chief Justice of India transfer a judge from one high court to another.
- The Chief Justice of India is justly empowered to transfer the head of any High Court in the interest of the "**better administration of justice**".
- A five-judge bench of the Supreme Court interpreted Article 222 in the *Sankalchand H Sheth case* and held that the transfer of a judge from one court to another inflicts many injuries on the individual.
- The court held that the consent of the judge proposed to be transferred was part of the scheme and language of Article 222.
- It also said that if the power of transfer is vested solely with the executive, it undermines judicial independence and eats into the basic features of the Constitution.
- *The First and Second Judges' cases* resulted in the formation of the Collegium System by interpreting "consultation" with the CJI to really mean "concurrence" which is arrived at by the CJI upon discussion with the two senior-most judges.
- *The Third Judges' case* expanded the collegium to include the five senior-most judges, including the CJI.
- *The K Ashok Reddy case* relied on the decision of the Second Judges' case and held that the primacy of the judiciary in the matter of appointments.

What are the concerns around the transfers?

- In Justice Banerjee's case, the transfer has come within 10 months of his assuming office, raising the question whether he was being punished for some uncertain reason.
- There is bound to be speculation on whether his transfer has anything to do with his stern approach and observations while seeking accountability from the Government and other institutions.
- This could be seen as degrading the work a judge is doing.

What does this call for?

- High Court Chief Justices play an important role in identifying judicial talent for appointments and streamlining administrative functions.
- It would be reasonable if a serving Chief Justice is given tenure long enough in a High Court to discharge the functions effectively.
- The Memorandum of Procedure for judicial appointments and transfers says a proposal to transfer a High Court judge can only be initiated by the CJI, "whose opinion in this regard is determinative".
- In addition, the views of "one or more knowledgeable Supreme Court judges" are taken which are considered by the five-member Collegium.
- However, recent developments suggest that it may not be enough to dispel the impression that a transfer is not exactly based on administrative needs or related to performance.
- There is a need for transparency in judicial functioning to dispel all notions of favouritism, bias or governmental interference.**No Quota without Quantifiable Data**

What is the issue?

- The Madras High Court has recently quashed the **10.5% special reservation for Vanniyakula Kshatriyas** within the overall 20% quota for MBC and DNC.



- This has again highlighted the importance of quantifiable data as a prerequisite for reservation in education and employment.

What was the reservation about?

- In 2021, the Assembly passed a special Act which divided the 'Most Backward Classes/Denotified Communities' category into three parts.
- Of the total, the largest share of 10.5% was given to the Vanniyakula Kshatriya and its various sub-castes.
- The MBC/DNC sub-division was to have 7% for DNCs and a section of MBCs, while the remaining 2.5% was meant for the rest of the MBCs.
- It was justified based on the report of Second Backward Class Commission which stated that the Vanniyar population was 13.01% of the then total population in 1983.

Is it possible for States to make changes in the backward classes list?

- The **102nd Amendment to the Constitution** created the National Backward Class Commission and empowered the President to notify the backward classes list for each State.
- The Supreme Court had ruled, in the Maratha reservation case, that the Amendment took away the power of the States to notify or identify OBCs.
- Later, the **105th Amendment** made it explicit that the States could make changes in their lists.

What were the reasons for the court's judgment?

- The legislation was challenged before the High Court which held it unconstitutional.
- The court cited the **lack of adequate quantifiable data** with the State government before the introduction of the law.
- The government did not wait for the report of a commission it had appointed earlier to gather quantifiable data to justify the State's 69% total reservation.
- The other ground was that the separate reservation for one caste amounted to discrimination against all the other castes in the same MBC category.
- Even the State BC Commission report 2011, which justified the 69% reservation for BC, MBC/DNCs and SC/ST under the 1994 Act, did not give any community-wise break up of representation in government services.

What was the stand of the State Backward Commissions regarding internal reservation?

- The **first BC Commission** (1969-70), headed by A.N. Sattanathan, talked of having a device for removing the top layers of the communities periodically (creamy layer concept).
- The **second BC Commission** headed by Ambasankar advocated compartmental reservation by grouping the BCs on the basis of backwardness.
- The concept of quota within quota is already in place in Tamil Nadu.
 - In 1989, a new category called MBC and DNC was carved out of the BCs and given 20% exclusively from the then quantum of 50%.
 - In 2007, Muslims in the BCs were provided with 3.5% reservation.
 - In 2009, 3% reservation was provided for Arunthathiars out of 18% quota for the SCs.

69 % Rule of Reservation	
Open Competition	31.00 %
Backward Class	26.50 %
Backward Class Muslim	3.50 %
Most Backward Class & Denotified Communities	20.00 %
Scheduled Caste	*15.00 %
Scheduled Caste (Arunthathiars)	*3.00 %
Scheduled Tribes	1.00 %

What are the effects of the verdict?

- The State government is planning to appeal to the Supreme Court.
- Any change in The State's 1994 Act would require an amendment to that law as well as the President's assent which may complicate the existing internal quotas given to BC Muslims and Arundhatiars.
- The High Court had mentioned that these two quotas were backed by census data and valid recommendations, but it did not consider the question whether their introduction without an amendment to the 1994 Act or the President's assent was valid.

4. GOVERNMENT ACTS & POLICIES

4.1 Falling Short on Data Protection Provisions

What is the issue?

The Joint Parliamentary Committee (JPC) on Personal Data Protection Bill, 2019 has recently met and the agenda is to adopt the draft report that deals with privacy and security of the personal data of citizens.

What is the draft personal data protection bill 2018?

- The draft personal data protection bill 2018 was submitted by the Justice B.N. Srikrishna-headed expert panel.
- The Justice Srikrishna Committee has set the standards to build a legal framework based on the landmark judgment, **Justice K.S. Puttaswamy vs Union of India**, on privacy.
- The draft takes into account three aspects in terms of data - the citizens, the state and the industry and notes that "**the right to privacy** is a fundamental right".
- To know more about the draft personal data protection bill 2018, [click here](#)

What is the Personal Data Protection Bill, 2019?

- The PDPB seeks to provide for protection of personal data of individuals, and establishes a Data Protection Authority for the same.
- **Applicability** - The Bill governs the processing of personal data by government, companies incorporated in India and foreign companies dealing with personal data of individuals in India.
- **Categorisation of personal data** - The Bill categorises certain personal data as sensitive personal data which includes financial data, biometric data, caste, religious or political beliefs, or any other category of data specified by the government.
- **Obligations of data fiduciary** - A data fiduciary is an entity or individual who decides the means and purpose of processing personal data.
 - All data fiduciaries must undertake certain measures such as
 - implement security safeguards (data encryption and preventing misuse of data),
 - institute grievance redressal mechanisms to address complaints of individuals.
 - institute mechanisms for age verification and parental consent
- **Rights of the individual** - The Bill includes the right to
 - Obtain confirmation from the fiduciary on whether their personal data has been processed
 - Seek correction of inaccurate, incomplete or out-of-date personal data
 - Have personal data transferred to any other data fiduciary
 - Restrict continuing disclosure of their personal data by a fiduciary, if it is no longer necessary or consent is withdrawn
- **Grounds for processing personal data** - The processing of data by fiduciaries is allowed only if consent is provided by the individual.
- But it can be processed without consent if it is required by the State for providing benefits to the individual or for legal proceedings or to respond to a medical emergency.
- **Social media intermediaries:** The Bill proposes to include intermediaries with certain obligations to enable online interaction between users and allow for sharing of information.
- **Data Protection Authority** - The Bill sets up a Data Protection Authority consisting of a chairperson and 6 members with at least 10 years' expertise in the field of data protection and information technology.
- Orders of the Authority can be appealed to an Appellate Tribunal which in turn can be appealed in the Supreme Court.
- **Transfer of data outside India** - Sensitive personal data may be transferred outside India for processing if explicitly consented and subject to certain additional conditions but critical personal data can only be processed in India.



- Such sensitive personal data should continue to be stored in India.
- Sharing of non-personal data with government** - The central government may direct data fiduciaries to provide it with any non-personal data and anonymised personal data for better targeting of services.

What are the divergences of the 2019 bill from the Justice Srikrishna Committee's draft Bill?

- The JPC was set up in 2019 to take up the personal data protection bill after parliamentarians were divided over several provisions of the law.
- The dissent notes submitted by some panel members from the Opposition point out that the draft falls short of the standards set by the Justice Srikrishna Committee.
- The key divergences from the Justice Srikrishna Committee's draft Bill is in the selection of the chairperson and members of the Data Protection Authority (DPA).
- While the 2018 draft Bill allowed for judicial oversight, the 2019 Bill relies entirely on members of the executive government in the selection process for the DPA.
- The 2018 Bill allowed for exemptions to be granted to state institutions from acquiring informed consent from data principals only to the "security of the state" but the 2019 Bill adds "public order" as a reason.

What has the panel suggested to build additional compliance?

- Companies will need to report a data breach within 72 hours
- Mandatorily disclose if information relating to a data principal (person or entity that owns the data) is passed on to someone else
- Appoint senior management personnel as data protection officers
- Ensure that copies of sensitive and critical personal data already in possession of foreign entities be brought back by the government in a timebound manner.
- Called for a mechanism in which social media companies can be treated as publishers in some circumstances.
- A change in the contentious portion of the law - Clause 35, which deals with conditions under which the government can access personal data without consent.

What relaxations were suggested for the government?

- Rule about mandatory disclosure of third party sharing need to the data principal need not be made in case it is for State functions or to comply with a court order.
- Quantifying the penalties for companies violating the provisions of the law
- An in-house inquiry by government departments to fix responsibility in the event of a leak.

How can the rules be made more stringent?

- The dangers of exemption on the grounds of public order is susceptible to misuse and "security of the state" criteria is recognised by other data regulations such as Europe's General Data Protection Regulation as a viable reason for exemption.
- The Global Privacy Assembly, featuring Privacy Commissioners from over 19 countries came up with a clear resolution on principles for government access to personal data.
- It has asked for a set of principles on legal basis, the need for clear and precise rules, proportionality and transparency, data subject rights, independent oversight, and effective remedies and redress to the individuals affected.
- The JPC's adoption of the draft Bill and the dissent notes suggest that it has fallen short of standards protecting privacy rights of individuals against blanket misuse by the state.

Key suggestions on data protection law

STRICT NEW NORMS

- 72-hour deadline for notification of breach, including of non-personal data
- Companies need to ensure fairness of algorithm or method used for processing personal data
- A data protection officer needs to be from senior management
- Companies will need to mandatorily disclose to data principals if their information is passed on to third party

RELAXATIONS FOR GOVERNMENT

- If data is passed on to another entity for purposes of State use, there need not be mandatory disclosure
- Government departments to carry out in-house inquiry to fix blame in case of breach, instead of head of department being responsible
- Government should quantify penalties for companies violating provisions of the law

SOCIAL MEDIA AS PUBLISHERS?

The report recommends that social media companies mandatorily verify users to keep their status as intermediaries. They will be liable for posts by unverified accounts

PUSH ON LOCALISATION

The commission also suggested that the central government bring back copies of sensitive and critical personal data that is already with foreign entities in a time-bound manner



- The Parliament has to tighten the provisions further and bring them in conformance with the 2018 Bill.

5. GOVERNANCE

5.1 Extension of Tenure of ED and CBI Directors

Why in news?

The Centre promulgated two ordinances to extend the tenures of the Directors of CBI and Enforcement Directorate from 2 years to upto 5 years and issued an order to amend the Fundamental Rules, 1922.

What is the amendment about?

- Director of CBI is appointed under the **Delhi Special Police Establishment Act, 1946** and Director of Enforcement in the Directorate of Enforcement is appointed under the **Central Vigilance Commission Act, 2003**.
- The fifth proviso of Clause (d) of **Rule 56 of the Fundamental Rules, 1922** was amended to extend the services of the Defence Secretary, Home Secretary, Director of IB, Secretary of RAW, the Director of CBI and ED in "public interest".
- The previous list comprised Defence Secretary, Foreign Secretary, Home Secretary, Director of Intelligence Bureau and Secretary of Research and Analysis Wing.
- Though Director of CBI was mentioned in the previous order, the new notification adds the Delhi Special Police Establishment Act, 1946 under which the investigation agency's head is appointed.

What are the concerns of this amendment?

- **Autonomy** – The notification will compromise the autonomy of these two agencies.
- It goes against the spirit of the Supreme Court judgment in *Vineet Narain vs Union of India* (1997) which said that the Directors of the CBI and the ED should have a minimum tenure of 2 years.
- While it did not bar longer terms or extensions, giving an annual extension can be an incentive for displaying loyalty to the ruling government in the discharge of their duties.
- **Ordinance route** - The changes were brought in through the ordinance route which raises a doubt whether the Government is keen on retaining the present Director of Enforcement, S.K.Mishra.
- **Beyond superannuation** - There is an implied extension for an officer appointed to one of these protected posts if the appointment comes within two years of retirement.
- A further extension beyond superannuation for one year at a time, will render the heads of two investigating agencies under the influence of the Government.

What is the judiciary's view in this case?

- The Supreme Court declined to interfere with the one-year addition to the original term of appointment in Mishra's case.
- It also said that extension of tenure granted to officers who have attained the age of superannuation should be done only in **rare and exceptional cases** and only for a **short period**.
- It also made it clear that no further extension shall be granted to him.
- The protection given by a fixed tenure is meant to dilute the '**doctrine of pleasure**' implicit in civil service but it may be breached, if the extension allowed in exceptional circumstances becomes the rule.

The Doctrine of Pleasure is one of the concepts which has been inherited from the British rule. Under this doctrine, the civil servants were regarded as servants of the crown and these civil servants served at their pleasure.

5.2 MGNREGA Tracker Report

Why in news?

A report tracking the implementation of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) was recently brought by the People's Action for Employment Guarantee (or PAEG) and LibTech India.

What is the rationale behind MGNREGA?

- The MGNREGA was enacted in 2005 by the Congress-led UPA government.
- Farming was proving to be increasingly unremunerative even as cities failed to create adequate job opportunities.
- Thus, MGNREGA was a response to the deep economic distress that existed in rural India.
- It provided 100 days of “guaranteed” employment in a year to any rural household (or family) at minimum wages.
- It was believed that fast economic growth will eventually reduce poverty and bring prosperity.
- Alongside the employment, safety net in the form such as subsidised food grains under NFSA were ensured to make the growth process more “inclusive” than before.

Why is tracking NREGA significant?

- MGNREGA's performance is possibly the most important proxy for the health of the informal economy (80-90% of all employment in India).
- If the Indian economy is booming and creating new jobs, one should expect less demand for jobs under the MGNREGA.
- Conversely, if the economy is struggling, MGNREGA would see exalted levels of activity.
- Be it the aftermath of demonetisation or the Covid-induced disruption, MGNREGA and NFSA continue to play crucial roles.

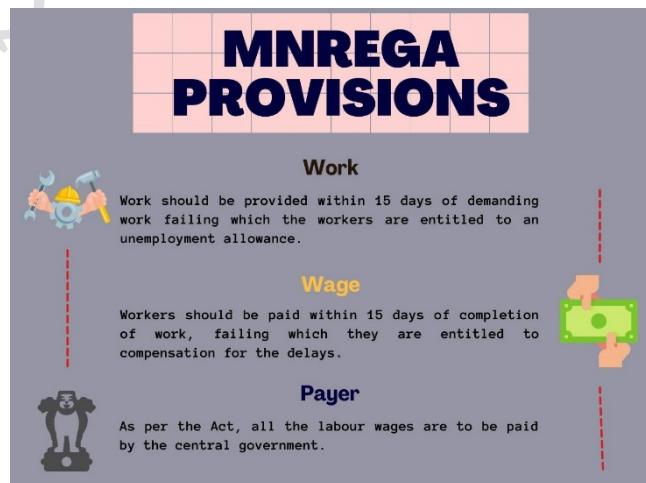
Counter-arguments

- MGNREGA payouts are making Indians lazy and taking away the incentive to migrate and work hard.
- It is also raising the cost of doing business for business firms.

What are the key findings of the latest MGNREGA ‘tracker’?

Inadequate Allocation

- The total budget allocation for MGNREGA for the current financial year (2021-2022) was 34% less than the revised budget of 2020-2021 financial year. Click [here](#) to know more.
- As of September 2021 end, the government had already spent 90% of its MGNREGA budget.
- Many states such as West Bengal, Andhra Pradesh, and Tamil Nadu have a negative net balance of funds remaining.
- There is little clarity on how MGNREGA budgets are decided.

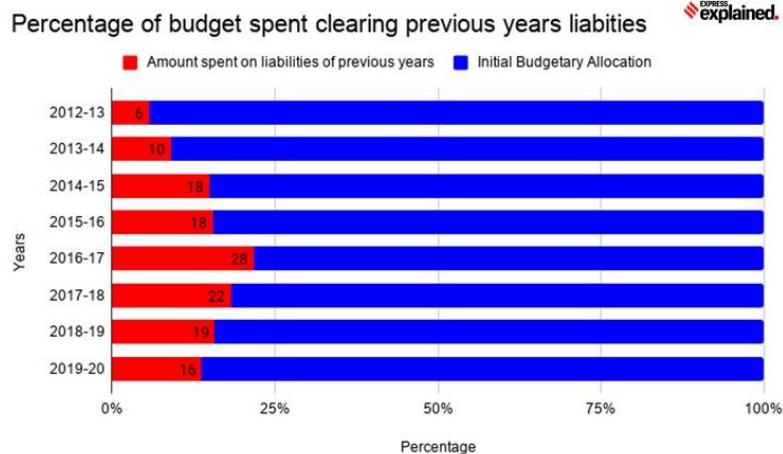


Arrears and delayed payments

- The inadequate budget allocation being an annual occurrence, each year's Budget allocation also has to contend with the previous year's arrears or unpaid dues.
- E.g., In the current year, of the total allocation of Rs 73,000 crore, over Rs 17,000 crore will be used just to pay off last year's arrears.

Demand suppression

- Being a “demand-driven” scheme, if there is greater demand, a higher allocation can be made in time.
- But, on the ground, the initial allocation





is of critical importance; if it is low, it delays payments and eventually suppresses demand.

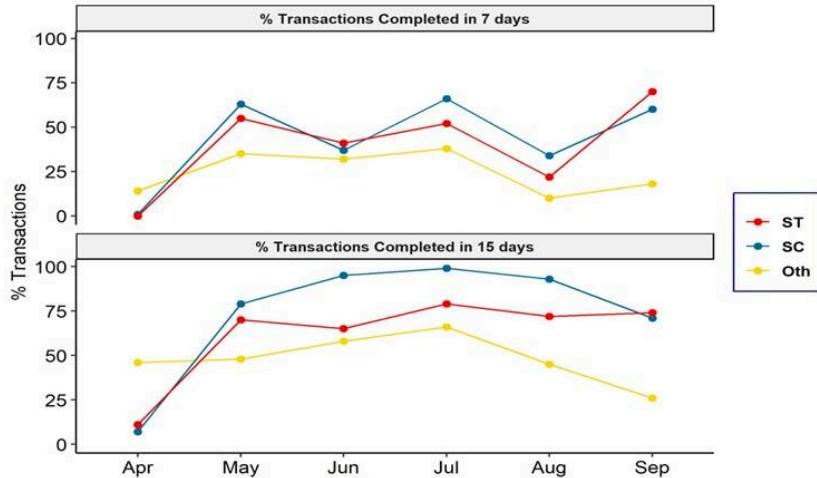
- The inadequate allocation thus has a detrimental impact on people asking for a job, because people seeking MGNREGA work cannot afford to not be paid for so long.
- Low budgets discourage the officials from even registering all the demand for jobs.
- Reportedly, the scale of such unmet demand is around 33%.

Caste-based payment delays

- A March 2021 central government circular asked the state governments to send three bills, officially called Funds Transfer Orders (FTOs), instead of just one for MGNREGA payments.
- So, instead of a single FTO, states are to give 3 FTOs - one each for MGNREGA workers belonging to Scheduled Castes, Scheduled Tribes and "Other" categories.
- The recent study has found that after the Caste-based circular, workers belonging to the "others" categories (over 87% of all MGNREGA workers) ended up facing much longer delays in payments.
- Jharkhand, Odisha, and Madhya Pradesh saw a particularly poor record of payments for non-SC, non-ST workers.
- The caste-based wage payments go against the universal nature of the programme, lead to more bureaucratic work at the lower levels and delays.
- Over time, such differences may discourage non-SC, non-ST workers from demanding work at the MGNREGA work sites and may lead to other social discrepancies.

Delays by Caste over Time

EXPRESS Explained.



What lies ahead?

- The NREGA can play a critical role in reviving rural mass consumption that is much needed for the economic recovery, given its multiplier effects.
- The tracker report underlines the importance for the Indian government to redouble its efforts towards MGNREGA and NFSA.

6. HEALTH

6.1 A Close Reading of the NFHS-5

Why in news?

The findings of Phase-II of the 2019-21 National Family Health Survey (NFHS-5) was released by the Union Ministry of Health and Family Welfare.

What is the survey about?

- The NFHS is a large-scale, multi-round survey conducted in a representative sample of households throughout India.
- This year, over 6 lakh households across the country were surveyed for this exercise.
- The NFHS provides estimates on key indicators related to population, family planning, child and

Hunger watch

The nutritional status of children in India barely improved in 2019-20 from the levels in 2015-16, the National Family Health Survey-5 data show

Indicator	2019-20	2015-16	2005-06
Children aged six to 59 months who are anaemic	67.1	58.6	69.4
Children under five who are stunted	35.5	38.4	48
Children under five who are wasted	19.3	21	19.8
Children under five who are severely wasted	7.7	7.5	6.4
Children under five who are underweight	32.1	35.8	42.5
Children aged six to 23 months receiving an adequate diet	11.3	9.6	-
Institutional births	88.6	78.9	38.7

maternal health, nutrition, adult health, and domestic violence, among others.

- The Ministry of Health and Family Welfare, Government of India, has designated **International Institute for Population Sciences (IIPS)** as the nodal agency for the NFHS.
- NFHS was funded by the United States Agency for International Development (USAID) with supplementary support from UNICEF.
- The First National Family Health Survey (NFHS-1) was conducted in 1992-93.

What are the key findings of the report?

- **Population** - The Total Fertility Rates (TFR) has declined from 2.2 to 2.0 at the national level, even below the replacement rate of 2.1.
- This means that the total population has stabilised and therefore politicians need to devote their energies to urgent health matters, instead of pointing out the population explosion.

TFR is the average number of children born to a woman during her lifetime whereas **Replacement Fertility Rate** is the level of fertility at which a population exactly replaces itself from one generation to the next.

- **Sex ratio** - Nationally, there are 1,020 adult women per 1,000 men portraying that women outnumber men in India for the first time but this raises question on whether this signals the beginning of the end of a tenacious problem of deep-rooted son preference.
- Nationally, the SRB has improved from 919 in 2015-16 to 929 in 2019-21, but it is still short of the natural SRB.
- The adult sex ratio is shaped by many factors other than sex selective abortions and in household surveys, the adult sex ratio might also be affected by sampling errors.
- Therefore, there is a need to recognise that the move to a small family size combined with persistent son preference is likely to impede the improvements in SRB.
- **Anaemia** - The incidence of anaemia has increased from 58.6 to 67% in under-5 children, from 53.1 to 57% in women and from 22.7 to 25% in men.
- Anaemia which is characterised as a serious public health concern by WHO has to be focussed as it is as worsening as the COVID-19 effect.
- **Malnutrition** - The three indicators of malnutrition - stunting, wasting and underweight showed an overall improvement.
- There is also increase in the proportion of overweight children, women and men with serious health consequences in the form of non-communicable diseases.
- **Breastfeeding** - Exclusive breastfeeding to children under age 6 months has shown an improvement in all-India level from 55 percent in 2015-16 to 64% in 2019-21

Child Nutrition indicators	All-India level data
Stunting (low height-for-age)	Declined from 38% to 36%
Wasting (low weight-for-height)	Declined from 21% to 19%
Underweight (low weight-for-age)	Declined from 36% to 32%

- IMR – Infant Mortality Rate has declined marginally across states which can be attributed to the increased institutional births.
- IMR is the number of infants who die before reaching the age of one year, per 1,000 live births.
- **Gender related indicators** - Indicators on use of hygienic methods of protection during menstrual period among women between 15-24 years of age, and spousal violence among married women were included

What are the notes of caution about the survey?

- The NHFS does not have data on micronutrients that are essential for body functions such as producing enzymes, hormones and other substances needed for growth and development.
- Some analyses have suggested that the rate of progress has slowed down based on comparisons between NHFS-4 and NHFS-5.



- The data for the second phase of NFHS-5 have been, to a large extent, collected during the unusual conditions of the COVID-19 pandemic but the deterioration in public health indicators cannot be attributed entirely to the pandemic.
- The data that increase in caesarian births in private health facilities (47.5% births are by C-section) call into question unethical practices of private health providers who prioritise monetary gain over women's health and control over their bodies.
- The survey highlights deep inequalities in health outcomes and an action plan to improve India's health needs to be inclusive, firm in its commitment and backed by solid resources.

6.2 Project Sampoorna : Bongaigaon's Response to Malnutrition

Why in news?

Project Sampoorna which was successfully implemented in Bongaigaon district of Assam is a model that can be easily implemented anywhere in reducing child malnutrition

What is the project about?

- The Bongaigaon district has 2,416 malnourished children, 246 cases of Severe Acute Malnutrition (SAM) and 2,170 instances of Moderate Acute Malnutrition (MAM).
- Project Sampoorna was launched to target the mothers of SAM/ MAM children with the tagline being '**Empowered Mothers, Healthy Children**'.
- It was based on the success of the community-based COVID-19 management model (Project Mili Juli).
- Under this project, the mother of a healthy child of an Anganwadi Centre was paired with the target mother and they would be **Buddy Mothers**.
- They were given diet charts to indicate the daily food intake of their children and would have discussions on all Tuesdays at the AWC.
- Since the major hindrance to the project was patriarchy, the mothers were enrolled in Self Help Groups (SHGs) under the National Rural Livelihoods Mission (NRLM).
- Meanwhile, 100 millilitres of milk and an egg on alternate days for the children for the first 3months were provided so that their mothers could stabilise themselves in the newly found jobs.

How was it interlinked with other programmes?

- Sampoorna is in accordance with the UN Sustainable Development Goals and those set by the UN Secretary General António Guterres in the 2021 Food Systems Summit.
- It complements in achieving the '**Kuposhan mukt Bharat**' (Malnutrition Free India) and the National Nutrition Mission - **POSHAN Abhiyaan**.
- It was during **Poshan Maah** (Nutrition Month) in September 2020 that 2,416 children were identified to be malnourished in the district of Bongaigaon.
- The National Family Health Survey (NFHS-5) has documented the stunted, wasted, underweight and the number of anaemic women and children in the district.
- Project Saubhagya** that was designed to reduce the maternal mortality rate and infant mortality rate of the district was utilized to endorse these figures.
- A real time data sheet is updated by field-level doctors as and when a high risk pregnancy is identified, which is then followed up till safe delivery.

National Family Health Survey figures (NFHS-5 2019-20)



- Infant Mortality Rate **4.4** (5.6)
- Neonatal Mortality Rate **3.4** (4.4)
- Under-5 mortality rate **5.2** (7.1)
(per 1,000 live births)



- Fully vaccinated children (12-23 months) **85.2%** (88.3%)



- Children under 5 who are stunted (height for age) **23.4%** (19.7%)



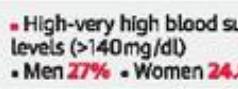
- Children under 5 who are underweight **19.7%** (16.1%)



- Children under 5 who are overweight **4%** (3.4%)



- Anaemia in pregnant women **31.4%** (22.6%)
- Proportion of people who are overweight or obese (BMI>25) **Women 38.1%** (32.4%) **Men 36.4%** (28.5%)



- High-very high blood sugar levels (>140mg/dl) **Men 27%** **Women 24.8%**



- Hypertension (140/90) **Men 32.8%** **Women 30.9%**

Figures in bracket refer to NFHS-4 2015-16



What was the impact of the Project Sampoorna?

- After three months of Project Sampoorna, out of 246 SAM children, 11% continued to be SAM, 11.4% improved to MAM and 76.8% became normal.
- By September 2021, 92.3% SAM and 98.9% MAM children were normal.
- Children who had not improved were checked and treated by doctors under the **Rashtriya Bal Swasthya Karyakram (RBSK)**.
- Project Sampoorna had prevented at least 1,200 children from becoming malnourished over the last year.
- The National Nutrition Mission and the State government recognised the project in the 'Innovation Category'.
- This model is successful in both women empowerment as well as tackling the malnutrition.

7. INDIA AND ITS NEIGHBOURHOOD

7.1 Delhi Regional Security Dialogue: NSAs' Agenda on Afghanistan

Why in news?

India is hosting the Delhi Regional Security Dialogue that will explore firming up a common approach for dealing with the changed realities in Afghanistan.

What is the meeting about?

- The idea of such a dialogue was first mooted in 2018, when the US decided to withdraw troops from Afghanistan.
- The first and second meetings were hosted by Iran in 2018 and 2019 to shore up multilateral cooperation on security among the key players in the global 'East'.
- The current meeting will be chaired by India's National security Adviser (NSA) Ajit Doval.
- Invitations were sent to Afghanistan's neighbours such as Pakistan, Iran, Tajikistan, and Uzbekistan, and other key players including Russia, and China.
- But Pakistan has announced that it would not attend the meeting while China has cited scheduling issues to convey that it will not participate.

Why is this meeting significant?

- The meeting that is being hosted by the National Security Council Secretariat would be the first time that all Central Asian countries, would be participating in this format.
- With security concerns pertaining to Afghanistan weighing heavily on New Delhi's mind, it is important to discuss on Afghanistan's current situation and the future outlook.
- Since stability in Afghanistan is essential for a balanced regional approach, the discussions on Afghanistan is a necessity.
- India is hosting this regional summit as it regards itself as a neighbour of Afghanistan, given its legal and Parliament-mandated claim on Pakistan-occupied Kashmir.
- It is different from other processes on Afghanistan such as the **Heart of Asia process or the Moscow format** as it is among the heads of the security establishments in these countries.

The Heart of Asia-Istanbul Process (HoA-IP) ministerial conference is part of the Istanbul Process (2011) - a regional initiative on security and cooperation for a stable and peaceful Afghanistan that was launched in Turkey. The Moscow Format was established in 2017 as a six-party mechanism involving Russia, Afghanistan, India, Iran, China and Pakistan which later expanded with the inclusion of more countries.

What is the agenda of this meeting?

- The Eurasian allies will explore in finding a common approach for cooperation against increasing threats of terrorism, radicalization and drug trafficking following the Taliban's takeover of Kabul.
- The meeting is in the direction of calling for a unified international response to address the security and humanitarian challenges facing Afghanistan.



- It is expected to deliberate on cross-border movement of people from Afghanistan as well as the threat emerging from the military equipment and weapons left behind by the US forces in that country.
- Issues relating to humanitarian aid will definitely be a part of the discussions.

What are the challenges on the table?

- **Challenges for New Delhi**
 1. Terrorism within Afghanistan and its spilling beyond its borders
 2. Radicalisation and extremism in the population in Afghanistan, and in each of these countries
 3. Cross-border movement of people, including ordinary Afghans and Taliban fighters
 4. Drug production and trafficking
 5. Vast number of weapons and equipment left behind by the US and its allies in Afghanistan
- **Absence of Pakistan** - New Delhi notes that a credibility gap exists between Pakistan's intentions and actions and without its presence in the table would not address this issue.
- **Absence of China** - Although China had attended both previous meetings, its absence now sends out a signal that it doesn't want to associate with any process led by India.
- **Taliban not invited** - India chose not to invite the Taliban, since none of the participating countries have so far officially recognised the Taliban regime yet.
- **Security interests** - The challenge for India is to protect its national interests and security interests and to frame an approach to deal with an uncertain present and future in Afghanistan.

What are the expected outcomes of this meeting?

- India feels that the high-level participation at the meeting reflects the widespread concern of regional countries about the situation in Afghanistan and their desire to coordinate with each other.
- India wants Afghanistan not to allow itself as a safe haven for terror, an inclusive administration and to protect the rights of minorities, women and children.
- New Delhi is hoping to emerge as the location for future dialogue processes with the expansion of the grouping by including other influential players such as the US.
- It is anticipated that this might enhance the pressure on the Afghan government to adhere to basic global norms of respect for human beings whether they be minorities or women.

8. BILATERAL ISSUES

8.1 The India-US Trade Policy Forum

Why in news?

The Trade Policy Forum (TPF), a premier forum to resolve trade and investment issues between India and the United States has been re-launched after four long years.

What is the status of India-US bilateral trade?

- The US remained India's **biggest trading partner and largest export market** and the bilateral trade exploded from approximately 20 billion dollars in 2001 to over 145 billion dollars in 2019.
- The US investment in India amounts to 46 billion dollars.
- Over 2,000 US companies are located in India, including every major Fortune 500 companies.
- Over 200 Indian companies created about 125,000 jobs in United States across all states.
- The US is one of the few countries with which India has a **trade surplus** with India's exports exceeding the imports.
- The top traded goods include pearls and precious stones, pharmaceuticals, machinery, electronics, clothing, vehicles, chemicals and fish products, optical, photo, medical apparatus and aluminium.

What are the key issues in the bilateral trade relations?

- **Issues for the US**

- Tariff barriers such as high import duties
- Market access restrictions
- Unpredictable regulatory norms
- Intellectual Property Rights issue
- The trade deficit with India
- India's digital tax
- Restricted digital trade

- **Issues for India**

- Withdrawal of Generalized System of Preferences (GSP)
- Removal of India from the “**developing countries**” list
- High import tariffs on steel and aluminium
- Visa restrictions

The GSP is the largest and oldest United States trade preference programme intended to promote economic development by eliminating duties on some products it imports from the 120 countries designated as beneficiaries.

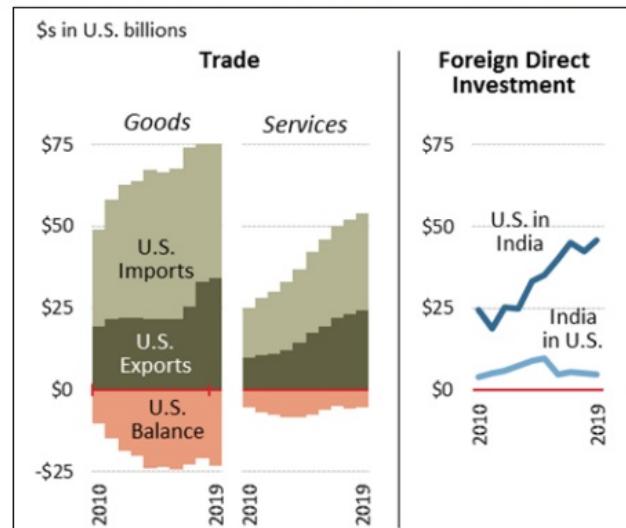
What is the US-India Trade Policy Forum?

- The India-US Trade policy Forum (TPF) was established in July 2005 to discuss about trade and investment issues.
- The objective of the forum is to
 - Facilitate trade and investment flows between the two countries
 - Develop and implement trade policies through transparent procedures that comply with international obligations
 - Foster a conducive environment for technological collaboration and innovation
 - Promote inclusive economic growth and job creation in India and the US.
- The Minister of Commerce and Industry for India and the United States Trade Representative of the USA are the co-chairs of the Trade Policy Forum.
- The India-US Trade Policy Forum has five focus groups.
 - Agriculture
 - Investment
 - Innovation and Creativity (intellectual property rights)
 - Services
 - Tariff and Non-tariff barriers

What is the significance of the relaunch of this forum?

- The relaunch is a fresh reset chance back from the Donald Trump administration days indicating US's interest in engaging with India in significant spheres.
- The TPF statement also outlines the sectors and goods and services that need quick attention.
- India should look into its trade posture and work for a more open approach towards a market that will remain the most critical, irrespective of the trade deals it is seeking with other nations.
- India must seize this fresh initiative with the U.S. to cement its place in the new supply chains being envisaged.
- For starters, it must pro-actively move away from the protectionism that is leading the globalised world adrift.

Figure 1. U.S. Trade and Investment with India



Source: CRS analysis, Bureau of Economic Analysis (BEA) data.

9. INTERNATIONAL ISSUES

9.1 Russia-Ukraine Border Conflict

What is the issue?

The massive mobilisation of Russian troops on the Ukraine border and occasional outbreak of violence in the contested Donbass region has pushed both countries to the brink of an open conflict.

What is the history of conflict between Ukraine and Russia?

- **Annexation of Crimea** - Ukraine was one of the republics within the USSR during the cold war days, and has remained a strong ally of Russia till 2013.
- While it was planning to sign an association agreement with the European Union in 2013, Russia sternly objected to it leading to tensions.
- Russia subsequently annexed “Crimea” (Russian speaking province in Ukraine) by force and declared its sovereignty over it with people's support.
- The resultant conflict has so far claimed about 10,000 lives and displaced millions with no lasting resolution in sight.
- **Naval skirmish over the Sea of Azov** - After Crimea's annexation in 2014, Russia gained control over both sides of the Kerch strait.
- In May 2018, Russia opened a 12-mile-long bridge over the Kerch Strait, which has also become the physical gateway to the Sea of Azov.
- To prevent the Ukrainian boats from passing under the bridge, Russia placed a cargo ship below it.
- Later, the Ukrainian vessels' attempt to travel from the Black Sea to the Sea of Azov was denied by the Russian coast guard.
- However, Ukraine insists that the patrol of the Kerch Strait was authorised under a bilateral agreement with Moscow.
- Thus the naval skirmish over the Sea of Azov proves again the Russia's irreversibility of its annexation of Crimea.
- **Russian backed rebels** - Russia has been criticised for its involvement in the Donetsk and Luhansk regions in eastern Ukraine.
- There, Russian-backed separatists have been fighting with Ukrainian troops.
- In May 2021, Moscow has allegedly deployed thousands of troops as well as tanks and artillery near Ukraine's eastern border and has mobilised troops in the annexed Black Sea region of Crimea.
- **Current conflict** - Belarus, a Russian ally was blamed for the migration crisis in the EU's Polish border.
- Russia flew bombers near Poland's borders earlier this month.
- In the Black Sea, Russian President Vladimir Putin dispatched vessels to shadow U.S. warships.

Why is the current conflict more aggressive than the earlier ones?

- There were similar scenes earlier this year but after U.S. diplomatic intervention, Moscow pulled back.
- This time, the Russian moves appear to be part of a larger strategy of force-projection across Russia's western perimeter, from the Baltic Sea to the Black Sea.





- Russia views Ukraine as a Western aircraft carrier parked just across southern Russia because of the U.S. influence on Ukraine.
- Russia's aggressiveness could have partly been driven by the assessment that the U.S. has strategically weakened after its Afghan withdrawal and its preoccupation with China's rise.
- Ukraine says an estimated 90,000 Russian troops have massed near the border which could be a prelude to another Russian invasion.

What are the Minsk Agreements?

- **The Minsk Protocol (Minsk-1)** with the **Minsk Memorandum** was signed in 2014 to prevent war in the eastern Ukrainian region of Donbas.
- The representatives of the Trilateral Contact Group on Ukraine (TCG – Russia, Ukraine, and the OSCE) and the representatives of Donetsk and Luhansk People's Republics (DNR,LNR) signed the agreement.
- The Protocol was followed by an additional Memorandum, which detailed the conditions of a ceasefire.
- The agreement failed to stop fighting, however, it significantly reduced fighting in the conflict zone for months.
- **The Minsk-2 (Package of measures for the Implementation of the Minsk agreements)** was signed in 2015 under the mediation of France and Germany to prevent an open conflict.
- It was designed to end the fighting in the rebel regions and hand over the border to Ukraine's national troops.
- Ukraine was required to delegate more power to the breakaway regions and introduce constitutional reforms, codifying their special status.

What are the practical ways to ease the tension?

- Ukraine's reluctance to implement the agreement and its growing military, economic and political ties with the West seem to have prompted Russia to put Ukraine under direct military pressure.
- Ukraine lacks the military resources to deter its giant neighbour and there is no guarantee that the West would come to its help in the event of a Russian invasion.
- Russia might make tactical gains from an invasion but such a move could further deteriorate its already ruptured ties with the West.
- The practical solution is to revive the Minsk peace process.
- The West should push both sides to resume talks and live up to their commitments as per the Minsk agreement to restore relative peace on the border.

9.2 WTO's Joint Initiatives

What is the issue?

Several countries, including India, have so far stayed out of the JI negotiations that these initiatives lack a multilateral negotiating mandate and are an attack on the fabric of multilateralism underlying WTO.

What is WTO?

- The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations.
- It came into being in 1995 as the successor to the General Agreement on Tariffs and Trade (GATT).
- Virtually all decisions in the WTO are taken by consensus among all member countries and they are ratified by members' parliaments.
- Trade friction is channeled into the WTO's dispute settlement process where the focus is on interpreting agreements and commitments.

What are the major concerns in WTO?

- **Appellate Body** – The legally binding dispute settlement process comprises of a two-tier structure of "panel" and "appellate body".
- It is now two years since the US blocked the appointment of Appellate Body members which has undermined the functioning of the enforcement.
- There are currently 21 appeals pending before the presently defunct Appellate Body.



- **Compromise on WTO's role** - The WTO's role as the arbiter of rules has been compromised and there is increasing pressure for new rules and new agreements.
- The multilateral format for rule-making that the WTO provided is also under threat.
- **Lack of consensus** – WTO has faced severe criticism for its inability to conclude any major negotiations in over two decades.
- There has been lack of consensus among its diverse membership, who differ considerably in terms of their economic, socio-political structures, and interests.

What are the joint initiatives?

- Some like-minded Members proposed an innovative approach called Joint Initiatives (JIs), during the 11th Ministerial Conference held in Buenos Aires in December 2017.
- JSIs can be broadly defined as a plurilateral negotiating tool initiated by a group of WTO Members who start negotiations on certain issues without adhering to the rule of consensus decision-making.
- The initiatives were on
 1. E-commerce
 2. Investment facilitation for development
 3. Services domestic regulation
 4. Micro, small, and medium-sized enterprises (MSMEs)
- Of the 164 WTO members, 136 are participating in the JI on investment facilitation, 86 in e-commerce, 65 in services domestic regulation and 70 in MSMEs.

What are the options for inserting JIs into the WTO system?

- Given the divide in how the membership views JSIs, there appear to be two most feasible options on how to include JSIs into the WTO system.
- **Through Regional Trade Agreements (RTAs)** – It is preferred by some developing countries and least developed countries.
- In order to form an RTA, members would have to meet the legal condition of liberalising “substantially all the trade” under GATT Art. XXIV and the “substantial sectoral coverage” condition under GATS Art. V.
- **Through an amendment to the Members' schedules** – It is preferred by developed countries.
- With regards to JIs on trade in services, GATS schedules can be amended under GATS Art. XXI to include conditions of market access and national treatment.

What are the issues in incorporating JIs into the WTO system?

- The negotiated disciplines on “Services domestic regulation” have been incorporated into WTO commitments on a Most Favoured Nation (MFN) basis.
- But, the JIs on e-commerce and investment facilitation are still exploring the issue of possible legal architecture.
- Other than Services domestic regulation, none of the other JIs have been comprehensively blended into existing WTO commitments.
- They also can't be incorporated into the WTO fold as new plurilateral agreements that create rights and obligations only among participating members because consensus of all members is necessary for this to happen.
- Several countries, including India, have so far stayed out of the JI negotiations that these initiatives lack a multilateral negotiating mandate and are an attack on the fabric of multilateralism underlying WTO.

How can the issues be addressed?

- JIs are likely to form the basis in any future bilateral or even multilateral negotiations and staying out minimises the ability to influence the shape of new rules.
- The thrust of JI discussions is facilitation for MSMEs by establishing a new **Trade4MSMEs** platform that is expected to provide trade-related information to small businesses.
- There has to be a clarity on this as any multilateral rules for MSMEs would first need to grapple with how size of an economy influences the perception of what is a MSME.

- It has to be ensured that any new rules are based on WTO's core principle of multilateral decision-making and the very principles of multilateralism can be used to insist that JIs need to be negotiated at the multilateral level.

9.3 AUKUS could rock China's Boat in the Indo-Pacific

What is the issue?

The ruffle over the AUKUS agreement continues to prevail as France has expressed its resentment at the Australian action at the G20 press conference.

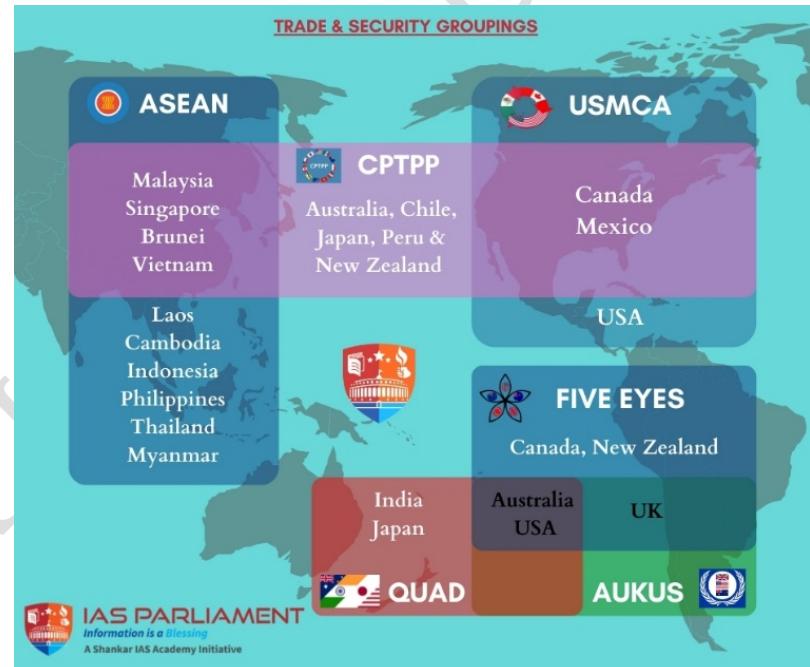
What is AUKUS?

- AUKUS is a new trilateral security partnership among The United States, United Kingdom, and Australia for enduring freedom and openness in the Indo-Pacific region.
- Under the agreement, America and Britain proposed to transfer technology to build a fleet of nuclear-powered submarines for Australia within 18 months.

To know more about AUKUS agreement, click [here](#)

What are the concerns over the emergence of AUKUS?

- **The ASEAN factor** - There is a matter of ASEAN disunity over the emergence of AUKUS.
- Even though AUKUS is not a defence alliance, issues such as the strategic threats posed by China are a matter of concern for AUKUS.
- Australia has clearly assured its commitment to ASEAN centrality and its continued support for the South Pacific Nuclear-Free Zone Treaty and the Treaty of Southeast Asia Nuclear Weapon-Free Zone.
- **The China factor** – The rise of China, particularly its rapid militarisation and aggressive behaviour, is undoubtedly the trigger for the emergence of the agreement.
- The China has criticised AUKUS as an “exclusive bloc” that gravely undermines regional peace and security and reflects a Cold War mentality.



What is the significance of this decades old partnership?

- The U.S. and the U.K. have enjoyed a special defence partnership for decades and have fought together as allies, together with Australia, in the Second World War.
- The U.S. shared nuclear weapons technology with the U.K. following the merging of the latter's nuclear weapons programme with the American Manhattan Project as early as in 1943.
- The first U.K. test was conducted in 1952 in the Montebello Islands in Australia.
- The transfer of sensitive submarine technology by the U.S. to the U.K. is a arrangement based on their long-standing Mutual Defence Agreement of 1958.
- The other areas covered are cyber capabilities, artificial intelligence and quantum technologies, apart from undersea capabilities.
- All three nations will also play a major role in U.S.-led programmes such as Build Back Better World, Blue Dot Network and Clean Network to meet the challenge of China's Belt and Road Initiative.

What is the status of their engagement with China?

- Australia had subordinated its strategic assessment of China to transactional commercial interests.

- China's naval expansion and incursions into the Indo-Pacific has compelled Australia to revisit its defence and security policies.
 - In 2017 and 2019, China's *Dongdiao*-class Type 815 auxiliary general intelligence (AGI) vessel tagged the Talisman Sabre exercises (a biennial exercise that is led by either Australia or the U.S.).
 - China also used the same type of vessel to monitor the multilateral Rim of the Pacific (RIMPAC) exercise in 2018.
 - AUKUS provides an opportunity to the U.S. to place proxy submarine forces to limit China's forays, especially in the Pacific Ocean.

9.4 NAM at 60 Marks an Age of Indian Alignment

Why in news?

The birth anniversary of Jawaharlal Nehru this month and the 60th anniversary of the Non-Aligned Movement prompt reflection on Nehru's major contribution to the field of international relations.

How did NAM evolve?

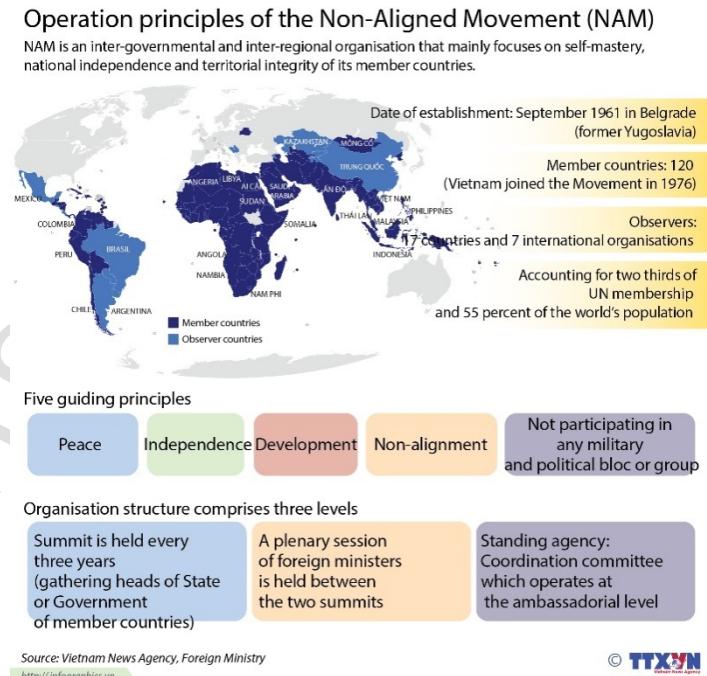
- The concept of not aligning a country's policy with others can be traced to the Congress of Vienna (1814-15) when the neutrality of Switzerland was recognised.
 - The NAM was founded during the collapse of the colonial system and the independence struggles of the peoples of Africa, Asia, Latin America and other regions and at the height of the Cold War.
 - While some meetings with a third-world perspective were held before 1955, historians consider that the **Bandung Asian-African Conference** is the most immediate antecedent to the creation of NAM.
 - This Conference was held in Bandung in **1955** with the aim of identifying and assessing world issues at the time and pursuing out joint policies in international relations.
 - The principles that would govern relations among large and small nations, known as the "**Ten Principles of Bandung**" were proclaimed at that Conference.
 - The NAM was formed during the Cold War to result in member States becoming pawns in the struggle between the superpowers.
 - The First Summit of the Movement of Non-Aligned Countries was held in Belgrade in 1961.
 - Abdel Nasser of Egypt, Kwame Nkrumah of Ghana, Sukarno of Indonesia and Josip Broz Tito of Yugoslavia later became known as the "Big Four".

What led to the adoption of NAM by India?

- Nehru saw world problems as interlinked but considers India's interests first even before the merits of the case.
 - Nehru was opposed to the conformity required by both sides in the Cold War.
 - His opposition to alliances was justified by American weapons to Pakistan from 1954 and the creation of western-led military blocs in Asia.
 - Non-alignment was the least costly policy for promoting India's diplomatic presence, a sensible approach when India was weak and the best means of securing economic assistance from abroad.

What were the challenges?

- The difficulty was always to find a definition of this policy, which caused a credibility gap between theory and practice.





- In the early years, there was economic dependence on donor countries who were nearly all members of western military pacts.
- Indian equidistance to both Koreas and both Vietnams was shown by India recognising neither but it recognised one party in the two Chinas and two Germanies.
- The **Treaty of peace, friendship and cooperation** between India and the USSR of 1971 due to the Liberation war of Bangladesh came dangerously to a military alliance.

What were the failures of NAM?

- Nehru was hesitant earlier because in theory a coalition or movement of non-aligned nations was a contradiction in terms.
- According to then Defence Minister Krishna Menon, true non-alignment was to be non-aligned towards the non-aligned.
- Among the members there were varying alignments, non-internalising of their own concepts of human rights and peaceful settlement of disputes without violating the principle of sovereign domestic jurisdiction.
- Lack of collective action and collective self-reliance, and the non-establishment of an equitable international economic or information order were other failures.
- The years following Nehru's death, the non-alignment has undergone considerable changes by inclining to **greater alignment with the United States** at present.

G.S PAPER III

10. ECONOMY

10.1 Pointers that India is witnessing a K-shaped Recovery

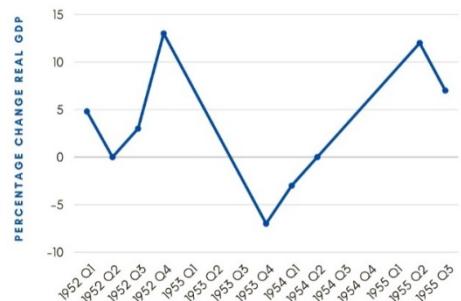
Why in news?

The pointers are indicating that India is witnessing a K shaped recovery more than V-shaped with various groups and industries recovering much more rapidly than their counterparts.

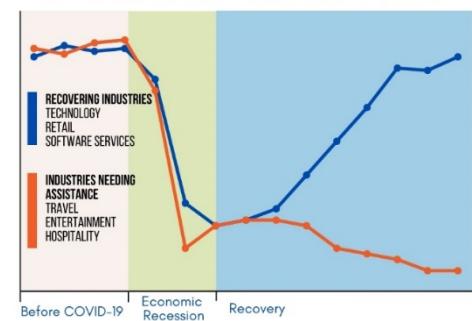
What shapes of economic theory are in debate?

- **V-shaped recovery** - A V-shaped recovery is characterized by a quick and sustained recovery in measures of economic performance after a sharp economic decline.
- Such recoveries are generally spurred by rapid readjustment of consumer demand and business investment spending.
- Because of the speed of economic adjustment and recovery in macroeconomic performance, a V-shaped recovery is a best-case scenario given the recession.
- The recoveries that followed the recessions of 1920-21 and 1953 in the U.S. are examples of V-shaped recoveries.
- Economic Survey 2021 predicted a 'V-shaped' post-pandemic recovery.
- The recovery in FY22 is indeed V-shaped after the first quarter because of 20 % expansion – a sharp upturn after a quick decline.
- **K-shaped recovery** - A K-shaped recovery is one in which the performance of different parts of the economy diverges like the arms of the letter "K"
- In a K-shaped recovery some parts of the economy may see strong growth while others continue to decline.
- Overall, the natural consequence of a pandemic is the widening of inequality and a K-shaped recovery.

V-SHAPED RECOVERY



K-SHAPED RECOVERY





- Education, for example, is inherently K-shaped in many places and this has become even more skewed due to Covid-19.
- A K-shaped recovery exhibits wealth inequality, greater corporate monopolies, a continuing racial wealth gap, long-term unemployment for low-income workers, and accelerating technological adoption.

What indicates that the economy is witnessing K shaped recovery?

- **Signs from industry** - The effects of this K-shaped recovery can be observed through the growth and consumption in specific industries.
- A report by CRISIL indicates that in the year 2021, two-wheeler sales are set to decline by 3%-6% year-over-year on top of a lower base in the year 2020.
- The sales of two-wheeler are the second-lowest it has been in seven years and the festival season was unable to rectify this phenomenon.
- On the other hand, premium cars and premium motorcycles have been resistant to the pandemic slowdown.
- **Impact of taxation** - The taxation policy of the Government insists on maintaining indirect taxes on fuel and consumer products while lowering corporate taxes.
- While inflation soars, the incomes of the middle and lower-middle-class have at best remained constant leading to a sustained loss in disposable income.
- **On jobs** - Over five million people lost their jobs in October, according to a Centre for Monitoring Indian Economy (CMIE) report.
- Unemployment coupled with the high food and fuel prices push families into poverty.
- **On NREGA** - There is a greater demand now for MGNREGA jobs than in the pre-COVID-19 era.
- But, in 2021-2022, the Government had cut its budget allocation towards MGNREGA by 34% for its inability to compensate workers in time and fairly.
- People who are looking for MGNREGA work cannot afford to be unpaid for such long durations and this again ties back to placing upward pressure on unemployment figures.
- **Stimulus and growth** - The recovery in the stock market and other such financial assets over the past year has been phenomenal but only less than 5% of India directly benefited from the said recovery.
- The lower middle class which does not invest in such assets has no guard against inflation and their only hedge against inflation is their income.
- The disproportional benefit of the asset price inflation favouring the upper-middle-class further displays the inherent K-shape of the recovery.

How can the Government address this phenomenon?

- The U.S. and European economies have stimulated the economy bottom-up through unemployment cheques and social welfare schemes.
- It is crucial that the Government addresses this phenomenon and works towards aiding the middle and lower-middle class.
- It is essential to prioritise those who are more likely to spend (the middle and lower-middle-class) rather than those who have a greater propensity to save.
- Social welfare schemes must be given greater importance to assist households to get through this period.
- The velocity of money which sustained a significant shock from pandemic lockdowns needs to be kickstarted.
- The Government needs to increase the progressive (direct) taxes and reduce the regressive (indirect) taxes to ease the financial pressure on lower-income households.

10.2 The Duality in India's Economic Recovery

What is the issue?

In the process of recovery of pandemic-induced economic crisis, there's a gap between rich and poor States due to vaccination levels and between the unemployed and the well-heeled.

What is the status of economic recovery in India?

- The RBI projected real GDP growth of 9.5 %for the FY 2021-22.

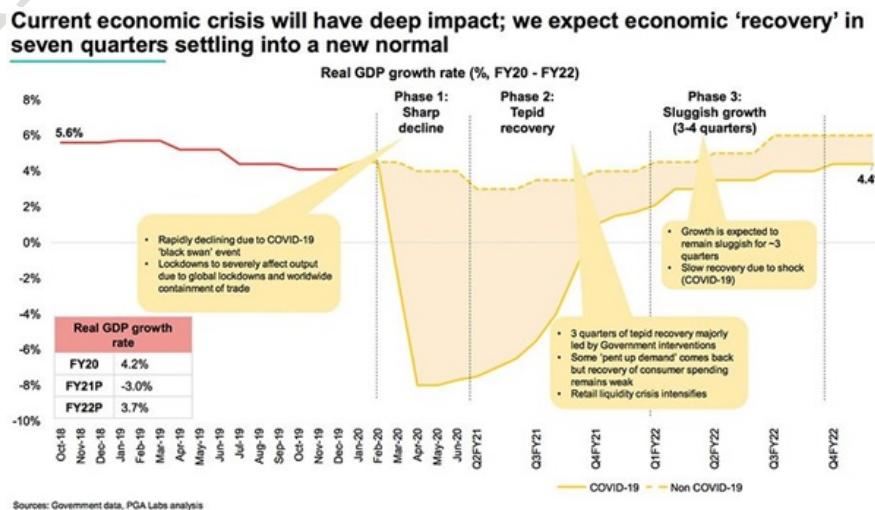
- Similar projections have been made by multilateral agencies like IMF and World Bank, projecting GDP growth rate in the range of 8.5-9.5 % indicating a V-shape recovery.
- The optimism is the result of increased consumer confidence and vaccination coverage.
- Google data indicates that the mobility trend across retail, transit, residential, and workplaces is back to its pre-pandemic level.
- Real-time Indicators such as PMI, e-way bills, GST collection, electricity demand, etc. recovered to their pre-pandemic level.
- Industrial output recovered during the quarter ending September 2021 and recorded a growth of 8 % compared with 2020.
- The GST collections grew more than 25% in July, August, September and, October and reached an all-time high of Rs 1.3 lakh crore in October 2021.
- Exports grew 38% in the quarter ending September 2021.
- The stock market is soaring up with a record number of IPOs debuting.

What are the reasons for India's economic recovery?

- Positive consumer confidence
- Higher vaccination coverage
- Decline in the number of infections
- Fading threat of the new Covid wave
- Increased consumption expenditure
- Festivals boosting the demand

What factors are attributed to the uneven economic recovery?

- Level of vaccination** - The higher income States have vaccinated 45-50% of its eligible population but the fully vaccinated population in poorer States remains under 30%.
- Saving glut** – A global saving glut (cash hoarding, dead cash, dead money) is a situation in which desired saving exceeds desired investment.
- The pandemic created a saving glut with the top income quintiles leading to reduced consumption and economic uncertainties.
- It is this section of the population that is leading the present recovery.
- Unemployment** - The bottom 50 % income quintile suffered permanent loss of jobs and incomes.
- As per CMIE's consumer pyramid survey, the labour force participation rate has declined from 43% to 39% between March 2020 to September 2021.
- In absolute terms, 1.4 million people have been forced out of the labour force.
- Increased poverty** – Around 3.5 million people are unemployed and have stopped looking for jobs coming under the category of discouraged workforce.
- As a result, the absolute number of poor in the country has increased by 76 million between 2011 and 2020.
- Income disparity** – The saving glut forces the interest rate to fall and people search for alternative asset classes for a higher return.





- In India, these excess savings are getting channelised into the stock markets and real estate, fuelling asset prices.
- Asset price bubbles make the rich feel even wealthier widening the inequality.

How can the issue be addressed?

- For an even recovery, the economic duality needs to be rectified and the people in the bottom 50% income quintile who are still in doldrums, require income and consumption support.
- The focus must be on addressing the equity concern and speeding up vaccination rates in low-income States.
- Fiscal policy needs to be prioritised over monetary policy.
- Targeted demand push in the form of extension of the free ration scheme, financial support to struggling SMEs and increased outlay for MGNREGA may help sustain the economic recovery.

10.3 Equalisation Levy: Prevailing Issues

What is the issue?

Due to the amendments made in the Finance Act 2021 to widen the equalisation levy provisions, various interpretational issues have arisen.

What is Equalisation Levy?

- **Equalization Levy 1.0** –Commonly known as **Google Tax**, EL 1.0 was introduced in 2016 as a withholding tax.
- It covered only services and is introduced via part of Finance Act and not by way of amendment to the Income Tax Act 1961.
- It charged an equalisation levy at the **rate of 6%** of the amount of consideration for any specified service received or receivable by a -resident from a person resident in India or a non-resident having a permanent establishment in India.
- **Equalization Levy 2.0** - Commonly known as the **Amazon Tax**, EL 2.0 was introduced in 2020 which is directly levied on the Non-resident.
- EL 2.0 covered e-commerce supply or services and was made by way of amendment to Finance Act 2016.
- It charged an equalisation levy at the **rate of 2%** of the amount of consideration received or receivable by an e-commerce operator (non-resident) from e-commerce services to a person resident in India or a non-resident or a person who buys goods and services using internet protocol address located in India.
- EL 2.0 is applicable to e-commerce operators (ECO) having sales, turnover, or gross receipts of Rs20 million in a financial year.

What amendments were made in the Finance Act 2021?

- Any foreign company providing services/goods in India through a digital platform could be within the scope of the levy.
- Given the expanded definition of ‘online sale of goods’, a mere payment that is made through an online mode can potentially be subject to the transaction to equalisation levy.
- The compliance obligation to discharge the levy in India is on the non-resident company.
- Pure traditional brick and mortar businesses that use a fair degree of digitisation, (website, digital payments) may also come under the net of EL 2.0.

What issues need to be addressed under EL 2.0?

- **Interplay between EL and Royalty/Fees for Technical Services (FTS)** - The classification of income as royalty/FTS/business income has been a subject matter of prolonged litigation.
- Royalty and FTS are subject to withholding tax on gross basis but if an enterprise has a Permanent Establishment in other country then such income is taxable as business profits on net basis.
- The present provisions are silent on the treatment of EL already paid by the taxpayer.
- There is a lack of clarity on whether the EL paid by the enterprise shall be allowed as credit against the tax liability arising on account of taxability as Royalty/FTS or refunded to the taxpayer and if it is to be refunded what is the mechanism to claim such refund.



- **Non-availability of foreign tax credit (FTC)** - The question whether the ECO will be eligible to claim the FTC of EL paid will depend on the local tax laws in home jurisdiction.
- The taxes covered under the respective Double Taxation Avoidance Agreements (DTAA) between India and foreign countries generally do not cover the EL and it is likely that the tax credit may not be available for the EL paid in India.
- With countries with which India does not have a DTAA , if the home country jurisdiction of ECO recognises EL as a type of direct tax and entitles the ECO, the ECO may be able to claim the tax credit.
- **Applicability to inter company transactions and reseller arrangements** - The EL 2.0 provisions do not provide any exemption for inter-company/ intra-group transactions.
- The present scope of EL 2.0 is widely worded and could cover such inter-company transactions provided they qualify within the definition of 'ECO' and 'e-commerce supply or services' as provided in EL laws.
- **Technological challenges in locating IP address** - Transactions between two non-residents where either the marketplace is in India or the IP address is located in India have been brought under the ambit of the EL 2.0.
- This could cover transactions of a non-resident tourist purchasing goods or services on a non-resident operated e-commerce platform using an Indian IP address which may pose a challenge for various stakeholders.
- **Meaning of the term 'digital or electronic facility or platform'** - Neither the EL law nor the Income Tax Act defines or explains this term.
- In the absence of any definition, the term is capable of being interpreted in different ways and can potentially cover ubiquitous digital communication tools like emails or calls.
- **Definition of the term 'goods' and 'services'** - The term 'goods' and 'services' have neither been defined under the Finance Act nor the Income Tax Act leading to interpretational issues.

How does the future of EL 2.0 look?

- The future of EL 2.0 depends on the adoption of OECD Pillar 1 and 2 amendments by India.
- Foreign companies need to factor in these levies as part of their global tax planning as it is likely to increase the cost of doing business in India without the ability to claim the tax credit in the home country.
- It is now necessary to assess the implications of EL 2.0 and currently it requires clarity.

10.4 Where and How Inflation Hits

Why in news?

Over the last few months, as most economies have started to recover, inflation has emerged as an important challenge.

What is the issue?

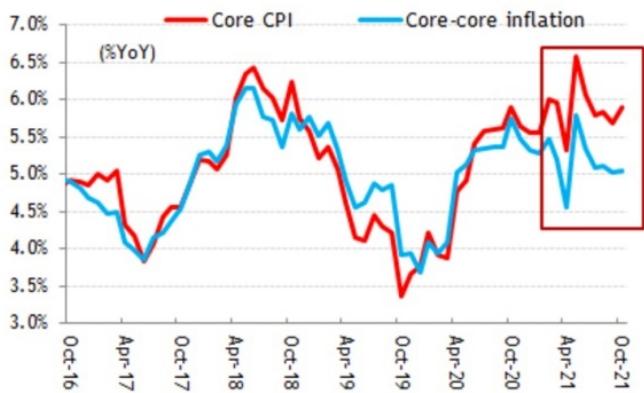
- Data from October showed the highest year-on-year spike in inflation in over 30 years in the United States.
- There are other countries too - inflation in Germany is 4.5%, Russia over 7%, Brazil 10%, Turkey 20%, and Argentina over 50%.
- The sharp and steady increase in prices has been mainly due to the unexpectedly fast demand recovery along with supply bottlenecks.
- The term "**stagflation**" which was popular in the 1960s and the 70s has regained currency.
- Inflation is the rate of increase in prices over a given period of time. Stagflation describes a situation of stagnant economic growth, along with persistently high inflation.

What is the situation in India?

- India does not face a serious stagflation situation, but it has its own set of inflation worries.
- Over the past few months, headline retail

Chart 2: Core inflation stays elevated, at close to 6%

EXPRESS EXPLAINED





inflation measured by the Consumer Price Index (CPI) has been well within the RBI's comfort zone of **6% at the upper end.**

- But Indians are likely to face sustained inflationary pressures till the next financial year (2022-23).
- In India, high inflation occurred even before the start of the pandemic, mostly in food and fuel prices which is usually a temporary phenomenon due to short-term or seasonal factors.
- But if these prices stay up for long, they tend to seep through the **core inflation which is now higher than headline inflation.**
- A major reason for high headline inflation in India was the high inflation in food prices but food price inflation has simmered down over the past few months.
- Core inflation is close to 6% now, and unless international crude prices come off sharply, core goods inflation may stay elevated.

The headline inflation measure demonstrates overall inflation in the economy. It is more volatile compared to core inflation.

Core inflation is the change in the costs of goods and services but does not include those from the food and energy sectors.

Who has been worst affected by high inflation of late?

- Crisil Research published a detailed paper explaining how the same level of inflation affects different sections of India differently.
- During the last of 2020-21 and in the first half of 2021-22, it was the urban poor (bottom 20% in the income category) that faced the highest inflation rate.
- But since April, food prices inflation have come down sharply, fuel inflation has soared, while core inflation has stayed high.
- In the urban areas, fuel price inflation has been soaring at almost 15% and the worst affected are the urban poor who spend almost 11% of their income on buying fuel.
- In rural areas, people belonging to the bottom 20% income bracket have some relief as food and beverages which account for over 60% of their total consumption, has an inflation rate of just 3.5%.
- The rich who spend much of their total consumption on goods and services that are neither food nor fuel will face a tougher time since core inflation is likely to stay high for some time.

Table 1:CPI inflation across different income classes* (y-o-y %)

Express Explained.

Income segment	FY21		H1FY22	
	Rural	Urban	Rural	Urban
Top 20%	5.9	6.4	5.4	5.4
Middle 60%	5.9	6.8	5.2	5.5
Bottom 20%	5.9	7.0	5.2	5.6

*with share of commodity groups in basket as weights
Source: NSSO, National Statistics Office (NSO), CEIC, CRISIL

10.5 Sunset Clause for Bad Banks

What is the issue?

The RBI recently gave license to National Asset Reconstruction Company Limited (NARCL), popularly known as a bad bank but the absence of a clause about the lifespan of NARCL may lead to a moral hazard problem.

What are bad banks?

- Technically, a bad bank is an asset reconstruction company (ARC) or an asset management company that takes over the bad loans of commercial banks, manages them and finally recovers the money over a period of time.
- The bad bank is not involved in lending and taking deposits.
- It just helps commercial banks clean up their balance sheets and resolve bad loans.
- The takeover of bad loans is normally below the book value of the loan and the bad bank tries to recover as much as possible subsequently.
- US-based Mellon Bank created the first bad bank in 1988.



- The role of the bad bank is to establish a liquid market for NPAs to enable the banks to sell their NPAs at a fair value.

What is the status of NPAs in India?

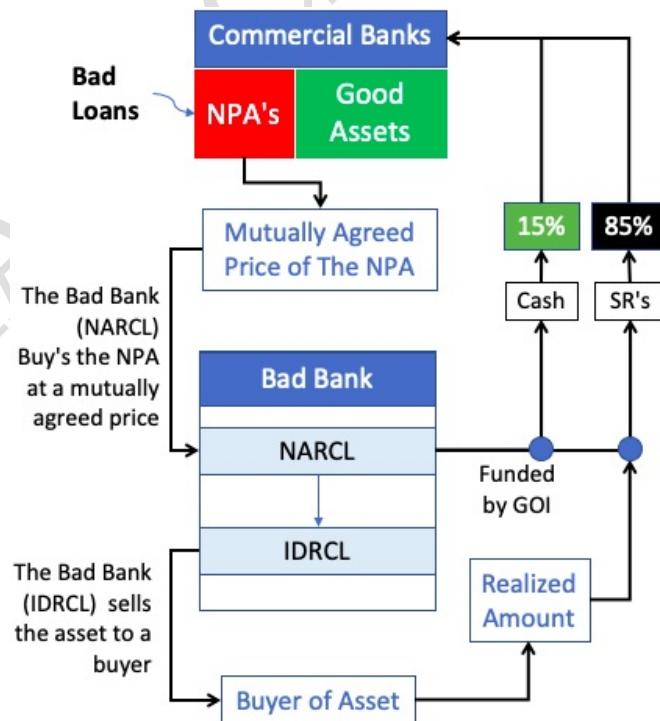
- Currently, the Indian banking system has one of the highest gross non-performing assets (GNPA) to total asset ratio globally.
- Post-covid stress scenarios estimated by the RBI pegs it at an aggregate GNPA ratio in the range of **12.5- 14.7 %**

What mechanisms have been initiated to recover NPAs?

- Debt recovery tribunals - under the Recovery of Debts Due to Banks and Financial Institutions (RDDBFI) Act in 1993
- Asset Reconstruction Companies (ARCs) - a part of the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act (SARFAESI Act) in 2002
- Insolvency and Bankruptcy Code (IBC) in 2016

What is NARCL?

- India's first-ever bad bank**, National Asset Reconstruction Company Limited (NARCL) will acquire stressed assets worth about Rs 2 lakh crore from various commercial banks
- It will pay 15% of the agreed price in cash and the remaining 85% will be in the form of Security Receipts.
- The rest will be paid when the assets are sold by **India Debt Resolution Company Ltd (IDRCL)**.
- Rs 90,000 crore of the asset will be managed in the first phase.
- A government guarantee will back the Security Receipts for a maximum amount of Rs.30,600 crore, and the guarantee will be valid for a resolution period of five years.
- The NARCL is essentially an Asset Reconstruction Company (ARC) with only two distinguishing features
 - NARCL is intended for dealing in big sized tickets
 - NARCL has a partial government guarantee.
- The effectiveness of ARCs hinges on
 - A focused mandate for setting up the ARCs
 - Limited lifespan of the ARC
 - Market-based resolution of NPAs



What are the issues in NARCL?

- The absence of a clause about the lifespan of NARCL may lead to a moral hazard problem.
- Propagation and evergreening of bad loans - Public sector banks (PSBs) which own 51 % stake in NARCL may continue buying their own stressed assets through NARCL.
- There are question marks over the government guarantee of Rs 30,600 crore in providing liquidity and creating a market for the NPAs.

How can the problems be addressed?

- The government should address the lifespan issue of NARCL in the form of a sunset clause to increase the effectiveness of the NARCL.
- There should be a fair and transparent mechanism while setting the haircut on the stressed assets by the NARCL.



- The net asset value of the Security Receipts must be fairly priced to boost the participation and liquidity in the security receipts market.
- There needs to be a strong political will to recognise bad loans and support legal infrastructure to address wilful defaulters.

10.6 SEBI - ESG Funds

Why in news?

SEBI recently came out with a consultation paper for introducing disclosure norms for ESG (environment sustainability and governance) mutual fund schemes.

What are ESG funds?

- ESG Mutual Funds are Thematic Mutual Funds that invest in socially responsible companies.
- ESG funds are those funds whose asset allocation mostly includes shares and bonds of companies that are evaluated based on the environmental, social, and governance factors.
- An organisation is said to be ESG compliant if it meets all the criteria of environmental, social, and governance standards.
- The ESG companies are assessed on their sustainability before they are given the tag.
- The ESG parameters reflect on an organisation's culture, the risk involved, and management, among other things.

Criteria included, among others

Environment: Companies that -

- put out carbon or sustainability reports
- Limit harmful pollutants and chemicals
- Seek to lower greenhouse gas emissions
- Use renewable energy sources

Social: Companies that -

- operate an ethical supply chain
- support LGBTQ rights and encourages diversity
- have policies to protect against sexual misconduct
- pay fair wages

Governance: Companies that -

- embrace diversity on their board
- embrace corporate transparency
- employ a CEO independent of the board chair

What are the SEBI's recent proposals?

- Earlier in 2017, SEBI had said that sectoral or thematic funds must have at least 80% of investments in specific sectors or themes.
- Now, SEBI has specified that ESG funds should have at least 80% of their total assets in securities following the sustainable theme, since these funds fall under the thematic category.
- The rest 20% assets should not be in stark contrast with the ESG philosophy.
- The AMCs (Asset Management Companies) should disclose the nature and extent of the scheme's ESG-related objectives and the approach used for screening companies.
- This will help investors judge if the fund meets their requirements.
- ESG funds should only invest in companies which have filed Business Responsibility and Sustainability Report (BRSR) from October 1, 2022.

What is the rationale?



- With the increased emphasis on adopting sustainable growth, there has been a surge in ESG investing globally.
- ESG assets surpassed \$35 trillion by the end of 2020.
- The momentum is expected to continue with ESG funds accounting for a third of global assets under management in 5 years.
- Investing based on the ESG theme is beginning to attract higher interest in India too.
- As per SEBI data, at the end of September 2021, there were 8 ESG thematic equity schemes with assets under management (AUM) of ₹12,085 crore.
- However, the regulation of this segment is at a nascent stage, globally and nationally.
- SEBI's recent norms is an effort to tighten the disclosure, strategies and practices of funds based on the ESG theme.
- It will help check ambiguity and usher in transparency.

10.7 Fed's Dot Plot

Why in news?

The Federal Reserve announced that it will reduce its asset purchases by \$15 billion a month in November and December 2021 which made commentators to look forward to the actual US Fed dot plot on interest rates.

What is the concern associated with Fed Reserve's reduction of asset purchase?

- Tapering means gradual slowing down of purchases of securities and bonds.
- Once the tapering is complete, the Fed may go for reduction in the size of the balance sheet to slowly remove the monetary stimulus.
- In 2013, a similar announcement led to a 'tantrum' across financial markets.

What is US Fed dot plot?

- The dot plot is the expected trajectory of interest rate hikes proposed by US Fed members in graphical form.
- The US **Federal Reserve's Federal Open Market Committee (FOMC)** releases its dot plot along with its projections on other major economic indicators like GDP, inflation, etc.
- 18 members participate and every member of the committee offers their prediction on where the policy rate should be over the next three years.
- Each member's interest rate forecast is then plotted on a graph in the form of a dot plot.
- The dot plot was introduced by the Fed in **2012** and is published **four times a year** (once a quarter) in March, June, September and December.

Why is it important?

- The Fed's dot plot tells the market in advance where interest rates could be heading in future.
- The dot plot is particularly important because the US central bank has been maintaining its interest rates near zero for a prolonged period.
- The dot plot will give a hint to the markets on when the rate hike cycle may begin and, more importantly, what could be the possible pace of increases in rates.

What does the dot plot say?

- The dot plot released in June 2021 had shown 12 members out of 18 predicting that rates would remain at the current levels of 0-0.25 per cent.
- But in September, this had come down to nine indicating that the first-rate hike is possible in 2022 itself.
- It also showed that there could be three rate hikes in 2023.



10.8 WTO's 12th Ministerial Conference

Why in news?

The World Trade Organization's 12th Ministerial Conference (MC12), a forum to ensure trade rules will take place from 30 November to 3 December 2021.

What is the WTO Conference (MC12)?

- The WTO is an inter-governmental organization for negotiating trade agreements, settling trade disputes, monitoring trade policies and delivering technical assistance on trade to developing countries.
- The Ministerial Conference is the **highest decision making body** of the WTO.
- Trade ministers generally meet at the Ministerial Conference every two years, but MC12 was postponed due to COVID-19.
- MC12 will be chaired by Timur Suleimenov, the Kazakhstan President's Envoy for International Trade.

What will happen at the WTO Conference in December?

MC12 Multilateral Discussions

- **Vaccines and other critical supplies** - Vaccine distribution, export restrictions, trade facilitation and improved transparency in medical supply chains needs to be discussed.
- Temporary intellectual property (IP) waivers have been debated.
- **Saving fish stocks** - Negotiations have been ongoing since 2001 to eliminate harmful fishing subsidies and a revised text is being discussed ahead of MC12.
- **Food and Agriculture** - Developing countries are keen to see a permanent solution preventing challenges to government food purchase programmes when these breach certain trade-distorting limits.
- Some countries are also pushing to reduce farming subsidies and some for new market access talks.
- **Electronic tariffs** - A temporary prohibition on customs duties on electronic transmissions is up for debate again.

MC12 Plurilateral Discussions

- **Services trade** - 65 WTO members accounting of 90% of global services trade have agreed to cut red tape in the way they regulate services.
- Its implementation could result in small businesses benefiting from an additional 2-3% cost reduction compared to large firms.
- **Sustainable trade** - Three sustainable trade coalitions will be launched on environmental sustainability, phasing out fossil fuel subsidies and on tackling plastic pollution.
- **Boosting investment** - Negotiations are looking at issues like streamlining the administrative procedures to make an investment in a country.
- **Going digital** - Talks on digital trade continue with text finalized on spam, e-signatures, e-contracts, consumer protection and open government data and paperless trading.
- **Addressing gender inequalities** - A group of WTO members will issue a joint declaration on improving gender-disaggregated data for better trade policymaking and ensuring gender-mainstreaming in the WTO's development work.

In which issues does India have major stake?

- WTO reforms on special and differentiated treatment (S&DT) of developing countries
- Public procurement for food security
- Response to Covid-19
- A patent waiver proposal floated by India and South Africa to fight the pandemic

What is India's stand on S&DT?

- India is concerned that developed nations are pushing on reforms that would dilute provisions on S&DT (special and differential treatment) for developing countries
- S&DT allows developing and less developed countries to enjoy certain benefits such as longer time periods for implementing agreements and binding commitments, measures to increase trading opportunities, etc.



- Currently, any WTO member can designate itself as a developing country and avail these benefits but developed countries believe that self-declaration will put the WTO on a path to failed negotiations and institutional irrelevance.
- However, India is open to discussions on classification of developing countries.
- India's best strategy at the ministerial is to make constructive suggestions on strengthening WTO as it has vital interests in a rules-based multilateral trading order while firmly standing up for the developing world.

11. AGRICULTURE

11.1 All about the Commodities Act

What is the issue?

The stock limit imposed on all pulses under the Essential Commodities Act, 1955 and the import by the government affects better rate for Tur dal in the Marathwada districts where the production is hit by at least 20%.

What is the status of pulse prices?

- The retail prices of pulses were substantially stabilized in the past five months from June 2021.
- The Consumer Price Index (CPI) inflation for pulses has also seen a consistent decline during the last five months from 10.01% in June to 5.42 % in October.
- The government cites that the import of Tur, Urad, and Moong dal is attributed to price stability but they incur heavy costs to farmers.
- When the government goes for imports, prices in the market collapse and the possibility of farmers getting a higher price for the produce gets affected.
- Since the farmers do not have storage capacity beyond a limit, they sell the produce at a price where even production cost is not recovered.

What are the Essential Commodities Act about?

The Ministry of Consumer Affairs, Food and Public Distribution implements the Act.

- **Essential Commodities Act, 1955** has given the Government the powers to regulate the production, supply and distribution of essential commodities.
- The Centre can notify an item as 'essential' commodity and by that declaration it can also impose a stock limit.
- **The Essential Commodities (Amendment) Act, 2020** removes restrictions on stocking of certain essential commodities.
- It provides that the central government can regulate the supply of food stuff only under extraordinary circumstances such as war, famine, exceptional price rise and grave natural calamities.
- It further specifies that stock limit can only be imposed if there is 50% rise in retail price of non-perishable agricultural foodstuff over the price prevailing in the preceding 12 months or average retail price of last 5 years, whichever is lower.
- It also provides that if a stock limit is imposed, it will not apply to a processor or value chain participant or an exporter.
- It gives the freedom to produce, hold, move, distribute and supply that will attract private sector or foreign direct investment into agriculture sector.

What were the concerns of the amendment?

- There were fears that this will give the traders freedom to purchase and store any quantity, hence indulging in hoarding.
- It was alleged that it will lead to complete market domination by big companies which would dictate terms to

ESSENTIAL COMMODITIES (AMENDMENT) BILL, 2020

Takes out most food items from list of essential commodities

How will it help?

- Pulses, onion, potatoes, oilseeds, cereals, and edible oils, etc. are removed from essential commodities list
- Except under unusual circumstances, it does away with the imposition of stock limit
- Business and traders get rid of harassment
- With the improvement of storage facilities, the wastage is likely to get reduced
- Aims for a stable price which will eventually help in raising farm incomes



farmers.

- This law might affect the urban and rural poor consumers who get grains under Public Distribution System (PDS).

How to achieve better pricing for the produce?

- A stock facility is essential to avoid post-harvest waste and price crashes during the bumper crop.
- The government must invest or allow the private players to invest in order to boost the agriculture sector.

12. ENVIRONMENT

12.1 Does India have a Right to Burn Fossil Fuels?

What is the issue?

With a lot of debate on India's dependence on coal, the Government of India has for the first time made a commitment to achieve the net zero target by 2070.

Why was India hesitant to commit to net zero target earlier?

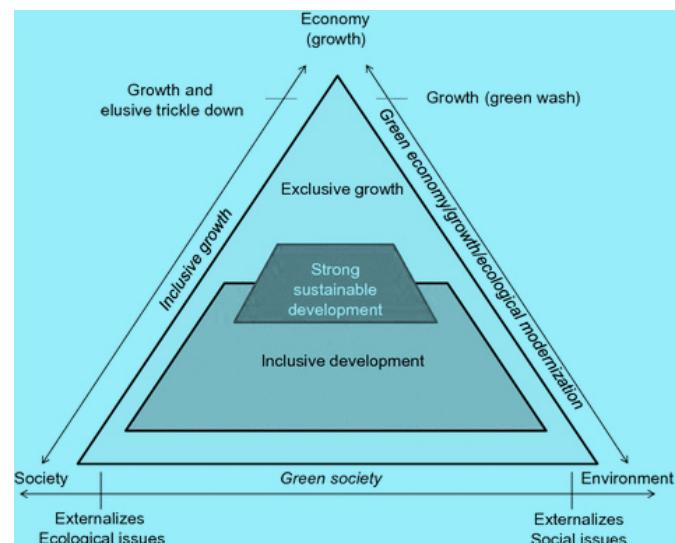
- India has neither historically emitted nor currently emits carbon anywhere close to what the global North has or does in per capita terms.
- India's per capita emissions is lower than the global average.
- It stressed for a higher and fairer share in the global carbon budget.
- There were arguments that since India was colonised, it has a right to burn and stopping the country from doing that is injustice.

What are the injustices in terms of a carbon budget?

- Global injustice in terms of a carbon budget happens at the level of the nation-states , between the rich and the poor within nations and between humans and non-human species.
- The Global South is not only made primarily responsible for climate change, but also has to bear the effect of climate change because of its tropical climate and high population density along the coastal lines.
- For development, the countries in the global South need not increase their share in the global carbon budget.

What major areas have to be focused for development?

- **Cleaner forms of energy** - The economic development requires energy and coal is favoured on account of its cost, reliability and domestic availability.
- But recent data show that the levelised cost of electricity from renewable energy sources like solar, hydro and onshore wind is already less than fossil fuel-based electricity generation.
- The frontier renewable energy technologies have managed to address the question of variability of sources with technological progress.
- Also, India is among the largest importers of coal in the world, whereas it has no scarcity of solar energy.
- **Development model** – The two significant issues under discussion in the post-colonial development were control over technology and choice of techniques to address the issue of surplus labour.
- The abundance of renewable natural resources in the tropical climate can give India a head start in this competitive world of technology.
- South-South collaborations can help India avoid the usual patterns of trade between the North and the South, where the former controls technology and the latter merely provides inputs.





- The high-employment path that the green energy provides may help address the issue of surplus labour while providing decentralised access to clean energy to the poor and the marginalized.
- It simultaneously addresses the issues of employment, technology, energy poverty and self-reliance.

What is the path ahead?

- Global North needs to pay for the energy transition in the South.
- Creating an independent, greener path to development may give the South the moral high ground to force the North to come to the table, like South Africa did at Glasgow.
- The need of the hour is a global progressive agenda that wants working people of the world as a whole against the global ruling elite in its aggressive and dangerous model of competitive emissions.
- The transition to economic growth coupled with increased efficiency of renewable resources can aid India in achieving its goal of inclusive growth and sustainable development.

12.2 Glasgow Climate Pact: Achievements and Disappointments

Why in news?

The Glasgow Climate Pact (of COP 26) was adopted recently and it is a mixed bag of modest achievements and disappointed expectations.

What are the modest achievements of the Summit?

- **Average global temperature** - The achievements include a clear consensus on a target of keeping global temperature rise down to 1.5 degrees Celsius.
- The notional target of 2 degrees of the Paris Agreement remains but the international discourse is now set in the more ambitious target.
- **Transition from fossil fuels** - It is the first clear recognition of the need to transition away from fossil fuels by phasing down the use of coal.
- **Importance of Adaptation** – Adaptation attained greater significance and there is a commitment to double the current finance available for this to developing countries.
- A start is being made in formulating an adaptation plan and this puts the issue firmly on the Climate agenda.
- **Global Methane Pledge** - Methane is a significant greenhouse gas with 28 to 34 times higher temperature forcing quality than carbon but stays in the atmosphere for a shorter duration.
- An agreement is signed among 100 countries to cut methane emissions by 30 % by 2030.
- **Ending deforestation** - A group of 100 countries has agreed to begin to reverse deforestation by 2030.
- Since the group includes Brazil and Indonesia where large areas of forests are being ravaged by legal and illegal logging, there will be progress in expanding these carbon sinks on the planet.
- **US-China Joint Declaration on Climate Change** - It implies that both the countries are moving towards a less confrontational and more cooperative relationship overall.
- **India's commitments** – The commitment to achieve net-zero carbon by 2070 and of enhanced targets for renewable energy were welcomed.
- **Clarity on Article 6 of Paris agreement** - There is greater clarity on how bilateral carbon trades can proceed and the creation of a centralised hub that replaces Kyoto Protocol's Clean Development Mechanism.
- Criteria have been set out for countries to use CERs from projects registered after January 1, 2013 to meet their first NDC or first adjusted NDC.
- It also designates a 12-member Supervisory Body to oversee the emerging hub and to review the baselines of recognised credits.
- Article 6 of the Paris Agreement introduces provisions for using international carbon markets to facilitate fulfilment of Nationally Determined Contributions (NDCs) by countries.

What are the major disappointments of the Summit?

- **Phasing out the coal** - India introduced an amendment to the original draft to replace the phrase "phase out" with "phase down" playing negatively with both the advanced as well as a large constituency of developing countries.



- India had earlier said that principles of equity meant all fossil sources: coal, oil and gas be reduced but the US and other countries refused as they were critical to their own economies.
- **Inadequate funding for adaptation** - Doubling the current finance available for adaptation to developing countries will be around \$ 30 billion which is grossly inadequate.
- According to UNEP, adaptation costs for developing countries are currently estimated at \$70 billion annually and will rise to an estimated \$130-300 billion annually by 2030.
- **Shortfall in Paris Agreement target** - The Paris Agreement target of \$100 billion per annum between 2005-2020 has a shortfall of more than half.
- The renewed commitment to deliver on this pledge in the 2020-2025 period is unlikely especially in this post-pandemic global economic slowdown.
- **Issue of compensation for loss and damage** – The compensation for loss and damage for developing countries who have suffered as a result of climate change for which they have not been responsible has not met.
- **Global Methane Pledge** - India did not join the Global Methane Pledge despite methane being the second-most abundant greenhouse gas in the atmosphere after carbon dioxide.
- **Ending deforestation** - India refused to join the group due to concerns over a clause on possible trade measures related to forest products.

How can the Glasgow outcome be assessed?

- There is more ambition in the intent to tackle climate change but little to show in terms of concrete actions as there are no compliance procedures.
- The UK Presidency noted that as on 2019, only 30% of the world was covered by net zero targets and this had now moved close to 90%.
- Enhanced Nationally Determined Contributions (NDCs) are expected to be announced next year and further deliberations are planned on the other pledges related to Adaptation and Finance.
- However the text of the agreement indicates that all countries should deliver climate plans to the UN on 5-year cycles starting from 2025 (submitting 2035 NDCs in 2025, 2040 NDCs in 2030).

12.3 Getting to the Root of Delhi's Air Pollution

What is the issue?

According to the System of Air Quality & Weather Forecasting & Research (SAFAR), Delhi's air quality continued to be in the 'very poor' category and curbs were imposed by the government.

What are the major causes for Delhi's air pollution?

According to the latest data from SAFAR, the levels of PM10 and PM2.5 particles have reached 876 and 680 micrograms per cubic metres, against the safe limits of 100 and 60 micrograms per cubic metres, respectively.

- A study commissioned by the Delhi government (2016) highlights that road dust along with construction and demolition dust is the most prominent polluter of air.
- Vehicles are the second largest polluter, with 20 % of PM 2.5 load and approximately 9 % of PM 10.
- The per capita registration of high emission vehicles in Delhi is reportedly the highest in India.
- Then there are over 100 coal thermal plants in the immediate 300-km periphery of Delhi and Industrial point sources have an annual contribution of about 11 % of PM 2.5 and 10 % of PM 10.
- Open burning of waste by neighbourhoods and municipalities, stubble burning, etc adds to this issue.
- Given the geographical nature of the region, Delhi ends up becoming a pollution trap with weather and wind speed playing a key role.
- Diwali crackers and stubble burning are the two most visible sources of pollution and every other sources of pollution are conveniently brushed under the carpet.

What is the relevance of blaming the neighbouring states?

- Stubble burning takes place for maximum three-four weeks in the month of October-November contributing to 2- 38 % of Delhi's ambient air quality.



- Goyal (2014) of Centre for Atmospheric Sciences, IIT Delhi reported that the largest contributor of air pollutant emissions in Delhi is found to be vehicles followed by industries, power plants and domestic sources.
- If stubble burning in these States is the only cause for Delhi's severe air pollution, then the air quality in Lucknow, Chandigarh and Amritsar should be high as well but this is not the case.
- The satellite images by ISRO prove that the neighbouring States were responsible for only 20% of the pollution, whereas the 80% was strictly from Delhi and mainly due to its garbage problem.

What is the way out for Delhi's pollution?

- Delhi's air pollution can be checked, provided the State has the will to do it and the residents should be also willing to change their lifestyle. +
- The Centre and the State need to rethink on the entire model of urban development that is being followed.
- Some long-term measures that can be suggested for cutting down the extreme pollution levels include
 - Imposing a ceiling on number of vehicles per household
 - Controlling diesel vehicles registration
 - Using of CNG engines for public transport
 - Phasing out old commercial vehicles
 - Restricting and regulating construction activities
 - Efficient management of garbage and
 - Banning of smoke generating fireworks in all social events
- Research initiatives need to be undertaken to ensure that the mechanised harvester does not leave the crop stubble behind.
- The government should provide right financial incentives and ensure that the collected straw can be used in biomass plants for power generation.

HOW THE AIR QUALITY HAS WORSENED THIS MONTH

AQI in November so far

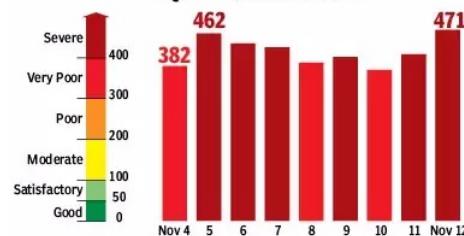


Photo: Sanjeev Rastogi

Factors

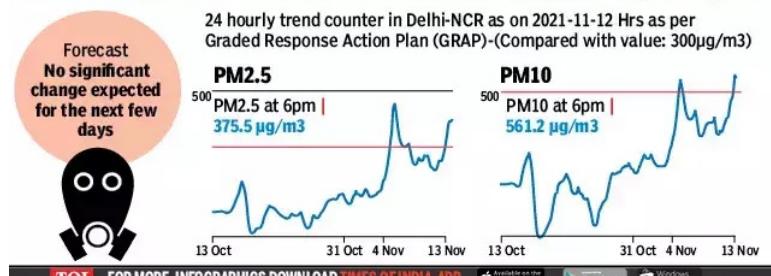
Wind speed | Calm winds at night and light winds during day not allowing dispersal of pollutants

Mixing layer height | The layer of the atmosphere, which drops closer to the surface when temperatures fall, traps pollutants

Temperature | Low temperatures slow down dispersal of pollutants

Moisture | The rise in moisture level makes the particles heavy and affects dispersion of pollutants

Stubble burning | The contribution of stubble burning to Delhi's PM2.5 concentration rose from 26% on Thursday to 35% on Friday. SAFAR: Effective fire counts were 4,056 on Friday



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12.4 Role of Bats in the Ecosystem

What is the issue?

Bats and humans have cohabited since time immemorial but the ecosystem services that bats provide are often neglected.

Why are bats so significant?

- The bats prey on insects in farms, fields, forests and grasslands including agricultural pests and disease-causing mosquitoes.
- A study in Thailand has shown that **pest biocontrol** provided by just one species of bat prevented the loss of 2,900 tons of rice per year saving 1.2 million dollars that would provide meals for 26,200 people annually.
- Some bats sip nectar and helps in the cross pollination of flowers.
- They eat fruits and spread the seeds of many important tree species including wild varieties of bananas, guava, cashew, mango, figs, mahua and other fruits.



- Bat droppings (guano) have high concentrations of nitrogen and phosphorous and are widely used as a fertilizer for agricultural crops.

What is the role of bats in spreading diseases?

- Bats are the largest mammalian groups after rodents and are among the longest lived mammals for their body size.
- Bats are known or suspected to be the natural reservoirs for many pathogenic viruses such as **Nipah, Hendra, Marburg, Ebola and the coronaviruses** that cause severe acute respiratory syndrome.
- Scientific evidences are pointing that the SARS-CoV2 virus that causes COVID-19 originated in bats.
- Despite being reservoirs for viruses, bats never fall sick.
- In gaining the ability to fly long distances, bats have inherited an **immune system that protects them from viruses**.
- It protects them from multiple chronic age-related diseases and makes them age slower, and live longer.

What about human-bat interface?

- Humans have significantly modified the landscape over the years by cutting the forests, clearing the land for agriculture and development resulting in disturbances to the habitat of bats.
- Activities such as mining destroy natural cave systems that bats live in.
- The spillovers are unusual and rare events and tend to occur when there is increased contact between humans and wild hosts.
- Scientists have shown that when bats are disturbed, they become stressed and could shed viruses that they carry, increasing the risk of spillover.
- Spillovers refer to the transmission of pathogens from their natural host or reservoirs to novel hosts such as humans.

How to restore the ecological balance?

- **Co-existence** - Several indigenous people are dependent on animals and nature, and have achieved a balance without any harm to both sides.
- Some have isolation practices such as quarantine following hunting.
- The Bomrr clan in Nagaland have traditionally celebrated the annual bat harvest where they gather at a place called Mimi and smoke a cave full of bats to kill them for consumption.
- In the process, the bats bite them or scratch them yet there has been no major disease outbreak among the Bomrr clan.
- To understand why the Bomrr are immune to the viruses in the bats, the National Centre for Biological Sciences (NCBS-TIFR), an aided centre of Department of Atomic Energy is carrying out sero-ecological studies on this human-bat interface.
- **Precautions** – Several precautions can be taken to minimise direct interactions with bats such as
 - Avoid handling or eating bats
 - Avoid eating fallen fruits gnawed by bats
 - Avoid fruits likely to be contaminated by bat fluids
- **Restoring the balance** - Restricting and reversing land-use change practices can help in regaining the balance with nature and animals.
- Integrated approaches such as **One Health**, where human health is linked to that of the environment and animals can result in the best possible outcomes.
- Global commitment is required for the reduction of habitat loss, and for the preservation and restoration of natural habitats and biodiversity.



13. SCIENCE & TECHNOLOGY

13.1 S-400 Triumph Defence System

Why in news?

Russia has started supplying S-400 air defence system to India and the first division will be delivered by the end of 2021.

What is the status of the deal?

- India has signed a deal in 2018 with Russia for five S-400 Triumph regiments from Russia under a 5.43 billion dollar deal.
- The delivery was to begin by the end of 2020 but was slightly delayed due to late payments as well as the COVID-19 pandemic and is likely to be completed by April 2023.
- Both sides worked out a **Rupee-Rouble exchange** for payments following which India paid 15% advance amount triggering the delivery cycle.
- The rupee-rouble arrangement means that the payment for S-400 will be done by India in Indian Rupees (INR) equivalent to the value of the weapon system in roubles, the currency of the Russian Federation.

What is the S-400 system?

- Named **SA-21 Growler** by NATO and developed by Russia's Almaz Central Design Bureau, S-400 Triumph is one of the world's most advanced air defence systems.
- It is a **surface-to-air** missile system that can simultaneously track and neutralise a range of incoming objects spanning aircraft, missiles and Unmanned Aerial Vehicles (UAV) over very long ranges.
- It can provide air interception against early warning aircraft, airborne missile strategic carriers, tactical and theatre ballistic missiles, medium-range ballistic missiles, etc.
- The S-400 is fully mobile and each system has a 3D phased array acquisition radar that can track around 300 targets up to 600 km.
- It has a command and control centre, automatic tracking and targeting systems, launchers and support vehicles.
- The missile system is tackle any aerial target within a range of **400km** and can simultaneously engage 36 targets.
- Each system has four different types to missiles for up to 40 km, 120 km, 250 km and 400 km and up to **30 km altitude**.
- It can be activated within five minutes and has the flexibility to be integrated into the existing and future air defence units of the air force, army and navy.
- The S-400 also comes with improved electronic counter-countermeasures to tackle the attempts at jamming.
- Another capability of S-400 is its "**fire-and-forget capability**" which does not require further guidance after the launch and can hit the target without the launcher being in line-of-sight of the target.

India inks S-400 Triumph deal with Russia

India has signed a \$ 5.43 billion (about ₹ 40,000 crore) deal with Russia to procure five S-400 Triumph advanced air defence missile systems

S-400 Triumph Features

Can engage all types of aerial targets including aircraft, unmanned aerial vehicles and all types of missiles

Locates targets at 600 km and can destroy them at 400 km range, up to an altitude of 30 km

The system can engage multiple targets simultaneously

Integrates:

- Multifunction radar
- Anti-aircraft missile systems
- Launchers
- Autonomous detection and targeting systems
- Command and control centre

Possible deployment options

Map not to scale

Range of missiles:

Capable of firing different types of missiles to create a layered defence shield

• 40N6: 400 km	• 9M96E2: 120 km
• 48N6: 250 km	• 9M96E: 40 km

KBK Infographics

Why is the S-400 important for India?

- The S-400 fills the gaps in India's national air defence network and would complement India's indigenous **Ballistic Missile Defence System** developed by the DRDO to create a multi-tier air defence over the country.
- The S-400 would be seamlessly integrated into the country's existing air defence network of Indian Air Force.



- If it is deployed towards the Western borders, the system can track movements of Pakistan Air Force aircraft as soon as they take off from their bases.
- The S-400 air defence systems and Rafale fighter jets are “**game-changers**” for the IAF and said they were like a booster dose to the force.
- Countries such as Algeria, Belarus, China, Turkey, etc. have already procured the S-400 defence system.

Why is the US upset with it?

- The US's **Countering America's Adversaries through Sanctions Act (CAATSA)**, 2017 has provided for economic and travel sanctions against countries and officials that transacted significant military and intelligence contracts with Russia, North Korea and Iran.
- The sanctions which were slapped on China and Turkey for buying the S-400 could also be used against India.
- For India, acceding to such sanctions challenges the nation's principles of sovereignty and strategic autonomy.
- The U.S. has a choice to waive sanctions if the waiver is found to be in American vital national security interests or if India reduces its future dependence on Russian weaponry.
- **India-Russia Defence trade** - The defence trade between India and Russia was \$15 billion in the last three years because of several big-ticket deals.
- A report by SIPRI on the trends in international arms transfer said that while arms imports by India decreased by 33% between 2011–15 and 2016–20, **Russia remained the largest supplier to India** in 2011–15 and in the next half decade from 2016–20.
- Deals related to Ka-226T utility helicopters, AK-203 assault rifles and Igla-S Very Short Range Air Defence (VSHORAD) systems are in advanced stages of being concluded.
- **India- US Defence trade** – The USA is the fourth largest arms supplier to India in 2016–20.
- India is in the process of procuring additional P-8I maritime reconnaissance aircraft, AH-64E Apache attack helicopters with the US.
- Negotiations are in advanced stages for armed drones and Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) aircraft.
- India is a prized U.S. partner of the Quad, the Indo-Pacific and in countering China and hence sanctions will cause a rift in India-U.S. ties and could spur India towards Russia.
- The US must recognise that its unilateral sanctions which are not U.N. endorsed would undermine the multilateral system.
- New Delhi must make it clear to Washington that the law should be abandoned, as it nullifies the very “rules-based international order” which is the foundation of the India-U.S. global strategic partnership.

13.2 Synthetic Biology in Dairy Sector

Why in news?

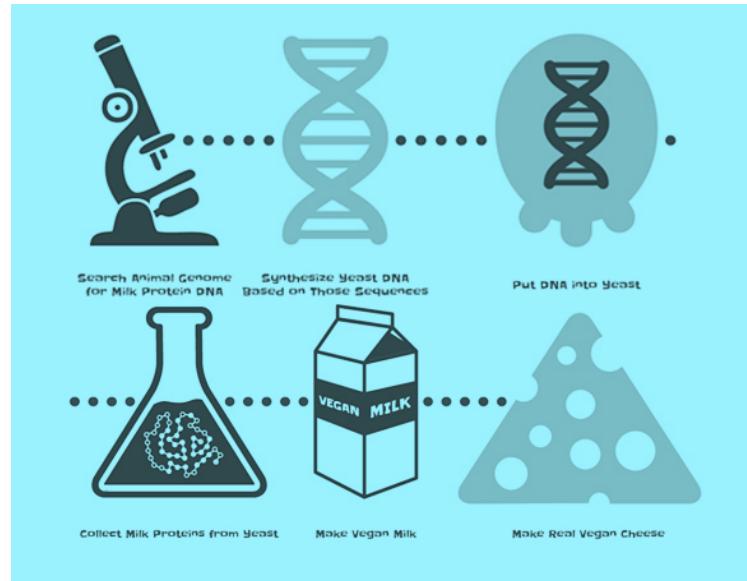
There has been increasing research on animal-free dairy by replicating milk proteins in genetically modified microbes by using genetic sequences from many mammals.

What is the composition of milk?

- India is the world's largest dairy producer and has over 100 million dairy farmers.
- Milk is a superfood that plays critical role in our nutrition.
- On an average, 87% of cow's milk is water.
- Lactose, a simple sugar consisting of glucose and galactose sub-units, makes up 4.4%.
- Milk fats average to about 4.5% and minerals constitute less than 1%.
- Milk proteins make up 3.8% of which almost 80% is caseins and about 20% is whey proteins.
- Lactoferrin and a few other proteins are also present in minute quantities.
- When the milk turns sour due to acid-producing bacteria, or if one adds a little bit of lemon juice, it curdles and the caseins precipitate.

What is synthetic biology?

- Synthetic biology is a field of science that involves redesigning organisms for useful purposes by engineering them to have new abilities.
- Redesigning organisms can produce substances, such as medicine or fuel, or gain a new ability, such as sensing something in the environment.
- Some examples of what scientists are producing with synthetic biology are:
 - Microorganisms harnessed for bioremediation to clean pollutants from our water, soil and air.
 - Rice modified to produce beta-carotene that prevents vitamin A deficiency.
 - Yeast engineered to produce rose oil as an eco-friendly and sustainable substitute for real roses
 - Production of animal free dairy products

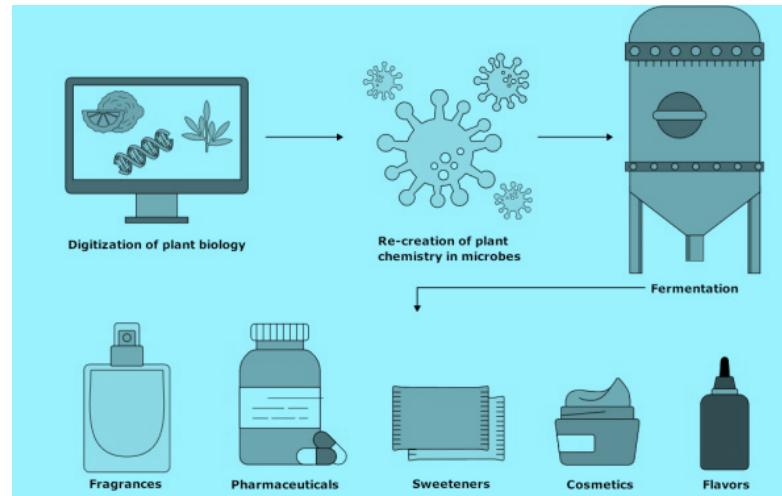


What is the difference between synthetic biology and genome editing?

- In synthetic biology, scientists typically stitch together long stretches of DNA and insert them into an organism's genome.
- These synthesized pieces of DNA could be genes that are found in other organisms or they could be entirely novel.
- In genome editing, scientists typically use tools to make smaller changes to the organism's own DNA.
- Genome editing tools can also be used to delete or add small stretches of DNA in the genome.

What is the significance of studying mammalian lactation?

- It shows us how evolution has resulted in remarkably fine-tuned solutions to problems.
- **Study about antimicrobial protein** - For instance, the duck-billed platypus, a mammal that lays eggs has evolved a milk pad but not teats.
- As a result, its newborn sucklings are exposed to a large load and variety of microbes.
- An unusually potent antimicrobial protein, MLP (**Monotreme Lactation Protein**) found only in platypus milk serves to protect its babies from pathogens.
- **Promote business** - Studying the mammalian lactation can aid to build sustainable businesses in the vegan milk sector.
- Amongst the most ambitious approaches are the ones trying to grow cell cultures of the mammary organs themselves to secrete human and other mammalian milks.
- Several start-ups are attempting to make “animal-free” value-added dairy products and atleast one start-up is trying to reconstitute human breast milk with critical proteins made through synthetic biology.
- **Understanding the proteins** - It helps scientists understand how **lactoferrin**, a whey protein, modulates in multiple ways thus promoting a beneficial gut microbiome among infants.
- Recently whey proteins have been produced using synthetic biology techniques by relying on re-programming a type of fungus called Trichoderma.



- The **Vechur cow** (now almost extinct), a dwarf cow, native to the Kuttanad region of Kerala yields milk containing as much lactoferrin as human breast milk.

What are the ethical and social implications of synthetic biology?

- Many of the ethical questions relevant to synthetic biology are similar to ethical discussions related to genome editing.
- Are humans crossing moral boundaries by redesigning organisms with synthetic biology techniques?
- If synthetic biology yields new treatments and cures for diseases, who in our society will have access to them?
- What are the environmental impacts of introducing modified organisms into the ecosystem?

What supports an animal-free food supply chain?

- Factory farming of animals has led to widespread antibiotic resistance because best practices in such factories required the extensive use of antibiotics.
- Pandemics also have arisen on account of the high density of animals in the factory farms.
- The vast amounts of concentrated animal waste also require careful disposal of nitrogen compounds into the environment.
- The ethical alternatives offered by synthetic biology decrease animal suffering.

13.3 How Digital Currencies Work

What is the issue?

Thousands of Indians are flocking to these digital assets and pumping in crores of rupees and there comes a need to know about cryptocurrencies before joining them.

What is a cryptocurrency?

Satoshi Nakamoto is said to have conceptualised an accounting system in the aftermath of the 2008 financial crisis which has mooted the idea of blockchain.

- A cryptocurrency is a medium of exchange, such as the rupee or the US dollar, but is digital in format and uses encryption techniques to both control the creation of monetary units and to verify the exchange of money.
- Bitcoin is the largest in the world according to market capitalisation, followed by Ethereum.
- With cryptocurrencies, a chain of private computers (a network) is constantly working towards authenticating the transactions by solving complex cryptographic puzzles.
- For solving the puzzles, these systems are rewarded with cryptocurrencies and this process is called mining.
- A blockchain wallet is used to store the cryptocoins which facilitate smooth exchanges and secure transactions as they are cryptographically signed.

How does cryptocurrency work?

- Cryptocurrency runs on blockchain technology which is simply a digital ledger of transactions.
- This ledger (or database) is distributed across a network of computer systems.
- No single system controls the ledger and instead, a decentralized network of computers keeps a blockchain running and authenticates its transactions.
- Bitcoin and other cryptocurrencies are essentially codes recorded on a blockchain that gets longer and longer as more people use them.

How are cryptocurrencies bought?

- **Buying it from someone** – It usually happens in two ways
 1. An exchange-facilitated transaction
 2. A peer-to-peer transaction
- Cryptocurrency exchanges are platforms that broker the trading of cryptocurrencies for other assets, including digital and fiat currencies.
- They are independent and operate just like stock exchanges do globally.

- Crypto exchanges operating in India include WazirX, CoinDCX, CoinSwitch Kuber, Zebpay, Bitbns, Giottus, etc.
- Peer to peer (P2P) trading is the act of buying and selling cryptocurrencies directly between users without a third party or intermediary.
- **Mining new cryptocurrencies** - Mining is a process of creating new crypto coins by solving complex mathematical equations.
- The transactions using cryptocurrency is complete only when a “miner” verifies the transaction as legitimate.
- This verification process requires miners to solve complex equations and those who do that first are paid a fraction of the transaction as a fee for their effort.

How are the cryptos sold for INR?

- The Indian exchanges allow sale of cryptocurrencies in exchange for INR as well.
- But many of the smaller banks that support the transactions do not have the necessary digital infrastructure to handle the volumes of withdrawal.
- The volatility experienced by these virtual currencies and disruption in withdrawal services is a common occurrence.

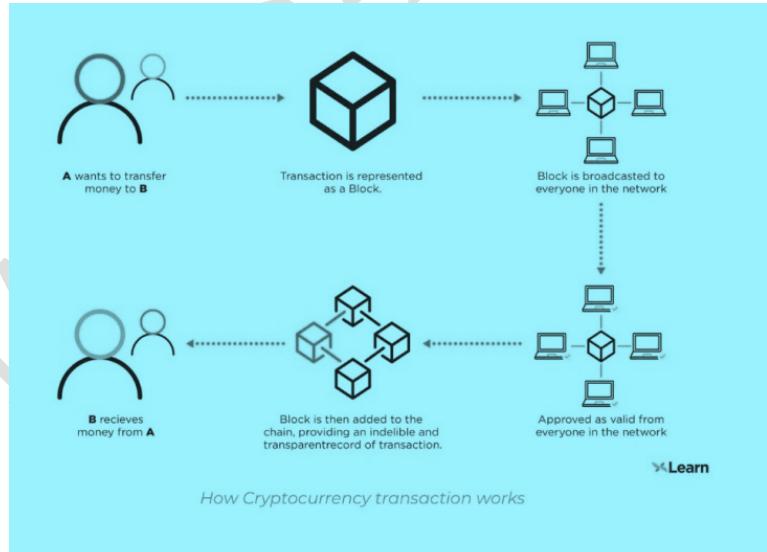
What are the pros and cons of cryptocurrency?

Pros of cryptocurrency

- Potential for high returns
- Transparency
- No chance of personal information leakage
- Immediate and secure ownership transfer
- Potential diversification
- Instant and 24 hour accessibility

Cons of cryptocurrency

- Illegal activities can be performed
- Loss risk is high
- Cryptocurrency market is highly volatile
- Poor store of value and limited acceptance
- Difficult to comprehend
- Challenges of market fluctuations



What alternatives are available against volatile cryptocurrencies?

- Stablecoins are a type of cryptocurrency that offer more stability than other cryptos because they are backed by assets.
- Their market value is pegged to some external reference such as the US dollar thus giving it an intrinsic value.
- Stablecoins achieve their price stability via collateralization or through algorithmic mechanisms of buying and selling the reference asset or its derivatives.
- Most of the sovereign governments push for stablecoins such as Tether, USD Coin and Diem (proposed by Facebook's parent company Meta) as it could increase the reach of the fiat currencies in the digital ecosystem.
- Stablecoins attempt to bridge the gap between fiat currencies and cryptocurrencies and there are three categories of stablecoins.
- **Fiat-Collateralized Stablecoins** - These stablecoins use a specific amount of a standard fiat currency, like the US dollar, as collateral to issue crypto coins.
- Other forms of collateral can include precious metals like gold and silver and commodities like oil.
- Tether (USDT) and TrueUSD are popular crypto coins that are backed by dollar deposits.



- **Crypto-collateralized stablecoins** - Here the underlying collateral is another cryptocurrency instead of a tangible commodity or a fiat currency.
- An example of crypto-backed stablecoin is **dai**, which is pegged to the U.S. dollar and runs on the Ethereum blockchain.
- **Algorithmic Stablecoins** - These stablecoins use a computer algorithm to keep the coin's value from fluctuating too much.

What are the risks in stablecoins?

- The credibility of stable coins such as tether has been the subject of controversy because the issuer of the coins may not actually hold fiat currencies against the tether or may not hold them in sufficient quantities.
- The providers promise they have reserves worth 100% of the value of their stablecoins, but that's not quite accurate.
- A large part of the assets are based on commercial paper and is not cash equivalent thereby posing a solvency risk in the event of a sudden collapse in the value of these assets.
- Another issue is the **e-dollarisation** as most stablecoins are likely to be pegged to the US dollar.
- The US might actually see that as an advantage to strengthen the reach of the dollar which in turn disincentivises the regulation of stablecoins.

How can this play out in India?

- Though India may patronize the use of a digital rupee as a legal tender and peg it to Indian rupee, banning other cryptos as asset classes may not be completely feasible as it may delink India from the rest of the world.
- India may need to allow the conversion of other cryptocurrencies into a digital rupee for regulating the same in the Indian market.
- This could bring in the required certainty if the digital rupee is compared to USD in the international market in the same way as the physical rupee

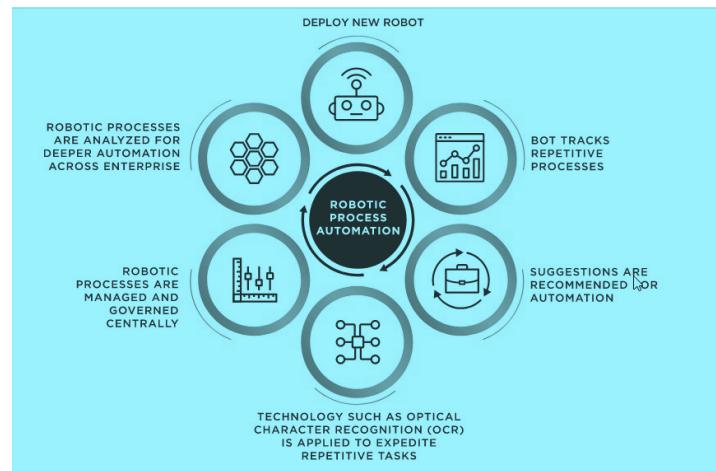
13.4 Challenges Posed by Automation

What is the issue?

Over the past decade, automation has increased across sector and it is imperative to consider multiple approaches in order to overcome the challenges posed by them.

What is the significance of automation at present times?

- Automation is the fourth irreversible trend after globalization, digitization and mobility.
- According to a report by McKinsey, around 88% of finance and insurance executives, and 76% of IT executives reported an increased implementation of automation since the pandemic.
- **Robotic Process Automation** - RPA is a software technology that is used to build, deploy, and manage software robots that emulate humans actions interacting with digital systems and software.
- **Intelligent automation** – IA, also called as cognitive automation is a combination RPA , business process management (BPM) and artificial intelligence (AI) that streamlines and scales decision-making across organizations.
- Intelligent automation is comprised of three cognitive technologies.
 1. **Artificial intelligence** - This is the decision engine of IA which uses machine learning and complex algorithms.
 2. **Business process management** - It automates workflows to provide greater consistency to business processes.

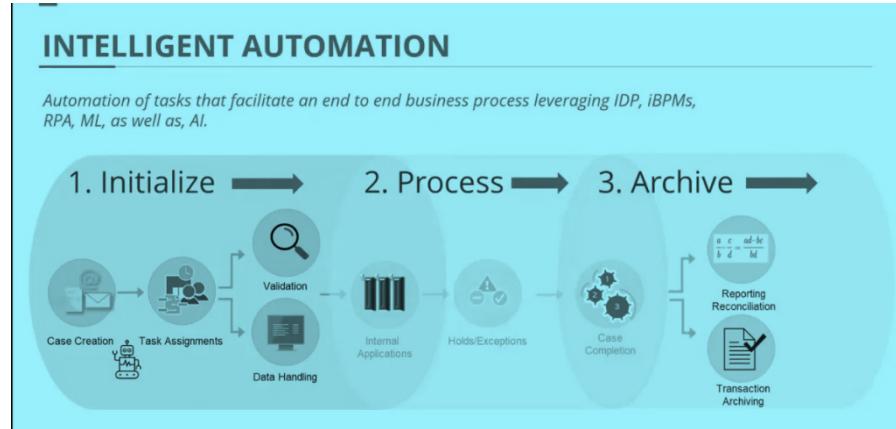




3. **Robotic process automation** - It uses software robots, or bots, to complete back-office tasks, such as extracting data or filling out forms.

What are the benefits of automation?

1. Accelerated transformation
2. Major cost savings
3. Greater resilience
4. Higher accuracy
5. Improved compliance
6. Boosted productivity
7. Increased employee satisfaction
8. Improve customer experience



What are the challenges in the automation?

- **Selecting the right adoption approach** - In a bottoms-up approach, automation is usually seen as a back-office necessity, restricting its value and benefits to a few departments.
- In a top-down approach, creating a fully automated enterprise is seen as a strategic business enabler that promotes competitive advantage.
- **Employee involvement** – Only if large number of employees use automation, it will result in greater return on investment.
- **Using low-code and citizen developer concepts** - Low-code platforms employ visual, drag-and-drop techniques instead of traditional lines of programming.
- However, it might lead to difficulties in enforcing standards and could also cause security issues.

How to overcome these challenges?

- Task mining and process mining capabilities of an automation platform can be determined to determine the best way for enterprise automation.
- Business leaders must also deploy multiple integrated automation solutions to benefit the overall business.
- A hybrid approach can be used to determine what to automate in which a feedback loop is created that amplifies use cases and drives adoption.
- It is imperative to have a mechanism to regulate citizen developer concepts and to ensure alignment with the organizational strategy.

PRELIM BITS

14. HISTORY, ART & CULTURE

Rani Gaidinliu

Union Home Minister laid the foundation stone for the 'Rani Gaidinliu Tribal Freedom Fighters Museum' in Manipur.

- Born on January 26, 1915 at Luangkao village in Manipur, Rani Gaidinliu was a spiritual and political leader of the Rongmei Naga tribe.
 - She preserved the identity and culture of her community - Zeme, Liangmai, Rongmei and Inpui - a cognate of tribes referred to as Zeliangrong and are spread across Assam, Manipur & Nagaland.

- At age 13, she became associated with Haipou Jadonang, and became his lieutenant in his social, religious and political movement.
- Jadonang started the ‘Heraka movement’, based on ancestral Naga religion, and envisioned an independent Naga kingdom (or Naga-Raja).
- After the execution of Jadonang, she took up the leadership of the movement, which slowly turned political from religious.
- Rani started a serious revolt against the British and was eventually imprisoned for life.
- She was released in 1947.
- She passed away in 1993 at her native village Luangkao.

Acknowledging her role in the struggle against the British, Jawaharlal Nehru called her the ‘Daughter of the Hills’ and gave her the title ‘Rani (Queen)’.

Indian Coast Guard commissioned a Fast Patrol Vessel ‘ICGS Rani Gaidinliu’ in 2016.

Sabz Burj

Sabz Burj has been conserved and restored over the last 4 years using traditional materials and building-craft techniques favoured by 16th century craftsmen.

- Built in 1530, Sabz Burj is one of the earliest Mughal-era monuments in Delhi.
- The tomb does not have any markings pointing to the identity of those buried under it.
- However, it is of immense significance due to the ceiling on its double dome structure painted in pure gold and lapis, which is the earliest surviving painted ceiling for any monument in India.
- The painting on the ceiling that has floral motifs predates similar work that was seen in miniature paintings and textiles from the Mughal era.

Pochampally - Best Tourism Village

Pochampally Village in Telangana State has been selected as one of the best Tourism Villages by the UN World Tourism Organisation (UNWTO).

- Pochampally in Telangana is often referred to as the **Silk City of India** for the exquisite sarees that are woven through a unique style called Ikat.
 - This style, Pochampally Ikat, received a Geographical Indicator (GI Status) in 2004.
- Pochampally is also known as **Bhoodan Pochampally** to commemorate the Bhoodan Movement that was launched by Acharya Vinobha Bhave from this village on April 18th, 1951.
- Pochampally saree has traditional, geometric patterns in the characteristic blurry design.

Ikat

- Ikat (meaning “Tie and Dye”) is a **yarn-resist dyeing process** that involves the process of wrapping (or tying) and dyeing sections of bundled yarn to a predetermined colour pattern before they are woven.
- The dye penetrates into exposed sections while the wrapped section remains undyed.
- This pattern formed by the yarn in this process is woven into fabric.

UNWTO's Best Tourism Villages

- This Pilot initiative aims to award those villages which are outstanding examples of rural destinations and showcase good practices in line with its specified 9 evaluation areas.
- It is a global initiative to highlight those villages where tourism preserves cultures and traditions, celebrates diversity, provides opportunities and safeguards biodiversity.
- **Benefits**
 1. Reduce regional inequalities in income and development.
 2. Fight rural depopulation.
 3. Progress gender equality and women’s and youth empowerment.
 4. Enhance education and skills development.

Srinagar Joins UCCN

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has picked Srinagar among 49 cities as part of the UNESCO Creative Cities Network (UCCN) under the Crafts and Folk Arts category.

- Created in 2004, the UCCN fosters international cooperation across cities of the world that invest in culture and creativity as accelerators of sustainable development.
- Through 7 creative fields, cities in the Network are innovative and strategic with a large scope of initiatives that have positive economic, social, cultural and environmental impacts.
 1. Crafts and Folk Art,
 2. Design,
 3. Film,
 4. Gastronomy,
 5. Literature,
 6. Media Arts, and
 7. Music.
- The UCCN aims to fulfil the enabling and transformative power of culture and creativity in building cities that are resilient, sustainable and future-proof.
- The Network further commits to supporting the United Nations frameworks, particularly the 2030 Agenda for Sustainable Development.
- Currently, 246 cities make up this network.

Other UCCN Places in India

City	Type
Chennai	Creative City of Music
Varanasi	Creative City of Music
Jaipur	Creative City of Crafts and Folk Art
Mumbai	Creative City of Films
Hyderabad	Creative City of Gastronomy
Srinagar	Creative City of Crafts and Folk Art

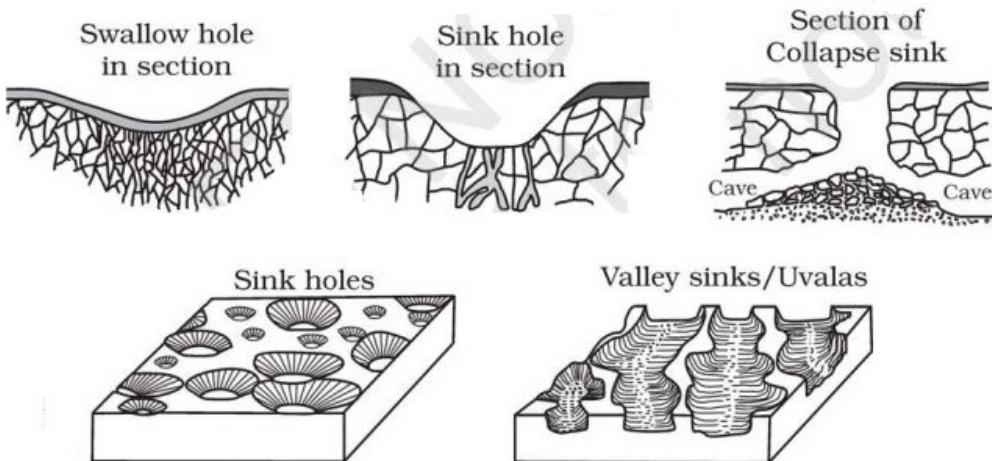
15. GEOGRAPHY

Dead Sea & Sinkholes

Thousands of sinkholes have formed around the Dead Sea, which has lost a third of its surface area since 1960.

Sinkholes

- A sinkhole is an opening more or less circular at the top and funnel-shaped towards the bottom.
- Its size varies in area from a few sq. m to a hectare and with depth from a less than 0.5 metre to 30 metres or more.
- Some of these form solely through solution action (solution sinks).
- Others might start as solution forms first and if the bottom of a sinkhole forms the roof of a void or cave underground, it might collapse leaving a large hole opening into a cave or a void below (collapse sinks or dolines).



- Quite often, sinkholes are covered up with soil mantle and appear as shallow water pools. Anybody stepping over such pools would go down.
- When sink holes and dolines join together because of slumping of materials along their margins or due to roof collapse of caves, long, narrow to wide trenches called valley sinks or Uvalas form.

Dead Sea

- Dead Sea or Salt Sea is the landlocked Salt Lake between Israel and Jordan located at the lowest point on earth.
- It is one of the four saltiest bodies of water in the world.
- It is the world's deepest hypersaline lake.
- Dead Sea is called the Dead Sea due to the harsh environment (extreme salinity of its water) in which plants and animals cannot flourish.
- The special conditions of the lake are an outcome of its extreme geo-morphological structure alongside a harsh desert climate.
- But, it has been receding by about a metre every year.



Earth's First Landmass

A new study suggests that the Earth's first continents, known as the cratons, emerged from the ocean between 3.3 billion and 3.2 billion years ago.

- This new study has challenged the widely accepted view that the continents rose from the oceans about 2.5 billion years ago.
- It has also found that the earliest continental landmass to emerge may have been Jharkhand's Singhbhum region.
- Sandstones** - The study found sandstones in Singhbhum with geological signatures of ancient river channels, tidal plains and beaches over 3.2 billion years old, representing the earliest crust exposed to air.
- All these water bodies could have only existed if there was continental land.
- Thus, it was inferred that the Singhbhum region was above the ocean before 3.1 billion years ago.
- Patches of the earliest continental land, however, exist in Australia and South Africa, too.
- The team studied the **zircons** (with uranium) in the rocks using a technique called mass spectrometry to find the age of the rocks.
- Granites** - The granites that form the continental crust of Singhbhum region are 3.5 to 3.1 billion years old.
- They were formed through extensive volcanism that happened about 35-45 km deep inside the Earth.

The sandstones tell us 'when the first landmasses were formed' and the granite tells us 'how the first landmasses were formed'.

Studying these sedimentary rocks gives information about the formation of first landmass, as sedimentary rocks could only form once land broke through the surface of early Earth's oceans.



- This process continued on-and-off for several years until all the magma solidified to form a thick continental crust in the area.
- Due to the thickness and less density, the continental crust emerged above surrounding oceanic crust owing to buoyancy.
- The earliest emergence of continents may have contributed to a proliferation of photosynthetic organisms, which would have increased oxygen levels in the atmosphere.
- Once you create land, what you also create is shallow seas, like lagoons.

Causes of Earth's First Mass Extinction

A recent paper has come up with a new reason behind the first mass extinction, also known as the Late Ordovician mass extinction.

- For decades, the prevailing school of thought in our field is that global warming causes the oceans to lose oxygen and thus impact marine habitability, potentially destabilising the entire ecosystem.
- But the new paper notes that the **cooling climate likely changed the ocean circulation pattern**.
- This disrupted the flow of oxygen-rich water from the shallow seas to deeper oceans, leading to a mass extinction of marine creatures.
- Upper-ocean oxygenation in response to cooling was anticipated because atmospheric oxygen preferentially dissolves in cold waters.
- However, a lack of oxygen or anoxia in the lower ocean expanded to the deep oceans during the period.
- [Generally, anoxia in Earth's history is associated with volcanism-induced global warming.]
- This deep-sea anoxia affected ocean circulation, which is an important component of the climatic system.
- The paper concludes that climate cooling may have led to changes in nutrient cycling, primary producer communities which ultimately drove the Late Ordovician mass extinction.

Mass Extinction	Period	Specialty
Devonian mass extinction	375 million years ago	Wiped out about 75% of the world's species
Permian mass extinction or Great Dying	250 million years ago	Wiped out about 95% of all species
Triassic mass extinction	200 million years ago	Wiped out about 80% of Earth's species, including some dinosaurs
Ordovician mass extinction	445 million years ago	Wiped out about 85% of all species
Cretaceous-Paleogene mass extinction (K-T or K-Pg extinction)	66 million years ago	Wiped out non-avian dinosaurs

Change of Course of Glacier

A new study has found that nearly 20,000 years ago, a 5-km-long Himalayan glacier abruptly changed course and over time fused into an adjacent glacier in present-day Pittoragarh, Uttarakhand.

- This sudden turn in the glacier's course in the Himalayas may be caused due to,
 1. Climate Change and
 2. Change in Tectonic Movement (active fault).
- The glacier, which lies in an extremely inaccessible region, was large enough that it formed its own "valley".
- The accumulated debris that accompanies the glacier formation probably turned it from a north-eastern to a south-eastern course.



- As the Himalayan region is among the world's youngest mountain ranges, the inherent instability of the underlying tectonic plates frequently trigger earthquakes and landslides.
- **Significance** - The event had "similarities" to the February disaster (2021) in Rishiganga valley, in which a large mass of rock and debris detached from a glacier and hurtled down the Rishiganga River.
- So, it is clear that the Himalayan region is ecologically fragile and prone to events such as these are certain.
- [The fragility of the Himalayan region may be due to weathering, percolation of melt-water in joints, crevasses, freezing & thawing, snowfall, overloading, & gradually operating tectonic forces forcing rocks to disintegrate mechanically.]

16. POLITY

Equal Property Rights to Women

The Vice President called for providing equal property rights to women.

Hindu Law

- Daughters have equal right of inheritance as sons to their father's property. Daughters also have a share in the mother's property.
- In 2018, the Supreme Court expanded on a Hindu woman's right to be a joint legal heir and inherit ancestral property on terms equal to male heirs.
- It says that the rights do not depend on whether her father was alive or not when the law was enacted in 2005.
- The Hindu Succession (Amendment) Act, 2005 gave Hindu women the right to be coparceners or joint legal heirs like a male heir does.
- The ruling said that since the coparcenary is by birth, it is not necessary that the father coparcener should be living as on 9.9.2005.
- **Wife** - "Wife" includes a woman who has been divorced by, or has obtained a divorce from, her husband and has not remarried.
- Unless she gifts it to anyone, she is the sole owner and has exclusive right over her assets whether earned, inherited or gifted to her.
- Entitled to maintenance, support and shelter from her husband, or if her husband belongs to a joint family, then from the family.
- Upon partition of a joint family estate, between her husband and his sons, she is entitled to a share equal to as any other person.
- Similarly, upon the death of her husband, she is entitled to an equal share of his portion, together with her children and his mother.
- **Mother** is entitled to maintenance from children who aren't dependents. She is also a Class I heir.
- A widowed mother has a right to take a share equal to the share of a son if a partition of joint family estate takes place among the sons.
- All property owned by her may be disposed by sale, will or gift as she chooses. In case she dies intestate, her children inherit equally.
- **Maintenance** - Section 125 of Criminal procedure code prescribes for maintenance of wives, children and parents.
- Magistrate of the first class can also during the pendency of the proceeding order monthly allowance for the interim maintenance
- **Related Links** - [Hindu Woman's Inheritance Right](#)

Muslim Law

- **Daughters** - In inheritance, the daughter's share is equal to one half of the son's in keeping with the concept that a woman is worth half a man.



- But, she has always had full control over this property. It is legally hers to manage, control, and to dispose of as she wishes in life or death.
- Though she may receive gifts from those whom she would inherit from, there should be no doubt that the gift is a means of circumventing the inheritance laws of one third of a man's share, since, under Muslim law.
- Daughters have rights of residence in parent's houses, as well as right to maintenance, until they are married.
- In case of divorce, charge for maintenance reverts to her parental family after the iddat period (approximately 3 months). In case she has children capable of supporting her. The charge falls upon them.
- **Wife** retains control over her goods and properties.
- She has a right to the same maintenance he gives to his other wives, if any, and may take action against him if he discriminates against her.
- The Supreme Court has held that in the case of divorce, a Muslim husband is liable to make reasonable and fair provision for the future of the divorced wife which obviously includes her maintenance as well.
- Such a provision extending beyond the iddat period must be made by the husband within the iddat period in terms of Muslim Women (Protection of Rights on Divorce) Act, 1986.
 - Liability of Muslim husband to pay maintenance is not consigned to iddat period.
- Right to mehr' according to the terms of the contract agreed to at the time of marriage.
- She will inherit from him to the extent of 1/8th if there are children or 1/4th if there are none.
- If there is more than one wife, the share may diminish to 1/16th.
- In circumstances, where there are no sharers in the estate as prescribed by law, the wife may inherit a greater amount by will.
- A Muslim may dispose of 1/3rd of his property by will, though not to a sharer in the inheritance.
- **Mothers** - In case of divorce or widowhood, she is entitled to maintenance from her children. Her property is to be divided as per Muslim law. She is entitled to inherit 1/6th of her deceased child's estate.

Christian Law

- **Daughter** inherits equally with any brothers and sisters to her father's estate or her mothers'.
- Entitled to shelter, maintenance before marriage, but not after from her parents. Full rights over her personal property, upon attaining majority. Until then, her natural guardian is her father.
- **Wife** is entitled to maintenance, from her husband, but his failure to provide the same is note by itself ground for divorce.
- Upon death of her husband, she is entitled to a one third share of his property, the rest being divided among the children equally.
- If the husband's estate is more than a minimum of Rs.5000/-, she may inherit it. In case it is not, she may inherit the whole.
- **Mother** is not entitled to maintenance from her children. If her children dies without spouse or living children, she may inherit 1/4th of the assets.

Supreme Court on RERA Act 2016

The Supreme Court (SC) upheld the jurisdiction of the Real Estate (Regulation & Development) Act, 2016, or RERA, in two different matters.

- **Aimed at protecting homebuyers**, the court
 1. Brings a major relief for the homebuyers,
 2. Speeds up the resolution process, and
 3. Makes it difficult for state governments to dilute the law's intent.
- The Supreme Court affirmed that the RERA Act, 2016 is **retroactive** in character.
- It said that RERA Act is applicable to projects that were ongoing and for whom completion certificates weren't obtained at the time of enactment of law, in effect interpreting that the law.



- The Act will also apply after getting the on-going projects and future projects registered under Section 3 to prospectively follow the mandate of the Act.
- However, the projects already completed or to which the completion certificate has been granted prior to enactment of RERA aren't affected in any manner covered by the law.
- **Genuine Appeals** - The real estate developers must deposit at least 30% or the full amount of the penalty (as the case may be) ordered by the regulator, before they challenge any RERA order under Section 43(5).
- This is expected to ensure that only genuine appeals are filed and homebuyers' interests are protected.
- **Recovering the homebuyers' investment** - This comes under Section 40(1) of the Act.
- The court has ruled against the contention of the builders that under Section 40(1), homebuyers are only entitled to recover interest or penalty as arrears of land.
- It said that the amount invested by the allottees, with interest as quantified by the regulatory authority or adjudicating officer becomes recoverable (by law) as arrears of land revenue from the builders.
- To know more about the RERA Act, [click here](#).

Final Draft of National Register of Citizens

The State Coordinator, National Register of Citizens (NRC), Assam said that 1032 doubtful cases in the final draft of NRC have been referred to the concerned district commissioners for necessary action.

- Assam is the only state in India to have a register of its citizens, due to the issue of illegal migration from Bangladesh.
- **NRC** was first created in 1951 in Assam to determine those born there, therefore Indian, and who might be a migrant from erstwhile East Pakistan, now Bangladesh.
- It was updated on August 31, 2019. Out of 3.29 crore applicants, 19.06 lakh were excluded from the final draft NRC.
- The final NRC is yet to be notified by the RGI under Union Home Ministry, as those excluded will get an opportunity to present their case before Foreigners Tribunals (FT), quasi-judicial bodies of the State.
 - FTs can begin hearing only when the excluded applicants receive "rejection slips" from the authorities. This process is yet to start.
- Non-inclusion of a person's name in NRC does not by itself amount to him/her being declared as a foreigner as they would be given adequate opportunity to present their case before the FTs.
- **Background to update NRC** - It was a culmination of the Assam Accord signed in 1985 for detection, disenfranchisement and deportation of foreigners.
- NRC was updated as per the provisions of
 1. The Citizenship Act, 1955 and
 2. The Citizenship (Registration of Citizens and Issue of National Identity Cards) Rules, 2003.
- To get their names included in the register, Assamese had to produce documents that proved their family resided in Assam before March 24, 1971, that is, from a day before the Bangladesh Liberation War began.

The State coordinator is a Secretary rank officer of Assam government who assists the Registrar General of India (RGI) as citizenship is a central subject.

17. GOVERNMENT INITIATIVES

National Action Plan to Combat Anti-Microbial Resistance

Department of Animal Husbandry and Dairying organises a National Stakeholder Workshop on the National Action Plan to Combat Anti-Microbial Resistance.

- The World Health Organization (WHO) spearheaded the development of a Global Action Plan on Anti-Microbial Resistance (AMR) which was approved in 2015.
- India is a signatory to the **Jaipur Declaration** on AMR, 2011.
- In 2017, India was amongst the first nations to have launched the National Action Plan for AMR for 2017 to 2021.



- **Delhi Declaration** on AMR was signed as an inter-ministerial consensus in order to adopt a holistic and collaborative approach towards prevention and containment of AMR.

Antimicrobial Resistance

- Antimicrobial resistance (AMR) refers to a **condition of antibiotics becoming inefficient** against a wide range of pathogenic bacteria.
- It has been identified as a global health threat with serious health, political and economic implications.
- It is emerging as a global public health concern and is acknowledged by policymakers as a major health crisis.
- The IACG report titled “No Time to Wait: Securing the Future from Drug Resistant Infections” brings attention to the financial implications of AMR.

River Cities Alliance

River Cities Alliance, which is a collaborated effort of National Mission for Clean Ganga (NMCG) and National Institute for Urban Affairs (NIUA), was launched recently.

- The River Cities Alliance (RCA) is a dedicated platform for river cities in India to ideate, discuss and exchange information for sustainable management of Urban Rivers such as,
 1. Minimizing their water footprint,
 2. Reducing impacts on river and water bodies,
 3. Capitalizing on natural, intangible, architectural heritage and associated services and
 4. Develop self-sufficient, self-sustainable water resources through recycle, reuse strategy.
- This Alliance will focus on 3 broad themes - Networking, Capacity Building and Technical Support.
- The Alliance cities will work towards adopting and localizing national policies and instruments with key river-related directions.
- They will prepare their Urban River Management Plans and develop city-specific sectoral strategies that are required for sustainable urban river management.
- **Benefits** - The Alliance gives opportunities to these cities to strengthen governance aspects for river cities.
- It improves their liveability to attract external economic investments, access state of the art knowledge and frameworks.
- It provides an opportunity to serve as the site for unique demonstration projects which will be implemented by NIUA and NMCG.

National Generic Document Registration System

National Generic Document Registration System (NGDRS) portal and Dashboard was launched recently.

- National Generic Document Registration System is a ‘One Nation One Software’ for registration of documents & properties.
- It is an in-house advanced software application developed by NIC.
- This software is scalable, flexible, configurable and compatible with the state-specific needs in the country.
- So far, it has already been implemented in 12 States and pilot tested in 3 States covering more than 10 crore population.
- More emphasis is given on the integration of the Registry Office with other offices where some information are required for the completion of registration deeds.
- **Benefits** - Ensures transparency, accountability of officials executing the documents and reduction in cost, time and number of visits and procedures required for the execution of the registration documents.
- Reduction in land disputes, check on fraudulent transactions, SMS and email enabled alerts related to transactions on property, external system integrations can be provided as required.

Central Sector Plan Scheme

Union Minister for Social Justice & Empowerment will release the Training Modules of Central Sector Plan Scheme.



- The Central Sector Plan Scheme is “In-service Training & Sensitization of Key functionaries of Central & State Governments and Local Bodies and other service providers” at national level w.e.f. 2015 -16.
- Ministry of Social Justice & Empowerment has entrusted the responsibility to the Rehabilitation Council India (RCI) as nodal agency for implementation of its Central Sector Plan Scheme.
 - The scheme has been implemented through various government implementation agencies at national level from FY 2015 -16.
- The RCI has developed the general guidelines for the implementation of this scheme and training modules for training and sensitization of various target groups as per the provisions of the scheme.
- RCI has developed target groups wise separate Training Modules namely Health & Allied Professionals, Education Functionaries, Grass Root, Senior & Mid-level Functionaries and Introductory Training Modules.

Rehabilitation Council of India

- The Rehabilitation Council of India (RCI) is a Statutory Body under the Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice and Empowerment.
- The RCI was set up as a registered society in 1986.
- The RCI Act, 1992 was enacted to make RCI a Statutory Body in 1993. It was amended by Parliament in 2000 to make it more broad-based.
- The mandate given to RCI is,
 1. To regulate and monitor services given to persons with disability,
 2. To standardise syllabi and
 3. To maintain a Central Rehabilitation Register of all qualified professionals and personnel working in the field of Rehabilitation and Special Education.
- The Act also prescribes punitive action against unqualified persons delivering services to persons with disability.

18. ECONOMY

Negative Real Interest Rate

As the RBI in its latest Monetary Policy Review has projected retail inflation to be at 5.3% for 2021-22, the investors may need to worry about earning negative real rates.

- **Real rate** of return on an investment is its actual rate of return minus the prevailing inflation rate.
- While real interest rates can be effectively negative if inflation exceeds the nominal interest rate.
- Unless the return on investments beat inflation, it isn't logical to postpone your consumption or to save for the future.
- The real rate would be even worse, if taxes on interest income are considered.
- By understanding the concept of negative real interest, one may make their purchase decision.
- Even safe investments can erode your capital if they offer negative real returns.
- **Government intervention** - The central banks around the world increase interest rates when inflation begins to exceed their desired threshold.
- But as economic growth needs a lower interest rate regime to kick-off investments, central banks may decide to keep the rates lower or hike at lower pace going ahead.
- This may lead to continuation of lower real interest rate scenario in the short to medium term.

As interest rates in India are now at a record low, this makes negative real returns a significant risk to your investments.

Inverted Tax Structure

The Government has notified uniform Goods and Services Tax rate at 12 % on Man-made Fibre (MMF) textile value chain. This has removed the problem of inverted tax structure in the MMF sector.



- The term 'Inverted Tax Structure' refers to a situation where the import duties on input goods are higher than on finished goods.
- In other words, the GST rate paid on purchases is more than the GST rate payable on sales.
- **Problem** - The taxpayers, businesses and the government are affected by the 'Inverted Duty Structure' problem.
- Taxpayers facing an inverted duty structure will have Input Tax Credit (ITC) in their GST e-credit ledger after paying off the output tax liability.
- This creates working capital issues for the taxpayers, as crucial resources remain blocked in the form of ITC.
 - Taxpayer can claim the unused ITC on account of Inverted Duty Structure as a refund at the end of any tax period, under the Section 54 of the CGST Act, 2017.
- Businesses paying taxes under this structure continue to have ITC in their ledger even after paying off the output tax liability, leading to crucial working capital remaining stuck in the form of credit.
- From the government's standpoint, many administrative-level issues may crop up.
- A complicated refund process under GST creates additional compliance requirements and leads to more compliance cost.

The changed rates will come into effect from 1st January, 2022. This will help the MMF segment emerge as a big job provider in the country.

Universal Service Obligation Fund

The Union Cabinet approves USOF scheme for provision of 4G based mobile services in uncovered villages of Aspirational Districts across five states of Andhra Pradesh, Chhattisgarh, Jharkhand, Maharashtra & Odisha.

- The Universal Service Obligation Fund (USOF) would fund the project.
- Created in 2002, the USOF is a non-lapsable fund that comes under the Department of Telecommunications.
- USOF was given statutory status by the Indian Telegraph (Amendment) Act, 2003.
- USOF ensures that there is universal access to quality ICT services, which are inclusive and non-discriminatory at economically efficient prices to people in rural and remote areas.
- USOF comes from the Universal Service Levy (USL) of 5% charged from all the telecom operators on their Adjusted Gross Revenue (AGR).
- USOF are then deposited into the Consolidated Fund of India, and require prior parliamentary approval to be dispensed.
- **Objective**
 1. **Economic:** Network extension & stimulate uptake of ICT services
 2. **Social:** Mainstreaming the underserved & un-served areas/groups by bridging the Access Gap
 3. **Political:** Enable citizens exercise their political rights in an informed way and
 4. **Constitutional:** Equitable distribution of the fruits of telecom/ digital revolution and fair allocation of national resource (pooled USO levy) via targeted subsidies

Services Sector

Minister of Commerce and Industry said that India is poised to achieve services export target of \$1 trillion by 2030.

- The Services sector is a key driver of India's economic growth.
- This sector provides employment to nearly 2.6 crore people and contributes approximately 40% to India's total global exports.
- Services trade surplus was \$89 billion in FY 2020-21 and it has been the largest FDI recipient (53% of FDI inflows 2000-2021).
- Indian services have the twin power of universal acceptance & universal attraction.
- In 2020, India became the 7th largest services exporter in the world, moving up the ladder by two positions.
- Services PMI rose to a decade high of 58.4 in October 2021.
- Services is boosting India's transition from an assembly economy to a knowledge based economy.



- So, the Government is actively pursuing market access opportunities (FTAs) and working on a scheme alternative to SEIS.
- The Government is supporting the service sector through Aatmanirbhar Bharat Package, collateral-free Automatic Loans for Businesses, including MSMEs.
- Rs. 56,027 Crore was released under various Export Promotion schemes.

Reduction in Import of Non-Coking Coal

In the Financial Year 2021-22 (upto August), the import of all varieties of Non-Coking Coal has reduced from 84.44 MT to 70.85 MT during the corresponding months of the FY 2019-20 - a decline of about 16.09%.

- India has been importing coal to bridge the gap between the requirement of coal and the domestic production in the country.
- The dependence on imports for Coking Coal mainly used in the steel sector has been predominantly due to very limited domestic availability.
- Even though the import of Coking Coal is non-substitutable, the imports of various grades of Non Coking Coal have reduced substantially. This includes,
 1. High calorific value (GCV) thermal coal used for industrial purpose
 2. Low GCV that goes for power generation.
- Reduction of coal import has resulted in huge financial savings in the current FY as coal prices are going up sharply in international market.
- Total domestic dispatch of coal has gone up by 9.44% to 317.69 MT in the current FY upto August as compared to that of the same period of FY 2019-20.
- The government is continuing all efforts to further enhance the domestic coal production and dispatch.

Decline in the Edible Oil prices

In a bid to reign in continuous rise in the cooking oil prices since past one year, the Government has taken some active measures.

- The Government has cut the basic duty on Crude Palm Oil, Crude Soyabean Oil and Crude Sunflower Oil from 2.5% to nil.
- The Agri-cess on these Oils has been brought down.
- To control prices of edible oils, the government has
 1. Rationalised import duties on palm, sunflower and soyabean oils,
 2. Futures trading in mustard oil on NCDEX has been suspended and
 3. Stock limits have been imposed.
- Major edible Oils players have cut wholesale prices in order to give relief to consumers during festival season.
- Despite international commodity prices being high, interventions have been taken by Central Government along with State Governments' proactive involvement have led to reduction in prices of edible oils.
- Also, the government is taking steps to improve the production of secondary edible oils, especially rice bran oil to reduce the import dependence.

19. AGRICULTURE

Integrated Farming Practices for India

A new study on integrated farming has found that the following 4 methods are worth following in India.

- This work found that
 1. **Relay planting** enhances yield,
 2. **Strip rotation** (Within-field rotation) was more fruitful,



3. **Soil munching** and **No-till** or a reduced tillage, when compared with traditional monoculture cropping,

- Increases the annual crop yield up by 15.6% to 49.9%, and
- Decreases the environmental footprint by 17.3%.

- While these methods are not easy for small farmers in India, they could be practised at least in **larger farms**.

Relay Planting

- Relay planting means the planting of different crops in the same plot, **one right after another**, in the same season.
 - Second crop is planted into an established stand of a main crop.
 - Second crop develops fully after the main crop is harvested.
- **Examples** - Planting rice and summer gourd in the same season.
- If this method is followed, there is **less risk** since you do not have to depend on one crop alone.
- It also means better distribution of labour, insects spread less, and any legumes actually add nitrogen to the soil.
- However, the difficulties involved in relay cropping are difficulty in mechanisation, and higher requirements for management.



Strip Cropping

- It is a practice of growing field crops in narrow strips either at right angles to the direction of the prevailing wind, or following the natural contours of the terrain to prevent soil erosion by wind and water.
- It involves planting crops in strips across the slope, with alternate strips of grain and/or forage crops.
- It is used when a slope is too steep or too long, or otherwise, when one does not have an alternative method of preventing soil erosion.
- It is more effective in reducing soil losses, as it combines,
 1. Soil & moisture conserving properties of cross-slope farming with
 2. Soil building advantages of a crop rotation.
- Strip cropping has been used in the U.S. (where the fields are larger than those in India), where they grow wheat, along with corn and soyabean, in the same farm in an alternative manner. However, this needs large lands.
- In India, it is used in the large fields such as the ones owned by cities and state governments.



Soil Mulching

- Soil mulching is the application of a layer of material (mulch) to the surface of an area of soil.
- It requires keeping all bare soil covered with straw, leaves, and the like, even when the land is in use.
- As mulch prevents rain from hitting the soil directly, the impact of the water drops is reduced.
- Erosion is curtailed, moisture retained, and beneficial organisms, such as earthworms, kept in place. Mulching adds organic matter to the soil.
- Mulch decreases water loss due to evaporation. The same set of benefits is also offered by not tilling the soil.

No-till Farming

- No-till farming (or zero tillage or direct drilling) is a technique for growing crops or pasture without disturbing the soil through tillage.



- In this, not only the soil is left undisturbed by tillage and but also the residue is left on the soil surface.
- In zero tillage, **herbicide functions are extended**. Before sowing, the vegetation present has to be destroyed for which broad spectrum, non-selective herbicides with relatively short residual effect are used.

Impact of Global Warming on Crop Cultivation

A new study has found that the continuation of the current trends of global warming could impact the wheat cultivation positively, but the maize cultivation negatively.

- If global warming trends continue, there will be higher levels of carbon dioxide in the atmosphere.
- This could expand the cultivation of wheat to higher latitudes by 2030, increasing its global yield.
- However, the nutritional value of such wheat would be reduced.
- Also, the increase in global wheat yield could level off by 2050.
- While wheat yield would increase 17% by 2030, global maize (or corn) yield would decline 24%.
- Maize is grown all over the world and large quantities are produced in countries near the equator (North and Central America, west Africa, central Asia, Brazil and China).
- So, farmers need to adapt much faster by changing the planting dates and using different crop varieties to avoid severe losses.

20. ENVIRONMENT

ICMR Policy on Climate Change

Indian Council of Medical Research (ICMR) has suggested India to ‘urgently wean away from coal as its main source of energy’ and ‘shift from traditional animal husbandry practices’ to combat the challenges of climate change.

- The ICMR’s policy brief accompanies the 2021 Global Lancet Countdown Report focusing on,
 1. Premature mortality due to ambient air pollution by sector;
 2. Emissions from agricultural production and consumption; and
 3. Detection, preparedness and response to health emergencies.
- The combustion of coal, mainly in power plants followed by industrial and household settings, has increased the premature mortality.
- Therefore, India needs to urgently wean away from coal as its main source of energy and needs to invest more on renewable, cleaner and sustainable sources such as solar, wind or hydro energy.
- Since 46% of all agricultural emissions in India are contributed by ruminants such as goats, sheep and cattle, India needs to move away from the traditional animal husbandry practices.
- India must invest in newer technologies that will improve,
 1. Animal breeding and rearing practices,
 2. Use of good livestock feeds and
 3. Implement proper manure management.
- All of these practices will contribute to the reduction of the GHG emissions.

Infrastructure for Resilient Island States

India and UK will together launch the initiative for the Resilient Island States (IRIS) for developing infrastructure of small island nations in COP26.

- IRIS aims to **strengthen critical infrastructure in small island states against disasters** induced by climate change.
- IRIS is the first major initiative by India under the Coalition for Disaster Resilient Infrastructure (CDRI) started in 2019.



- IRIS seeks to operationalize the CDRI initiative, as Small Island states are the most vulnerable to the impacts of climate change.
- Major threats to Small Island states - Rising seas, and major weather events such as large storms triggered by climate change.

Coalition for Disaster Resilient Infrastructure

- CDRI is India's second international climate initiative by India in 2019; the first was the International Solar Alliance, launched in 2015.
- CDRI was launched as a global partnership to promote **resilient climate-proof critical infrastructure** in member countries.
 - 26 countries, including US, Germany, UK, Australia, Brazil, Bangladesh, Afghanistan, Nepal, Bhutan, and Sri Lanka are already part of the coalition.
- The coalition will not create any new infrastructure - rather, it will serve as a '**knowledge centre**' for member countries to share and learn best practices with respect to disaster-proofing of infra.
- It will work towards making existing and upcoming infrastructure in member countries more robust and resilient against climate disasters such as floods, heat, cyclones, forest fires, and rain.
- The aim of CDRI is to minimise the damage and disruptions.

According to CDRI estimates, every one dollar invested in making infrastructure more resilient in low-and middle-income countries can potentially save losses of over \$4 when a disaster strikes.

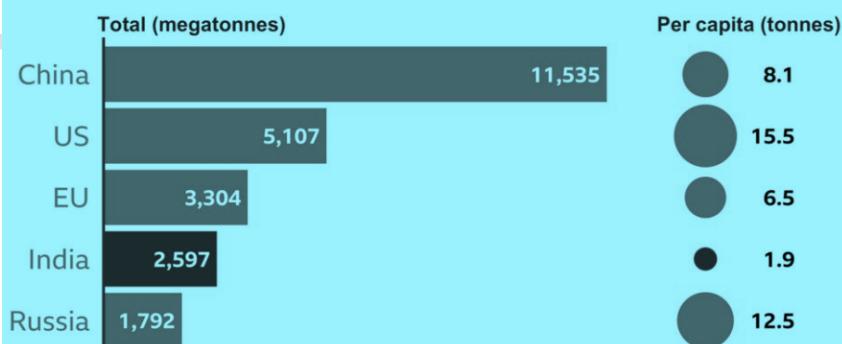
India's five-point Climate Action Plan

Indian Prime Minister announced as part of a five-point Climate Action plan at the COP26 summit in Glasgow.

- By 2070, India will achieve the target of net zero emissions. (India's first commitment towards net-zero emissions.)
- [Going 'Net Zero' indicates a situation where all the carbon dioxide or greenhouse gases produced by a country is completely absorbed via natural solutions or through the use of advanced technology.]
- By 2030, India will increase its non-fossil fuel power capacity to 500 gigawatts (GW) up from 450GW.
- By 2030, India will ensure 50% of its energy will be sourced from renewable energy sources.
- India will reduce its carbon emissions by 1 billion tonnes from business as usual by 2030.
- By 2030, India will reduce its carbon intensity goal - measured as carbon dioxide emissions per unit of GDP - by less than 45% (increased from 35% to 45%).
- **Related Links** - [Net-zero Targets of Countries](#)

India is the world's fourth biggest emitter of carbon dioxide

Total and per capita emissions of CO₂ per year



2019 data, EU includes UK
One megatonne = 1,000,000 tonnes

Source: EC, Emissions Database for Global Atmospheric Research

BBC



Tight Oil

Cairn Oil & Gas has partnered with US-based Halliburton to start shale exploration in the Lower Barmer Hill formation, Western Rajasthan.

- Tight oil (also known as shale oil, shale-hosted oil or light tight oil) is **light-gravity crude oil** found in petroleum-bearing shale or tight sandstone formations of low permeability.
- It is different from oil shale, which contains kerogen.
- Tight oil is found in **smaller batches**, and **deeper** than conventional crude deposits.
- Its extraction requires creation of fractures in oil and gas rich shale to release hydrocarbons through a process called **hydraulic fracking**.
 - Hydraulic fracking requires massive amount of water.
 - As the shale fluid from fracking may penetrate aquifers leading to methane poisoning of groundwater, the groundwater in the areas adjacent to shale production sites would be contaminated.
- Also, the construction of horizontal wells with multi-fracturing completions is one of the most effective methods for recovering tight oil.
- Tight oil is processed into gasoline, diesel, and jet fuels.
- Russia and the US are among the largest shale oil producers of the world, with a surge in shale oil production in the US having turned the country from an importer of crude to a net exporter in 2019.
- To know more about shale gas and its extraction, [click here](#).

Shale Oil Exploration in India

- Currently, there is no large-scale commercial production of shale oil and gas in India.
- In 2013, state-owned ONGC had started exploration and, by the end of FY21, ONGC's assessment found prospects of shale oil at the Cambay basin (Gujarat) and Krishna Godavari basin (Andhra Pradesh).
- But, the quantity of oil flow observed in these basins did not indicate 'commerciality'.

India's Solar Energy Capacity

India told the UN COP26 climate summit about its solar energy capacity.

- India's solar energy capacity stands at about 45 gigawatts after it increased 17 times in the last 7 years.
- This asserts that although the country represents 17% of the global population, its historical cumulative emissions are only 4%, and its current annual greenhouse gas (GHG) emissions are only about 5%.
- India achieved 24% reduction in emission intensity of its Gross Domestic Product (GDP) over the period of 2005-2014.
- Also, India's 15% of total CO₂ emission in 2016 was removed from the atmosphere by the Land Use, Land-Use Change & Forestry (LULUCF).
- Between 2015 and 2019, the forest and tree cover increased by 13,031 sq. km. and mangrove cover increased by 235 sq. km.

Elephant Collaring

A wild elephant was radio-collared in Assam by the state's Forest Department, in collaboration with NGO World Wildlife Fund (WWF)-India.

- This initiative is seen as a step to study & mitigate human-elephant conflict in the state. But experts say that the exercise is challenging, and even runs the risk of having a low success rate.
- **Radio-collars** are GPS-enabled collars. They can be fitted around the elephant's neck to relay information about an elephants' whereabouts.
- Collaring includes,
 1. Identifying a suitable candidate (generally an adult elephant),
 2. Darting the candidate with a sedative, and
 3. Fitting a collar around its neck, before the animal is revived.
- The objectives of this joint initiative are twofold.



1. GPS information from the collar would help us track and study the movement patterns of the herd, across regions and habitats. This would help in understanding what is driving the conflict.
 2. The collars would serve as an early warning system. If people know in which direction an elephant is moving, they can be prepared.
- These collars are a tried-and-tested tool for wildlife monitoring and will give rangers a leg up on poachers, allowing them to identify and respond to threats in real-time through mobile devices.
 - **Challenges** – As we don't have helicopters and other sophisticated equipment to approach elephants to tranquillise them, we go by foot. There is life risk.
 - All components for radio collaring are not available in India. These have to be imported and are quite expensive.
 - As the elephants grow in size, collars may become tight. So, we usually have to identify a senior elephant to avoid the chance of growth.
 - Each geographical area has its own peculiar problems. Also, we have elephants that are long ranging, and have a diverse topography.
 - Many times elephants are not able to keep the collar on. They will have it on for maximum 6 months, before it falls off. Also, there may be technical glitches with the device too.
 - Apart from Assam, collaring has been attempted in Chhattisgarh, Odisha and Tamil Nadu too.

Global Methane Pledge

The Global Methane Pledge launched at the UN COP26 climate conference in Glasgow has been signed by over 90 countries so far.

- This pledge is an effort led jointly by the US and the European Union.
- It is essentially an agreement to stop deforestation and cut down global methane emissions by up to 30% from 2020 levels by 2030.
- **Significance** - Rapidly reducing methane emissions is complementary to action on carbon dioxide and other greenhouse gases.
- This is regarded as the single most effective strategy to keep the goal of limiting global warming to 1.5 degrees Celsius within reach.
- **Signatories** - Among the signatories is Brazil - one of the five biggest emitters of methane.
- China, Russia and India have not signed up, while Australia has said it will not back the pledge.

Methane

- Methane is the second-most abundant greenhouse gas in the atmosphere, after carbon dioxide.
- Methane is more short-lived in the atmosphere than carbon dioxide but 80 times more potent in warming the earth.
- Methane accounts for about 20% of the heating effects by all of the greenhouse gases combined.
- The UN says that 25% of the global warming is because of methane.
- **Sources of methane** include natural sources (40% of global methane emissions) and human sources (60% of global methane emissions).
 - Natural sources - Emissions from wetlands and oceans, cows' digestive systems, and from the digestive processes of termites.
 - Human sources - Oil and natural gas systems (largest contributors to human sources), landfills, agricultural activities, coal mining, wastewater treatment, and certain industrial processes.
- **Uses** - Methane is flammable, and is used as a fuel worldwide. It is a principal component of natural gas.

The latest IPCC report reveals that the methane accounts for about half of the 1.0 degrees Celsius net rise in global average temperature since the pre-industrial era.



Kerala Revoked Order to Fell Trees by TN

A fresh controversy over felling of trees downstream the baby dam, which is part of the 126-year-old Mullaperiyar dam has erupted

- Mullaperiyar dam comprises the main dam, a baby dam, an earthen dam and the spillway.
- **Baby dam** was constructed to increase the water level.
- As per a 2014 Supreme Court directive, the water level at the dam can be maintained at 142 ft.
- Pointing out the age of the dam and raising safety concerns, Kerala has been demanding that the water level be reduced to 136 ft.
- For Tamil Nadu, strengthening of the baby dam is crucial for increasing the water level from 142 ft to 152ft.
- This is the reason why Tamil Nadu is seeking the permission from Kerala to cut the trees.
- Recently, Kerala granted TN permission to cut down trees. But it froze its decision in the wake of fears that the move would impair the interests of Kerala in the long-pending inter-state dispute.
 - By strengthening the baby dam and other structures, TN can play to hilt its demand that water level has to be raised to 152 ft.
- The forest department froze the order, pointing out that cutting of trees from the Periyar Tiger Reserve is subject to the clearance by the Union Ministry of Environmental and Forests and other statutory bodies.
- So, Tamil Nadu has to obtain approval from the Standing Committee of the National Board of Wild Life.
- Apart from that, permission is required as per the Forest Conservation Act of 1980. However, Tamil Nadu has not completed these mandatory steps before seeking permission to cut the trees.

Mullaperiyar dam is situated in Kerala, and Tamil Nadu, the custodian of the dam. Although the dam is controlled by Tamil Nadu, the permission for felling trees has to be granted by Kerala, where the dam is situated.

Sümi Nagas

The wisdom of Sumi Nagas to use the ecological indicators to facilitate agricultural practices and predict seasonal variation is vanishing with time.

- Sümi Naga tribes are the major ethnic group among Nagas, who are **Indo-Mongoloid** tribal groups, in Nagaland, India.
- Sümi Nagas practiced Aki Kiti (a semi-contact combat sport), and headhunting like other Nagas before their conversion to Christianity.
- Sumis have two different clan heads, Swu (Sumi) and Tuku (Tukumi).
- **Festivals** - Their grandest festival, Tuluni, is marked with feasts as the occasion occurs in the bountiful season of the year.
- Ahuna is a traditional post-harvest festival of the Sumis.
- Sumi Nagas is **primarily agrarian** and depends on forests for both food and livelihood. So several of the indicators facilitate agricultural practices and predict seasonal variation.
 - For instance, fruiting of mulberry (*Morus*) trees indicates spring and their harvest means summer is here.
 - Then, to predict winter, the Sumi tribe uses a universal indicator - migrating birds.
- Sümi is one of the **recognised scheduled tribes** of India.

Kadar Tribe

Some families of Kadar tribe has got pattas for homestead inside the Anaimalai Tiger Reserve (ATR).

- Kadar is a small tribe of southern India residing along the hilly border between Cochin in Kerala and Coimbatore in Tamil Nādu.
- Kadars are one of the five primitive tribal groups in Kerala, where they constitute nearly 5% of the State's total tribal population.
- **Economy** - The Kadar live in the forests and do not practice agriculture.

- They build shelters thatched with leaves and shifting location as their employment requires.
- They have long served as specialized collectors of honey, wax, sago, cardamom, ginger, and umbrella sticks for trade with merchants from the plains. Many Kadar men work as labourers.
- **Language** - They speak the Dravidian languages of Tamil and Kannada.
- **Religion** - Modern kadars like to known as Hindus. Their favourite deities are Ayappan, Kali and Malavazhi.
- Primitive polytheism and the worship of invisible gods have considerably disappeared. But a few elders still worship the rising sun.
- Their customs and conventions indicate that they had been strong animists not long ago.
- **Status** - The Kadar tribe has been listed as a Particularly Vulnerable Tribal Groups (PVTG) in Kerala, but not in Tamil Nadu.
- A tribe listed in the PVTG allows the tribe to have habitat rights under the Forest Rights Act 2006.

SPECIES IN NEWS

Kaiser-i-Hind Butterfly

Arunachal Pradesh's State Cabinet approved the large, brightly coloured Kaiser-i-Hind as the State butterfly.

- Kaiser-i-Hind (*Teinopalpus imperialis*) literally means Emperor of India.
- Kaiser-i-Hind Butterfly is an elusive swallowtail butterfly that usually flies at tree-top level and descends to sit on low vegetation when there is strong morning sunlight.
- It is in flight during April-July and lays eggs on the underside of leaves.
- It is found in 6 States along the Eastern Himalayas at elevations from 6,000-10,000 feet in well-wooded terrain. It also flutters in Nepal, Bhutan, Myanmar, Laos, Vietnam and southern China.
- **Threat** - Hunted for supply to butterfly collectors.

The Cabinet also adopted the Pakke Tiger Reserve 2047 declaration on climate change-resilient and responsive Arunachal Pradesh aimed at lowering emissions and sustainable development.



Protection Status	
Wildlife (Protection) Act, 1972	Schedule II
IUCN Status	Near Threatened
CITES	Appendix II

Vulture Bees

- These are tropical stingless bee species that have evolved into **carrion-feeding or meat-eating bees**.
 - These bees are the only bees in the world that have evolved to use food sources not produced by plants.
- These bees have evolved an **extra tooth** for biting flesh and an **acidic gut** that more closely resembles that of vultures rather than other bees.
- Typically, bees don't eat meat. But the Vulture Bees has evolved the ability to do so, due to **intense competition for nectar**.
 - Vulture bees and related species feed on meat for their **protein**.
- Unlike humans, whose guts change with every meal, the guts of most bee species are colonized by the same 5 core microbes over 80 million years of evolution.





- But, given their radical change in food choice, it is found that the vulture bees' gut bacteria differed dramatically from those of a vegetarian bee.
 - Gut bacteria, like Lactobacillus, harbor Carnobacterium, helps vulture bees fight pathogens on rotting meat. They help produce acid which helps the bees to fight toxins that form on rotting flesh.
- The carrion-feeding bees gathered the flesh in **little baskets on their hind legs**, where other bees collect pollen, or swallowed the meat to store in their stomachs.
- **Purpose** - The bees were preparing to carry the chicken back to their hives, where they would enclose the meat chunks in pods, leave them there for 2 weeks, then feed them to their babies.
- The adults don't need to eat protein. They survive on nectar.

Milu Deer

The comeback of Milu Deer from the brink of extinction marks a rare success for China's conservation efforts.

- Milu deer (*Elaphurus davidianus*) is a rare and endangered species.
- Also known as Pere David's deer, these animals were on the verge of disappearing towards the end of the 19th century.
- **Habitat** - Milu deer is native and endemic to the river valleys of China.
- They live in natural, open-range habitats, especially in the wetlands. They forage on grass and water plants.
- They particularly love rolling about in the mud, especially during the mating season, which makes the land easier for farmers to cultivate.
- **Threats** -
 1. Hunting for their meat,
 2. Loss of wetland habitat and
 3. Illicit mining and logging have fragmented reserves and left endangered animals marooned in "forest islands".
- **IUCN** - Extinct in the Wild

Christmas Island Red Crabs

Australia's Christmas Island witnesses the annual red crab migration.

- The red crab is a species of **land crab**.
- It is endemic to the Christmas Island and Cocos Islands of Australia in the Indian Ocean.
- Every year, these crabs emerge from the forest and make their way to the ocean to breed, swarming across roads, streams, rocks and beaches.
- Male crabs lead the migration and are joined by females along the way.
- Migration starts with the first rainfall of the wet season. This is usually in October or November.
- The exact timing and speed of the migration is determined by the phase of the moon.
 - Red crabs always spawn before dawn on a receding high-tide during the last quarter of the moon.
- **Diet** - Red crabs are opportunistic omnivorous scavengers.
- They mostly eat fallen leaves, fruits, flowers and seedlings, but will also feed on dead animals.
- **Predators** - Red crabs have no natural predators on Christmas Island.
- But the yellow crazy ant, an invasive species introduced to Christmas Island from Africa, is believed to have killed many red crabs recently.



Christmas Island

- Christmas Island is administered as an external territory of Australia.
- This island in the Indian Ocean was first sighted in 1615 by Richard Rowe.
- The island is the **summit of an oceanic mountain** whose highest point on the island is Murray Hill.
- The main settlement and chief port is at Flying Fish Cove.



21. SCIENCE AND TECHNOLOGY

SPACE

Leonids Meteor Shower

This year's annual November Leonids Meteor Shower has begun.

- Every year in November, an annual meteor shower called the Leonids radiate out from the direction of the constellation of Leo in the sky.
- The peak activity of a meteor shower is on November 17. The peak time comes when the Earth passes through the densest part of the debris.
- The meteors originate from the comet 55P/Tempel-Tuttle, which orbits the sun every 33 years in the constellation Leo.
- Earth passes through this trail of meteors each year as it revolves around the sun, causing meteor showers (1,000 meteors per hour) to occur.
- Leonids are the major shower that features the fastest meteors (speeds of 71 km/s), although the rates are often as low as 15 meteors per hour.
- They are also called fireballs (because of their bright colours) and earthgazer meteors (because they streak close to the horizon.)
- The light is a result of the friction between the meteorite and the molecules present in the Earth's atmosphere because of which it burns.
- The last Leonid storm took place in 2002.
- **Visibility** - The showers are visible on any cloudless night when the Moon is not very bright. They are best viewed at about midnight.
- Ideally, the viewing location should have no light pollution; the farther away from cities the better.

Fastest Spinning White Dwarf

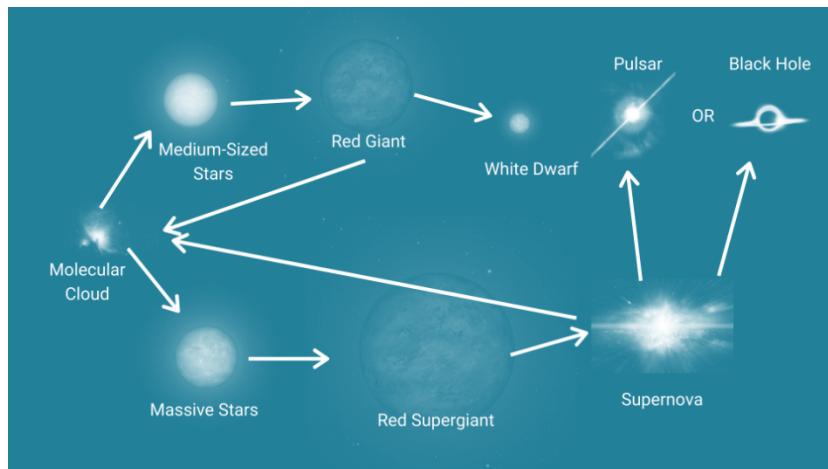
An astronomers' team has confirmed that a white dwarf star that completes a full rotation once every 25 seconds is the fastest spinning white dwarf.

- This star, named LAMOST J0240+1952, is part of a binary star system.
- It is the size of the Earth but at least 200,000 times more massive.
- **Magnetic Propeller System** - J0240+1952 is an extremely rare example of a magnetic propeller system, as it pulls gaseous plasma from the companion star and flings them into space at 3,000 km per second.
 - J0240+1952 is pulling material from its companion star due to its **strong gravitational effect**.
 - But as the material gets closer to the white dwarf the **magnetic field starts to dominate**.
 - This type of gas is highly conducting and picks up a lot of speed from this process, which propels it away from the star and out into space.

A white dwarf is star that has burnt up all of its nuclear fuel, and is shedding its outer layers, now undergoing a process of shrinking and cooling.

Evolution of White Dwarf

- A white dwarf is a very high density star that has burnt up all of its nuclear fuel (hydrogen).
- It shed its outer layers, now undergoing a process of shrinking and cooling over millions of years.
- **Mass** - White Dwarf is half the size of our Sun and has a surface gravity 100,000 times that of Earth.
- They can have a mass, which is limited to 4 times the mass of the Sun. This limit is known as the "Chandrasekhar Limit."
- **Detection** - White dwarfs can be detected as they are sources of soft, or lower-energy, X-rays.
- **Black Dwarf** - A white dwarf cools until it becomes a black dwarf, which emits no energy.



Supermassive Black Hole & Gravity

A change of state of a Monster black hole system named OJ 287 (monitored since 2015) was detected by Indian Astronomers

In some galaxies, the black hole is actively devouring a large amount of material and shooting a jet of plasma, called blazars, at the speed of light towards us.

- New state of this supermassive black hole (SMBH), which originated in the form of blazars, could help
 1. Probe how particles behave under intense gravity and acceleration to the speed of light, and
 2. Study the role of strong gravity and acceleration of matter in the formation, interaction, and evolution of galaxies in the early universe.
- This black hole is found at the center of an active galaxy detected 5 Billion Light years away.
- OJ 287 (source) belongs to a class of blazars known as BL Lacerate blazars, which show very rapid and large amplitude flux variations but barely discernible emission line features.
- This source emit in the whole electromagnetic spectrum, a rather uncommon phenomenon which requires extreme gravitational field.
 - Due to the extreme gravitational field, it is difficult for light also to escape from the vicinity of the black hole.
- This source shows a repeated optical brightness enhancement almost every 12 years. This reveals that the system hosts a binary black hole.

Black Holes

- A black hole is a place in space where gravity pulls so much that even light cannot get out.
- The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.
- As no light can get out, people can't see black holes. They are invisible.
- Space telescopes with special tools can help find black holes, by seeing how stars that are very close to black holes act differently than others.

- **Size** - Black holes can be big or small. The smallest black holes are as small as just one atom.
- '**Stellar black holes**' are made when the center of a very big star falls in upon itself, or collapses. They have a mass that can be up to 20 times more than the mass of the sun.
- '**Supermassive black holes**' are the largest black holes, which has masses that are more than 1 million suns together.
- Every large galaxy contains a supermassive black hole at its center.
- The supermassive black hole at the center of the Milky Way galaxy is called Sagittarius A, which has a mass equal to about 4 million suns.
- **Related Links** - [Merging of 3 Super-massive Black Holes](#), [The Unicorn](#)

James Webb Space Telescope

The James Webb Space Telescope is scheduled to be sent into orbit no earlier than December 2022.

- The Webb telescope is said to be the scientific successor to the Hubble and Spitzer space telescopes.
- It is NASA's largest and most powerful space science telescope ever constructed.
- The telescope will
 1. Hunt for the unobserved formation of the first galaxies, and
 2. Look inside dust clouds where stars and planetary systems are forming today.
- The collected data will help find answers to questions in 4 areas of modern astronomy - First light, Assembly of galaxies, Birth of stars and protoplanetary systems, and Planetary systems and the origin of life.
- The telescope carries 4 scientific instruments.
 1. Near-Infrared Camera
 2. Near-Infrared Spectrograph
 3. Mid-Infrared Instrument
 4. Near-Infrared Imager and Slitless Spectrograph (To study the planetary systems)
- **Reason to carry infrared cameras** - About 13.8 billion years after the Big Bang, our universe was extremely hot and filled with dense particles.
- As it slowly cooled, it gave rise to the building blocks - helium and hydrogen.
- Studies have suggested that the first stars formed about 150-200 million years after the Big Bang.
- Using infrared cameras, Webb is designed to help us find the answer to the questions like, "How did the Universe's first light or stars look like?"
- **Redshift** - Light from the first stars and galaxies formed nearly 13.6 billion years ago will have to travel through space & time before reaching the telescope.
- By the time this light reaches the telescope, its colour changes, and this phenomenon is called Redshift.
- The visible or UV light from the first stars and galaxies shift to redder wavelengths by the time the telescope sees it. For this reason, Webb is equipped with near- and mid-infrared instruments.
- By studying the earliest galaxies and comparing them to today's galaxies we can understand the growth and evolution of galaxies.
- **Communication** - The Webb telescope will send data to Earth via a high-frequency radio transmitter and large radio antennas part of the NASA Deep Space Network will receive these signals.
- It will be forwarded to the Webb Science and Operation Center at the Space Telescope Science Institute in Baltimore, Maryland, USA

Matosinhos Manifesto

European Space Agency (ESA) Council approved the Matosinhos Manifesto to accelerate the use of space in Europe.

- By accelerating the use of space in Europe, Matosinhos Manifesto aims to tackle the unprecedented societal, economic and security challenges faced by Europe and its citizens.



- This resolution defines three “accelerators” to further advance Europe’s space ambitions.
- First accelerator is for the ESA to work towards the ‘**Space for a Green Future**’, so that people are better able to understand the current state of Earth and to develop scenarios and solutions for sustainable life here.
 - This is in line with achieving net-zero greenhouse gas emission targets by the year 2050.
- Second accelerator ‘**Rapid and Resilient Crisis Response**’ aims to support governments to act decisively on crises facing Europe, from flooding and storms to wildfires.
- Third accelerator is ‘**Protection of Space Assets**’, whose objective is to safeguard ESA astronauts and assets from interference by space debris and space weather.
- Other than this, the council recognised two “inspirators” to reinforce European management in science, expertise growth and inspiration,
 1. An icy moon pattern return mission and
 2. Human space exploration.

NASA's DART Mission

NASA will launch the agency's first planetary defense test mission named the Double Asteroid Redirection Test (DART) on a SpaceX Falcon 9 rocket.

- DART is a planetary defense-driven test of technologies for preventing an impact of Earth by a hazardous asteroid.
- DART is a **suicide mission** that aims to test the newly developed technology that would allow a **spacecraft to crash into an asteroid** and change its course.
- DART's target asteroid **Dimorphos** (small moonlet) is NOT a threat to Earth. Dimorphos orbits a larger asteroid named Didymos.
 - Didymos is a perfect system for the test mission as it is an eclipsing binary.
 - This means it has a moonlet that regularly orbits the asteroid and we can see it when it passes in front of the main asteroid.
- The spacecraft will collide with the moonlet at a speed of about 24,000 kms per hour when it is 11 million kms away from Earth. The collision may take place between September 26 and October 1, 2022.

Related Links - [Asteroid Impact and Deflection Assessment](#)

DART Spacecraft

- DART is a low-cost spacecraft that uses **hydrazine** propellant for maneuvering the spacecraft.
- It carries **10 kg of xenon** to be used to demonstrate the NASA Evolutionary Xenon Thruster-Commercial (NEXT-C) solar electric propulsion system as part of its in-space propulsion.

Components	Uses
2 Roll Out Solar Arrays (ROSA)	It will provide the solar power needed for DART's electric propulsion system.
NASA Evolutionary Xenon Thruster-Commercial (NEXT-C)	It is a solar electric propulsion system
Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO)	<p>It is a high-resolution imager that will send real-time images to Earth.</p> <p>These images will help study the impact site and surface of Dimorphos.</p>
Light Italian CubeSat for Imaging of Asteroids (LICIACube)	<p>It is expected to capture images of the impact and the impact crater formed as a result of the collision.</p> <p>It can also capture images of any dust cloud formed during the impact.</p>

DEFENCE

India's Submarine Strength

The CBI filed charges against some naval officers for allegedly sharing details of the ongoing modernisation project of India's Kilo Class submarines (imported submarines that are being retrofitted).

- India has 15 conventional diesel-electric submarines, classified as SSKs, and one nuclear ballistic submarine, classified as SSBN.
- India is building at least two larger SSBNs that will have bigger missiles, called S4 & S4 projects. The 4 SSBNs may be commissioned before 2030.

SSKs	
4 Shishumar Class	Bought and then built in India in collaboration with the Germans in 1980s
8 Kilo Class or Sindhughosh Class	Bought from Russia (including erstwhile USSR) between 1984 and 2000
3 Kalvari Class Scorpene submarines	Built at India's Mazagon Dock in partnership with France's Naval Group
SSBN	
INS Arihant	Indigenously-built nuclear-powered ballistic missile submarine
INS Arighat	An upgraded version of Arihant (Yet to be commissioned)

- **History** - India got its first submarine, INS Kalvari of the Foxtrot Class, from the USSR in December 1967. By 1969, it had four of those.
- Between 1971 and 1974, India bought 4 more Foxtrot Class submarines.
- In 1981, it signed a contract to buy two Type 209 submarines from West Germany, while two others were to be assembled at Mazgaon Dock.
- These formed the Shishumar Class.
- Parallelly, Russia offered India its Kilo Class submarines.
- Between 1986 and 1992, India got 8 submarines from the USSR and 2 from Germany.
- India bought 2 more Kilo Class submarines from Russia in 1999 and 2000, taking the total submarine fleet to around 20.
- Soon after, the older Foxtrots started getting decommissioned.
- Of the 10 Kilo Class submarines, INS Sindhurakshak sank off Mumbai after explosions caused by fire. India gifted INS Sindhuvir to Myanmar.

30-year Construction Plan

- The 30-year plan (2000-30) for indigenous submarine construction envisaged 2 production lines of 6 submarines each, built in India in partnership with a foreign Original Equipment Manufacturer (OEM).
 - The projects were called P-75 and P-75I.
- The plan anticipated that India would get 12 new submarines by 2012-15.
- Subsequently, India would make 12 of its own by 2030, taking the fleet size to 24, with the older submarines getting decommissioned.
- But the contract for P-75 was signed only by 2005, with France's DCNS, now the Naval Group.
- INS Kalvari, built in India in partnership with France's Naval Group.



Operation Sankalp

As part of Operation Sankalp, INS Trikand is currently deployed by the Indian Navy in the Persian Gulf and Gulf of Oman.

- Indian Navy's effort to maintain a frontline ship in the region to ensure safe and secure movement of trade instill confidence in the maritime community and contribute to regional maritime security.
- Operation Sankalp was started in 2019 after there were explosions in oil tanker ships in the Gulf of Oman amid tensions between Iran and the US
- Since then, an Indian Navy ship with an integral helicopter embarked has been continuously deployed in the north-west Arabian Sea, Gulf of Oman and Persian Gulf.
- **Need** - Operation Sankalp ensure safety of India's Mercantile Marine in the Persian Gulf and the Gulf of Oman.
- India is dependent for about 85% of its demand for oil on imports.
- So, this operation will help India in building a strategic bilateral relationship and enhancing maritime security in the region.



INS Trikand

- INS Trikand is a state-of-the-art guided missile stealth frigate.
- It is part of the Western Fleet that operates under the Flag Officer Commanding-in-Chief, Western Naval Command (Mumbai.)

Sagar Nidhi

A Union Minister visited Indian Subcontinent's Pioneer Research Vessel Ship "Sagar Nidhi" at Chennai Port.

- Sagar Nidhi is India's ice-class Ocean Research Vessel (ORV) operated by National Institute of Ocean Technology (NIOT), Chennai.
 - The 4 vessels under NIOT are ORV Sagar Nidhi & Sagar Manjusha, Coastal Research Vessels (CRVs) Sagar Tara & Sagar Anveshika.
- Sagar Nidhi is the first Indian flagged research ship that reached the 66°S latitude [Antarctic waters], witnessing nature's harshest conditions.
- The vessel is capable of carrying out geo-scientific, meteorological and oceanographic research.
- It is designed with blue-water capability with ranges of up to 10,000 nautical miles for voyages lasting up to 45 days.
- Sagar Nidhi plays an important role in **exploring the ocean resources** and participation in **search and rescue operations**, especially its importance for implementation of [Deep Ocean Mission](#).

Research Vessel

- Research Vessel (Ships) is an important tool for ocean research, development of ocean technology and Ocean Survey of the Exclusive Economic Zone (EEZ) and deep oceans for minerals and energy.
- Ministry of Earth Sciences (MoES) has the mandate of providing weather, climate, Ocean and seismological services and to harness living and non-living resources.
- So, MoES has **6 ships** - Sagar Nidhi, Sagar Manjusha, Sagar Kanya, Sagar Sampada, Sagar Tara & Sagar Anveshika.

India's Ocean Resources

- India has an EEZ of about 2.37 million square kms wherein India enjoys the exclusive legal right to utilize all living and non-living resources.



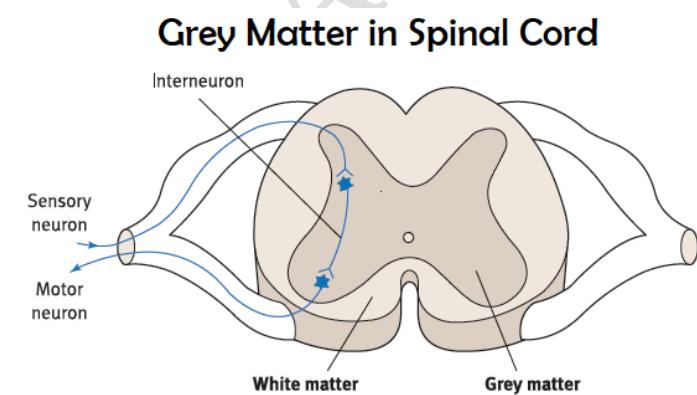
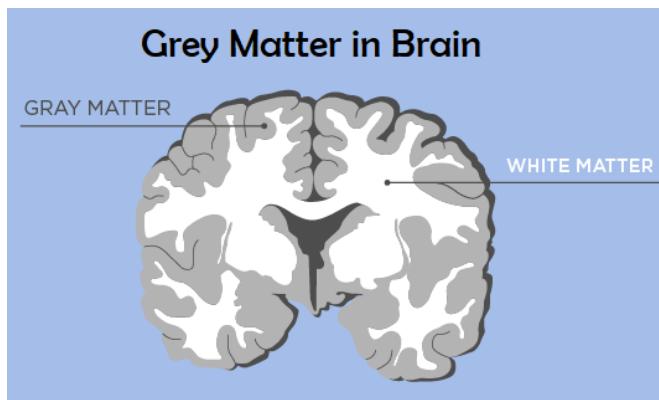
- Apart from this, India has been allotted 75000 square kms in the Central Indian Ocean, 10000 square kms in the Southern Indian Ocean by the International Seabed Authority.
- These areas are rich in minerals like Manganese, Cobalt and Nickel.

HEALTH

Grey Matter

A research supported under the SATYAM program by Department of Science & Technology has found that daily home-based meditation can increase the amount of grey matter in brains of patients with mild Alzheimer's disease.

- Grey matter refers to **unmyelinated neurons** and other cells of the Central Nervous System.
- It is present in the **brain, brainstem and cerebellum**, and present throughout the **spinal cord**.
- It is referred to as the grey matter due to its greyish appearance. The neuron cell bodies are concentrated here giving the colour.
- **Functions** - Grey matter in the brain is involved in muscle control, and sensory perception such as seeing and hearing, memory, emotions, speech, decision making, and self-control.
- Also, the grey matter in the spinal cord is involved in muscle movement (motor neurons), and receiving and sending sensory information from the body (sensory neurons).



Rheumatic Heart Disease

A new study has found that penicillin can prevent latent Rheumatic Heart Disease from progressing in children and adolescents.

- Rheumatic Heart Disease (RHD) is the most commonly acquired heart disease in people under age 25, caused by rheumatic fever.
- [Rheumatic fever is an autoimmune inflammatory reaction to throat infection with group A streptococci.]
- It arises from poorly treated, repeat infections of streptococcus bacteria.]
- It most commonly occurs in childhood, and can lead to death or life-long disability.
- **Risk groups** - Rheumatic fever mostly affects children and adolescents in low- and middle-income countries.
- People who live in overcrowded and poor conditions are at greatest risk of developing the disease.
- **Treatment** - There is no cure for RHD and the damage to the heart valves is permanent.
- Patients with severe RHD will often require surgery to replace or repair the damaged valve or valves.
- Depending on the severity of disease, medications that thin the blood to reduce the risk of blood clots may also be needed.
- **Prevention** - Since RHD results from rheumatic fever, treatment of strep throat with appropriate antibiotics will prevent rheumatic fever.

Worldwide, around 40.5 million people, mostly people under the age of 25, suffer from the disease and 306,000 people die of it every year.



Autism Spectrum Disorder

Indian researchers have developed a compound called “6BIO” that can provide a better method to treat Autism Spectrum Disorder (ASD) / Intellectual disability (ID).

- This compound has potential for improving daily activities like learning and recollecting new tasks in patients with ASD/ ID.
- ASD is the name for a group of developmental disorders that includes a wide range, “a spectrum” of symptoms, skills, and levels of disability.
 - Fragile X Syndrome (FXS) is the leading inherited cause of autism in 4% of the global population.
- ASD includes conditions that were previously considered separate - autism, Asperger's syndrome, childhood disintegrative disorder and an unspecified form of pervasive developmental disorder.
- People with ASD often have these characteristics:
 1. Ongoing social problems that include difficulty in communicating and interacting with others.
 2. Repetitive behaviours as well as limited interests or activities.
 3. Symptoms that typically are recognized in the first 2 years of life.
 4. Symptoms that hurt the individual's ability to function socially, at school or work, or in other areas of life.
- While there is no cure for autism spectrum disorder, intensive, early treatment can make a big difference in the lives of many children.

Wolbachia Mosquitoes

Researchers from the World Mosquito Program (WMP) have found a way to fight disease-bearing mosquitoes by breeding Aedes aegypti mosquitoes, which carries Wolbachia bacteria.

- Wolbachia is a common bacterium that occurs naturally in 60% of insect species, including some mosquitoes, fruit flies, moths and butterflies.
- But, it is not found in dengue-carrying Aedes aegypti mosquitoes, the primary species responsible for transmitting human viruses such as Zika, dengue, chikungunya and yellow fever.
- Now, the lab-bred mosquitoes with Wolbachia will mate with mosquitoes with dengue, which will produce Wolbachia mosquitoes.
- Wolbachia bacteria in the mosquitoes prevent viruses like dengue from growing inside them. So even if they bite people, it won't affect them.
- Trial results showed that deploying mosquitoes with Wolbachia reduced dengue cases by as much as 77% and hospitalisations by up to 86%.
- Wolbachia method helps to protect communities from mosquito-borne diseases like Zika, dengue, chikungunya and yellow fever, and does so without posing a risk to natural ecosystems or human health.

According to the World Health Organization (WHO), global dengue infections have risen rapidly in recent decades, with about half of the world's population now at risk. An estimated 100-400 million infections are reported every year.

Three-step Synthesis Route for Molnupiravir

Researchers have engineered enzymes to enable faster manufacture of antiviral drug molnupiravir.

- **Molnupiravir** is an investigational oral antiviral for treatment of Covid-19, which was originally developed to treat influenza.
- Molnupiravir works by causing viruses to make errors when copying their own RNA, introducing mutations that inhibit replication.
- Recently, molnupiravir reduced the risk of hospitalization and death from COVID-19 for newly diagnosed, at-risk patients, and that it worked equally well against different SARS-CoV-2 variants.
- **In the new study**, a 3-step synthesis route was developed - from a sugar molecule called **ribose** - to increase the yield of Molnupiravir.
- They identified enzymes or chemical treatments to sequentially add the appropriate chemical groups to ribose to generate the molecule.



- For the 2nd step of the synthesis, the team identified bacterial enzymes that weakly catalyzed the desired reactions.
- Using in vitro evolution, they greatly enhanced these enzymes' activities.
- This new route, which also included a phosphate recycling strategy, was 70% shorter and had a 7-fold higher overall yield than the original route.

Insulin Signaling & Tissue Health

A new study has uncovered how insulin amounts shape the flow of information through the signalling network.

- **Insulin** is a hormone secreted by the b cells of the pancreas.
- It is commonly associated with an ability to regulate glucose metabolism.
- It plays a larger role and helps in growth and maintenance of tissues.
- **Insulin signalling** is a series of biochemical reactions that convey information about availability of insulin and the necessity to regulate the glucose in the blood.
- There are 2 main pathways for insulin signaling (AKT and ERK), which together balance metabolism and growth.
- These specifically control storage of glucose in the liver and also stimulate glucose transport in skeletal muscle and fat.
- Abnormalities in insulin signalling thus impact health and survival itself of organisms and the study addresses an important piece of the puzzle.
- **Study** - The study mimicked both normal levels of insulin, as in a healthy individual, and abnormal levels of insulin as in pathophysiology.
- The study found that the inputs from the fasted insulin levels created a memory that improved the fed insulin inputs.
- It also elucidates the detrimental impact of constant high insulin as in the case of uncontrolled feeding habits, without a fasting phase, and its effects on signaling molecules that govern tissue maintenance & growth.
- It identifies potential novel regulatory components & parameters whose modulation could lead to better therapeutic interventions in the future to reduce tissue damage, beyond the usual impact on blood glucose.

Suffering from 'Climate Change'

A Canadian woman becomes world's first patient to be diagnosed with breathing trouble as suffering from 'climate change'.

- She was struggling to breathe after the recent wildfires in Kootenays region in the British Columbia province worsened her asthma.
- In this diagnosis, the doctor linked mortality or severe illness to heat waves or air pollution.
- If we're not looking at the underlying cause (climate change), and we're just treating the symptoms, we're just gonna keep falling further behind.

OTHERS

Technical Textiles

Union Minister of Textiles said that time has come to target 5 times increase in export of Technical Textiles in 3 years.

- Technical textiles are textiles materials and products manufactured for **non-aesthetic purposes**, primarily for technical performance and functional properties.
- Depending upon their application areas, Technical Textiles products are divided into 12 broad categories.
- Agrotech, Buildtech, Clothtech, Geotech, Hometech, Indutech, Mobiltech, Meditech, Protech, Sportstech, Oekotech, Packtech.
- India shares nearly 6% of world market size of 250 Billion USD.



- The growth of Technical Textiles in India has gained momentum in past 5 years, currently growing at 8 % per annum rate. The aim is to hasten this growth to 15-20% range during next 5 years.

The Taproot

Bitcoin went through a major upgrade called the Taproot, which is the most major change to the bitcoin protocol since the SegWit block capacity change (2017)

- The Taproot upgrade was first proposed by Greg Maxwell in 2018.
- It enables the blockchain of the bitcoin network to execute more complex transactions, potentially widening the use cases of virtual currency.
- Taproot introduces a new digital signature scheme called "Schnorr" that will help bitcoin transactions become more efficient and more private.
- Schnorr signatures bundle many signatures required for multi-signature and complex transactions into a single unique key on-chain.
- Schnorr can also be leveraged to let bitcoin users execute more complex smart contracts on the bitcoin protocol.
 - Smart contracts are self-executing transactions whose results depend on pre-programmed inputs.
- Taproot impacts the bitcoin network's ability to **process more smart contracts**, making it a little more competitive with Ethereum.
- Taproot **increases privacy** by obscuring what type of transaction is being executed.
- Taproot improves the Bitcoin network's efficiency by drastically reducing the volume of data required to be stored on-chain to complete complex transactions.
- More flexible transaction types and lower costs may support more development of Decentralized Finance (DeFi) and Non-fungible Tokens (NFTs) on bitcoin.

SegWit (Segregated Witness) increased the amount of transactions that could fit into a block by pulling data on signatures from bitcoin transactions.

5G Technology

Lava International becomes the first Indian brand to launch 5G smart phone under the brand name 'Agni' for domestic consumers.

- 5G is the fifth-generation wireless technology that operates in the millimeter wave spectrum (30-300 GHz).
- It is the latest upgrade in the long-term evolution (LTE) mobile broadband networks.
- 5G mainly works in 3 bands, namely low, mid and high frequency spectrum.

Spectrum	Benefit	Limitation
Low frequency spectrum	High coverage and speed of internet and data exchange	Maximum speed is limited to 100 Mbps
Mid frequency spectrum	Higher speeds compared to the low frequency	Relatively limited coverage area and penetration of signals
High frequency spectrum	Highest speed of all the three bands	Extremely limited coverage area and penetration of signals

- Pros of 5G** - 5G can provide higher speed (20 Gbps speed), lower latency and greater capacity than 4G LTE networks.
- It increases more bandwidth that will help transfer the data as soon as possible. Less tower congestion.
- Cons of 5G** - Limited global coverage, decreased broadcast distance, the upload speeds are not over 100 Mbps when compared to 4G, weakened device batteries, lack of early encryption in the connection process, etc



22. INDEX AND REPORT

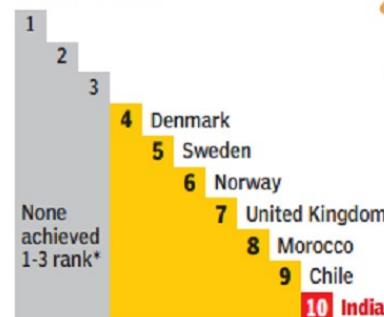
Climate Change Performance Index

The 17th edition of the Climate Change Performance Index was released.

- This index was compiled by Germanwatch, the New Climate Institute, and the Climate Action Network.
- The index is an independent monitoring tool for tracking the climate protection performance of 60 countries and the European Union.
- **Findings** - The recent edition of the index kept the first 3 ranks of the overall rankings empty as no country had performed well enough in all index categories to achieve an overall very high rating.
- The first 3 ranks in the greenhouse gas emissions category were kept empty too.
- Overall, the overall top performers in the list of 60 countries were Denmark, Sweden and Norway.
- Australia, South Korea, Russia and the US are among the lowest performing countries along with Kazakhstan and Saudi Arabia.
- In terms of greenhouse gas emissions, Sweden, Egypt, Chile and the UK are in the top 7 of this category.
- **India** is at number 10 in the overall rankings. It is a high performer except in the renewable energy category, in which it is ranked “medium”.
- India is benefiting from its relatively low per-capita emissions.
- India is ranked 10 in terms of greenhouse gas emissions.

HAT-TRICK FOR INDIA

Where do countries stand in Climate Change Performance Index (CCPI) Ranking



LEADS Report 2021

The Ministry of Commerce and Industry releases report on Logistics Ease Across Different States (LEADS) 2021.

- **Findings** - The LEADS survey 2021 was conducted over the period from May to August 2021.
- Gujarat, Haryana & Punjab have got the top 3 positions respectively.
- Within the North Eastern States and Himalayan Region, Jammu and Kashmir is the top ranker followed by Sikkim and Meghalaya.
- Delhi stands at the top rank among Other UTs.
- Uttar Pradesh, Uttarakhand & Jharkhand have witnessed a remarkable improvement in their ranks compared to 2019 LEADS ranking.
- **Improvements** - LEADS 2021 has gone 2-step ahead of the previous reports in analysing the domestic & EXIM logistics ecosystem of the state.
- Along with the perception-based indicators, objective parameters have been used for index formulation in the LEADS 2021 Index.
- Also, the statistical methodologies to build the index has been updated to get more robust results, given change in the overall framework.
- 21 perception and objective variables have been statistically analysed to prepare a composite index basis upon which the states have been ranked.
- The perception survey was administered to the 4 categories of logistics stakeholders, viz. traders/ shippers, transport service providers, terminal operators, and logistics service providers.
- **Significance** - LEADS report would be a practical guide to identify strengths, opportunities & improve the logistics performance of States.

- The inputs given by LEADS Report 2021 can lead the way to bring down logistics cost by 5% over the next 5 years. The current cost is about 13-14% of the GDP, according to estimates.

LEADS Report

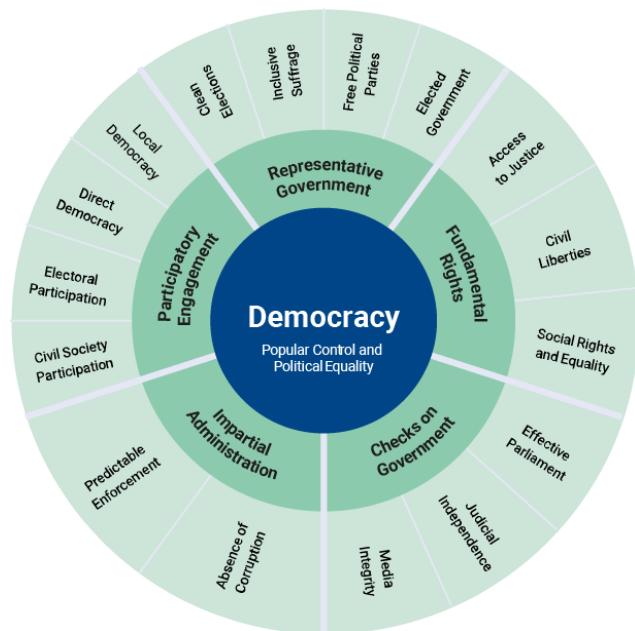
- The Ministry of Commerce and Industry (MoCI) had launched a study, "Logistics Ease Across Different States (LEADS)" in 2018.
- The report ranks the states and UTs on the basis of their logistics ecosystem, highlights the key logistics related challenges faced by the stakeholders and includes suggestive recommendations.
- The states have been ranked in three separate classes including 'North Eastern States & Himalayan UTs' and 'Other UTs' group.
- With Competitive & Cooperative federalism, LEADS is creating an Ecosystem for Excellence by bringing in a healthy competitive spirit where everyone is persuaded to improve.
- LEADS report aims to enhance focus on improving logistics performance across states which is key to improving the country's trade and reducing transaction cost.

Report	Focus
LEADS 2018	Focused on export-import trade Assessed the efficiency of the logistics ecosystem in each State and UT
LEADS 2019	Covered both international and domestic trade
	No ranking was released last year due to the Covid-19 pandemic
LEADS 2021	Analysis of domestic and EXIM logistics ecosystem of the state

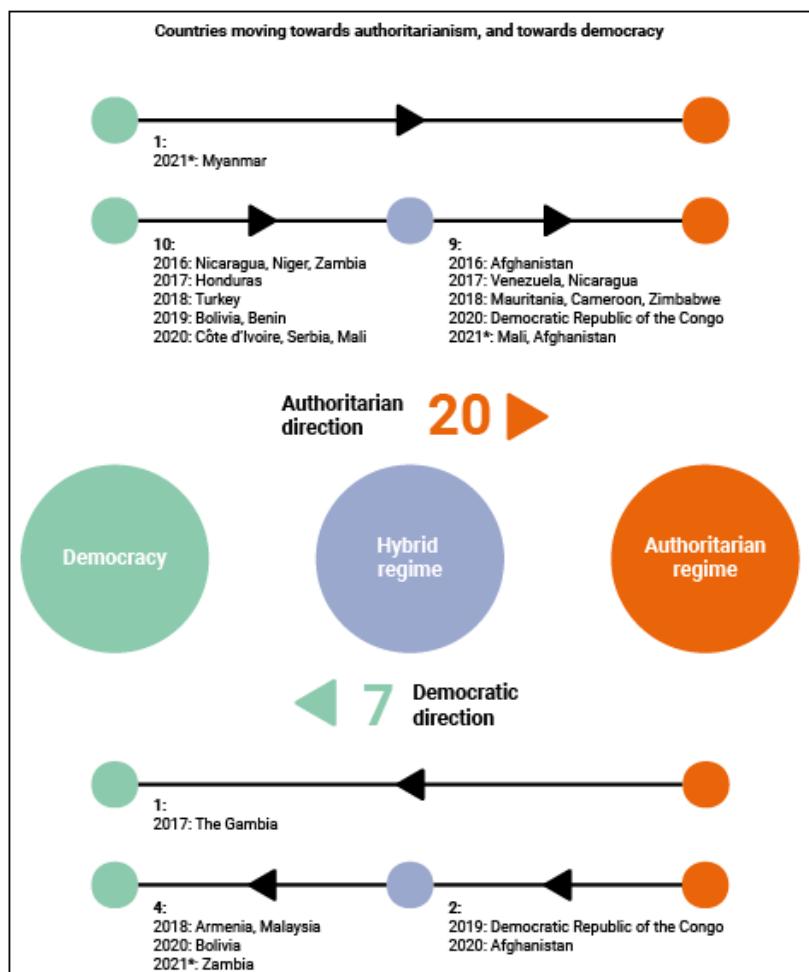
Global State of Democracy Report, 2021

The Global State of Democracy Report, 2021 was released by the International Institute for Democracy and Electoral Assistance (International-IDEA).

- The reports refer to 3 main regime types - Democracies, Hybrid and Authoritarian Regimes.
 - Hybrid & authoritarian regimes are classified as non-democratic.
- The report aims to influence the global debate and analyses current trends and challenges to democracy, exacerbated by the Covid-19 pandemic.
- It offers specific policy recommendations to spark new and innovative thinking for policymakers, governments and civil society organizations supporting democracy.
- Findings** - The report said that the 20 countries moved in the direction of authoritarianism, but 7 countries moved towards democracy.
- The US and three members of the European Union (EU) [Hungary, Poland and Slovenia] have also seen concerning democratic declines.
- The pandemic has prolonged this existing negative trend into a 5-year stretch, the longest such period since the start of the 3rd wave of democratization in the 1970s.
- Democratically elected Governments, including established democracies, are increasingly adopting authoritarian tactics.



- **India** - Some of the most worrying examples of Democratic backsliding are found in some of the world's largest countries (Brazil, India).



National Multidimensional Poverty Index

The Government think-tank NITI Aayog has prepared and released the National Multidimensional Poverty Index (MPI).

- **Index** - National MPI of India is a contribution towards measuring progress towards **target 1.2** of the Sustainable Development Goals (SDGs) of the 2030 Agenda.
- National MPI is a **baseline report** that is based on the reference period of **2015-16** of the National Family Health Survey-4 (**NFHS-4**).
- It captures multiple and simultaneous deprivation faced by households.
- [SDG Target 1.2 aims at reducing at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions.]
- National MPI has been constructed by utilising 12 key components covering 3 dimensions of **health and nutrition, education and standard of living**.
- India's national MPI measure uses the globally accepted and robust methodology developed by the Oxford Poverty and Human Development Initiative (OPHI) and the UN Development Programme (UNDP).

MPI as a measure was first developed by OPHI and UNDP for inclusion in UNDP's flagship Human Development Report in 2010.

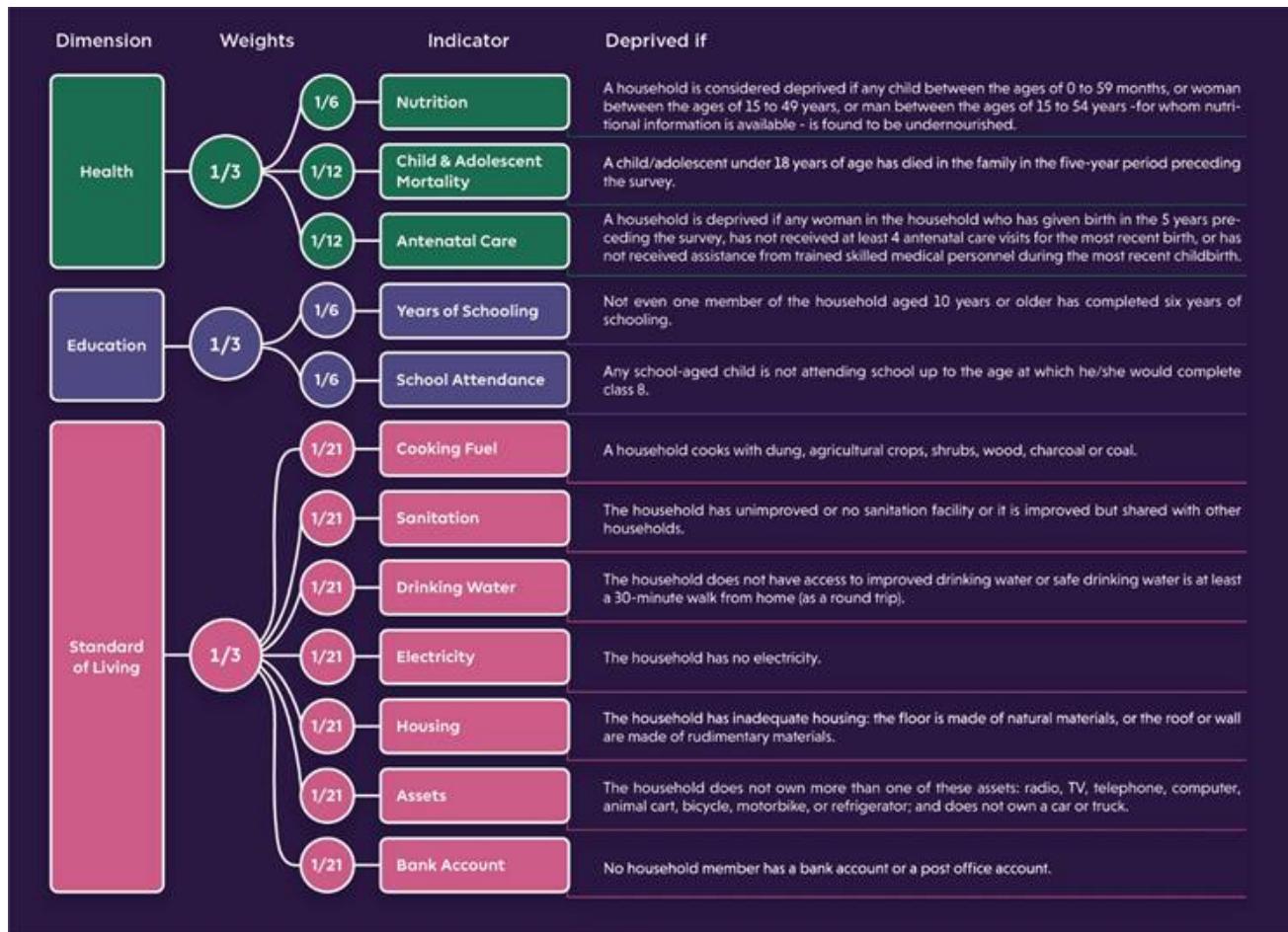


FIGURE 1: INDICATORS IN INDIA'S NATIONAL MPI

- **Findings** - With 51.91% of the population in the State identified as “multi-dimensionally poor”, Bihar has the maximum percentage of population living in poverty among all the States and Union Territories.
 - Bihar is followed by Jharkhand, Uttar Pradesh, Madhya Pradesh and Meghalaya.
- On the other hand, Kerala registered lowest population poverty levels (0.71%), followed by Puducherry, Lakshadweep, Goa and Sikkim.
- Other States and UTs where less than 10% of the population are poor include Tamil Nadu (4.89%), Delhi (4.79%), Andaman & Nicobar Islands, Punjab, Himachal Pradesh and Mizoram.

Global Nutrition Report 2021

The Global Nutrition Report, 2021 (GNR, 2021) was released recently.

- The Global Nutrition Report was conceived following the first Nutrition for Growth Initiative Summit (N4G) in 2013.
- **The annual GNR -**
 - Evaluates the impact of poor diets on human health and the planet,
 - Provides a concise data-focused updates on the state of diets and nutrition in the world,
 - Assesses the nutrition financing landscape and progress towards global nutrition targets.

Findings of GNR, 2021

- At the current rate of progress, the global nutrition targets will not be achieved by 2025 globally and in most countries worldwide. The Covid-19 pandemic is impeding progress towards achieving these targets.
 - To achieve the global nutrition targets, countries must intensify and accelerate efforts to reach their commitment goals, particularly **financial and impact goals**.
- Economic downturn triggered by the Covid-19 pandemic, combined with disrupted food and health systems, threatens to increase malnutrition significantly in low- and middle-income countries.



- Given these economic challenges, when donor and domestic resources are constrained by the pandemic, there is an urgent need for concessional, private sector and catalytic **innovative finance**.
- The previous decade has seen little progress in improving diets, and a quarter of all deaths among adults are attributable to poor diets.
- Food production currently generates more than a third of all greenhouse gas emissions globally, and uses substantial and rising amounts of environmental resources.
- No region is on track to meet the Sustainable Development Goals aimed at limiting health and environmental burdens related to diets and the food system.
- Poor diets and malnutrition should be addressed holistically and sustainably to create a healthy future for all.

<p>TARGET 1</p> <p> Under-5 stunting</p> <p>Maternal, infant and young child nutrition targets for 2025</p> <p>TARGET: 40% reduction in the number of children under 5 who are stunted</p> <p>DEFINITION: Children aged 0–59 months who are more than 2 standard deviations (SD) below the median height-for-age of the WHO Child Growth Standards</p>	<p>TARGET 4</p> <p> Salt intake</p> <p>Global non-communicable disease targets for 2025 (diet-related)</p> <p>TARGET: 30% relative reduction in the mean population intake of salt/sodium by 2025</p> <p>DEFINITION: Mean population recommended intake of salt is 5g/day Mean population recommended intake of sodium is 2g/day</p>
<p>TARGET 2</p> <p> Anaemia</p> <p>TARGET: 50% reduction of anaemia in women of reproductive age</p> <p>DEFINITION: Prevalence of anaemia is (1) percentage of pregnant women whose haemoglobin level is less than 110 g/L at sea level or (2) percentage of non-pregnant women whose haemoglobin level is less than 120 g/L at sea level</p>	<p>TARGET 5</p> <p> Adult raised blood pressure</p> <p>TARGET: 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances</p> <p>DEFINITION: Raised blood pressure is defined as blood pressure, systolic and/or diastolic blood pressure $\geq 140/90\text{mmHg}$</p>
<p>TARGET 3</p> <p> Low birth weight</p> <p>TARGET: 30% reduction in low birth weight</p> <p>DEFINITION: Infants born in each population and over a given period who weigh less than 2.5kg</p>	<p>TARGET 6</p> <p> Adult obesity</p> <p>TARGET: Halt the rise in obesity and diabetes</p> <p>DEFINITION: Adult obesity: BMI $\geq 30\text{kg}/\text{m}^2$ Adult diabetes: Diabetes is defined as fasting glucose $\geq 7.0\text{mmol}/\text{L}$, on medication for raised blood glucose or with a history of diagnosis of diabetes</p>
<p>TARGET 4</p> <p> Under-5 overweight</p> <p>TARGET: No increase in childhood overweight</p> <p>DEFINITION: Children aged 0–59 months who are more than 2 SD above the median weight-for-height of the WHO Child Growth Standards</p>	<p>TARGET 7</p> <p> Adult diabetes</p>
<p>TARGET 5</p> <p> Exclusive breastfeeding</p> <p>TARGET: Increase the rate of exclusive breastfeeding in the first 6 months to at least 50%</p> <p>DEFINITION: Infants 0–5 months of age who are fed exclusively with breast milk</p>	
<p>TARGET 6</p> <p> Under-5 wasting</p> <p>TARGET: Reduce and maintain childhood wasting to less than 5%</p> <p>DEFINITION: Children aged 0–59 months who are more than 2 SD below the median weight-for-height of the WHO Child Growth Standards</p>	

India's Performance

- According to the GNR 2021, India is among the countries documented in the report as having made no progress or said to be worsening with regards to reducing '**anaemia**' and '**childhood wasting**'.
- Over half of Indian women in the age group 15-49 years are anaemic.

- In 2016, 52.6% of Indian women were anaemic. But in 2020, 53% were found to be anaemic.
 - Over 17% of Indian children under 5 years of age are affected by wasting. This figure is much higher than the average for Asia (9%).
 - According to the report, India is '**off-course**' in meeting 7 of the 13 global nutrition targets.
 - These include sodium intake, raised blood pressure, obesity and diabetes (all both in men and women).
 - Some 6.2% of adult (aged 18 years and over) women and 3.5% of adult men are living with obesity in the country.
 - India is among 53 countries '**on course**' to meet the target for 'stunting', 'childhood overweight' and 'exclusive breast feeding'.
 - Over 34% of children under 5 years of age are still affected by stunting. This figure is higher than average for Asia (22%).
 - Some 58% of infants in the age group 0-5 months are exclusively breastfed in India.

Global Nutrition Targets

In 2012, the World Health Organisation identified six nutrition targets to be met by 2025.



Accidental Deaths and Suicides Report 2020

The National Crime Records Bureau (NCRB) has released the Accidental Deaths and Suicides report, 2020.

Accidental deaths

- Accidental deaths fell by 11% from 2019 to 2020 to 374,397, the lowest figure since 2009.
 - Road closures and restrictions on movements due to the lockdown likely had a significant impact on this trend since road accidents make up 40% of all accident deaths.

While road accidents and related deaths fell in the pandemic year, the number of deaths by suicides rose by 10% from 2019.

Suicidal Deaths

- The number of deaths by suicide per lakh population in 2020 stands at 11.3%, up from 10.4% in 2019 and the highest since 2010 (11.4%).
 - The ASDI report classifies suicides, among other categories, on the basis of profession.
 - The NCRB omitted a chapter on Central Armed Police Forces (CAPFs) in the 2020 edition of its report, without stating any reason.
 - **Daily wage workers** made up the largest proportion of people who died by suicide in the country in 2020 at 24.6%



- 2020 was a year marked by a sudden call for lockdown with 4 hours' notice, leading to distress to daily wage workers, a very large portion of whom are migrants, struggling to return home and then earn an income.
- **Other occupations** - After daily wage workers, the percentage share in total deaths by suicide by occupation, in decreasing order, went from
 1. Housewives (14.6%),
 2. Self-employed persons (11.3%),
 3. Professional/salaried persons (9.7%),
 4. Farmers/cultivators (7%) and
 5. Retired persons (1%).
- The 'other' category made up 13.4% of all suicides.
- **Students** - Suicidal deaths among students increased 21.20%, the highest year-on-year percentage increase of all the occupation categories.
- The share of students in total deaths by suicide in the country also increased from 7.4% last year to 8.2% in 2020. (Highest proportion of deaths by suicides among students ever.)
- **Self-employed** - Deaths by suicide in the ASDI category 'self-employed' increased by 7.67% from 2019 to 2020.
- **Agricultural labourers** - Number of agricultural labourers who died by suicide in 2020 was **18% higher** than in 2019.
- Most of these deaths were among those whose main source of income comes from labour activities in agriculture or horticulture.
- Also, landless agricultural labourers who didn't benefit from income support schemes (such as PM Kisan) may have faced higher levels of distress during the pandemic.
- However, among landowning farmers (farmers who cultivate their own land), with or without the help of other workers, the number of suicides dropped 3.7% during the pandemic year.
- The worst among States continues to be Maharashtra (4,006 suicides in the farm sector). MH saw a 15% increase in farm worker suicides.
- **Suicides by cause** - The ASDI report also lays out deaths by suicide by their cause.
 1. Deaths by suicide due to poverty increased by 69% from 2019 to 2020
 2. Deaths by suicide due to unemployment stood at 24%
 3. Deaths by suicide due to drug and alcohol addiction at 17%,
 4. Deaths by suicide due to illness at 16% and
 5. Deaths by suicide due to family problems at 14%

PRELIMS PRACTICE QUESTIONS

1) Which of the following is **not** a part of "Panchamrit", the five commitments announced by the Indian Prime Minister Narendra Modi at the COP26 global climate summit held in Glasgow?

- a. India will bring its non-fossil energy capacity to 500 GW by 2030
- b. India will bring its economy's carbon intensity down to 45 per cent by 2030
- c. India will reduce 1 billion tonnes of carbon emissions from the total projected emissions by 2030
- d. India will enhance its forest cover which will absorb 2.5 to 3 billion tonnes of carbon dioxide by 2030

2) With reference to Net Zero Emissions, consider the following statements:

1. It is a condition in which a country would bring down its emissions to zero, taking pre-industrial levels as base range.
2. India has recently pledged to achieve net zero carbon emissions by 2070.

Which of the statement(s) given above is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

3) Consider the following statements with respect to Climate Equity Monitor:

- 1. It is an online dashboard for assessing equity in climate action, inequalities in emissions, energy and resource consumption across the world.
- 2. It was conceptualized and developed by the Ministry of Environment, Forest & Climate Change.
- 3. It will compare the policies and actions of Annex-I and Non Annex-I Parties from the perspective of equity and Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC).

Which of the statement(s) given above is/are correct?

- a. 3 only
- b. 1 and 2 only
- c. 1 and 3 only
- d. 1, 2 and 3

4) Consider the following statements with respect to Sikhism:

- 1. The travels made by Guru Nanak are documented in texts called 'Janamsakhis'.
- 2. Guru Nanak visited hundreds of interfaith institutions by foot and it is called 'Udasis'.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

5) Consider the following statements with respect to Indian Dolphins:

- 1. Indus dolphins are the State aquatic animal of Himachal Pradesh.
- 2. Vikramshila Dolphin Sanctuary is in the state of Uttar Pradesh.
- 3. Gangetic dolphins are generally blind and catch their prey using ultrasonic sound.

Which of the above statement(s) is/are correct?

- a. 1 and 2 only
- b. 2 and 3 only
- c. 3 only
- d. 1 and 3 only

6) With respect to Global Methane Pledge, sometimes seen in the news recently, consider the following statements:

- 1. It aims to slash emissions of the potent greenhouse gas Methane 30% by 2030 from 2020 levels.
- 2. It is a joint effort led by the United States and European Union.
- 3. India, one of the world's five biggest emitters of methane, signed the pledge.

Which of the statement(s) given above is/are correct?

- a. 1 only
- b. 1 and 2 only



- c. 1, 2 and 3
- d. None of the above

7) Consider the following statements:

- 1. Methane is more short-lived in the atmosphere than Carbon dioxide.
- 2. Methane is 80 times more potent in warming the earth than Carbon dioxide.

Which of the statement(s) given above is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

8) In which of the following, Methane gas is generated?

- 1. Old Coal Mines
- 2. Oil and Gas Production
- 3. Cows' Digestive Systems
- 4. Agricultural & Landfill Sites

Select the correct answer using the codes given below:

- a. 1 and 2 only
- b. 2 and 4 only
- c. 1, 3 and 4 only
- d. 1, 2, 3 and 4

9) Consider the following statements with respect to Solar Flares

- 1. These are highly energetic phenomena that happen inside the sunspots which are regions that rise to the surface of the sun and appear like dark spots.
- 2. In a solar flare, the energy stored in the sun's magnetic structures is converted into light and heat energy.
- 3. They sometimes cause hot plasma to be ejected from the Sun, causing a solar storm called Coronal Mass Ejection (CME).

Which of the statement(s) given above is/are **not correct**?

- a. 3 only
- b. 2 only
- c. 2 and 3 only
- d. None of the above

10) Consider the following statements with respect to Battle of Bhima Koregaon

- 1. It was fought between the British East India Company and the Peshwa faction of the Maratha Confederacy in 1818.
- 2. The battle was a part of third Anglo Maratha war which resulted in the overthrow of the Peshwas.
- 3. In 1921, Dr B.R. Ambedkar visited the site.

Which of the statements given above are correct?

- a. 1 and 2 only
- b. 1 and 3 only

- c. 2 and 3 only
- d. 1, 2 and 3

11) Consider the following statements with respect to Mullaiperiyar Dam

- 1. The dam is located on the confluence of the Mullayar and Periyar River in Kerala's Idukki district.
- 2. It is a gravity dam built using lime-surkhi (burnt brick powder) mortar.
- 3. Although the dam is located in Kerala, it is operated by Tamil Nadu.

Which of the statements given above are correct?

- a. 1 and 2 only
- b. 1 and 3 only
- c. 2 and 3 only
- d. 1, 2 and 3

12) Velakali is a traditional martial dance form performed in which of the following states?

- a. Tamil Nadu
- b. Kerala
- c. Karnataka
- d. Andhra Pradesh

13) Which of the following may be the consequence(s) of Coronal Mass Ejections (CME)?

- 1. Failure of power grids
- 2. Affects Oil pipelines and deep-sea cables
- 3. Affects electronics within satellites and astronauts
- 4. Cause spectacular aurorae in the high-latitude and polar countries

Select the correct answer using the codes given below:

- a. 1 and 3 only
- b. 1, 3 and 4 only
- c. 1, 2 and 3 only
- d. 1, 2, 3 and 4

14) Consider the following statements regarding Unlawful Activities Prevention Act (UAPA):

- 1. Under the act a person can only be detained and cannot be given capital punishment.
- 2. UAPA is effective only in the Indian boundary and only Indian Citizens can be charged under the act.

Which of the above statement is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

15) With respect to Coal, arrange the following statements based on the sequence of formation of coal:

- 1. Plant material accumulates under water and partial decomposition occurs.
- 2. Vertical pressure is applied on the accumulating sediments and lignite is formed.

3. All traces of plants disappear and soft coal is formed.
4. High temperature and short flames results in the formation of hard coal.

Choose the correct sequence.

- a. 1-2-3-4
- b. 1-3-2-4
- c. 2-3-1-4
- d. 2-1-3-4

16) With respect to mass extinction of earth, consider the following statements:

1. Ordovician-Silurian is the most recent extinction earth has faced.
2. Cretaceous-Paleogene is the first mass extinction that occurred on earth.
3. Permian-Triassic affected the inspect species the most.

Choose the correct answer.

- a. 1 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 3 only

17) With respect to Financial Inclusion Index in India, consider the following statements:

1. Financial Inclusion Index is released by the Reserve bank of India bi-annually.
2. The Index has been constructed without any base year.
3. It aims to capture the extent of financial inclusion across the country.

Which of the above statement(s) is **incorrect**?

- a. 1 only
- b. 2 only
- c. 1 and 2 only
- d. 2 and 3 only

18) Identify the fields used in choosing the UNESCO Creative Cities Network (UCCN):

1. Crafts and Folk Arts
2. Gastronomy
3. Film
4. Design
5. Literature and Music

Select the correct answer using the codes given below:

- a. 1, 2, 3 and 5 only
- b. 3, 4 and 5 only
- c. 1, 2, 3, 4 and 5
- d. 2, 4 and 5 only

19) Which of the following is/are Pelagic species?

1. Olive Ridley



2. Pond slider
3. Diamond back Terrapin
4. Herrings

Choose the correct option.

- a. 2 only
- b. 3 only
- c. 2 and 4 only
- d. 1 and 4 only

20) Arrange the following states with respect to having highest forest cover as a percentage of total geographical area:

1. Arunachal Pradesh
2. Mizoram
3. Meghalaya
4. Manipur
5. Nagaland

Identify the correct options.

- a. 1, 2, 3, 4 and 5
- b. 2, 1, 3, 4 and 5
- c. 3, 2, 1, 5 and 4
- d. 4, 1, 3, 5 and 2

21) Consider the following statements:

1. Great Rift Valley runs from northern Syria to central Mozambique in East Africa.
2. The valley is the home of the Jordan River which continues south through the Jordan Valley into the Dead Sea.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

22) With respect to NASA's Double Asteroid Redirection Test (DART) mission, consider the following statements:

1. The target of the spacecraft is a small moonlet called Didymos and it orbits around an asteroid named Dimorphos.
2. DART will carry a small satellite to capture the images of the impact and the impact crater formed as a result of the collision.

Which of the above statement(s) is/are **incorrect**?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2



23) Consider the following statements with respect to Diamond-Water Paradox:

1. It refers to the price difference between a non-essential item that is priced high and an essential item that is priced low.
2. It refers to the personal savings that can be detrimental to overall economic growth.

Identify the correct statement.

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

24) Consider the following with respect to Sedimentary Rocks:

1. Sedimentary rocks are formed out of existing rocks undergoing recrystallization.
2. Argillaceous rocks have more sand and bigger sized particles and are hard and porous.
3. Arenaceous rocks have more clay and are fine-grained, softer, mostly impermeable.

Which of the above statement(s) is/are **incorrect**?

- a. 1 and 2 only
- b. 1 and 3 only
- c. 2 and 3 only
- d. 1, 2 and 3

25) Identify the taxes levied and collected by the Union but assigned to States:

1. Duties in respect of succession to property other than agricultural land.
2. Stamp duties on bills of exchange, cheques, promissory notes, bills of landing, etc.
3. Excise duties on medicinal toilet preparation containing alcohol or opium.
4. Taxes on the sale or purchase of newspapers and advertisements published therein.

Choose the correct options.

- a. 1 and 4 only
- b. 2 and 3 only
- c. 2 and 4 only
- d. 1 and 3 only

26) Consider the following statements:

1. Onake Obavva fought the forces of Tipu Sultan in the 18th century.
2. She died protecting the Chitradurga fort, ruled by Madakari Nayaka.
3. Obavva Pade, is a squad of women police constables to protect and educate women.

Choose the correct statement(s).

- a. 1 only
- b. 3 only
- c. 1 and 3 only
- d. 1, 2 and 3

27) Identify the indigenous/native crops of India:

1. Red Okra



2. Red Corn
3. Black Rice
4. Barley
5. Sorghum
6. Millet

Choose the correct option.

- a. 1, 3, 4, 5 and 6 only
- b. 2, 4, 5 and 6 only
- c. 1, 2, 4, 5 and 6 only
- d. 1, 2, 3, 4, 5 and 6

28) Consider the following statements with respect to Norovirus

1. It causes gastrointestinal illness including inflammation of the lining of the stomach and intestines.
2. The virus is sexually transmitted from one person to another.
3. Symptoms include diarrhea, abdominal pain, vomiting, nausea, head ache, body ache and high temperature.

Which of the above statement(s) is/are correct?

- a. 2 and 3 only
- b. 1 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3

29) With respect to One Sun, One World, One Grid (OSOWOG), consider the following statements:

1. This initiative is an alternative to the International Solar Alliance at the global level.
2. It is the brain child of France and United Kingdom.
3. The vision behind OSOWOG is 'The Sun Never Sets' and is a constant at some geographical location at any given point of time.
4. A ministerial Steering Group which includes France, United Kingdom and United States is responsible for its implementation.

Which of the above statement(s) is **incorrect**?

- a. 1, 2 and 3 only
- b. 2 and 3 only
- c. 3 and 4 only
- d. 1, 2 and 4 only

30) Identify the animals which use echolocation to navigate:

1. Bats
2. Seals
3. Sea turtles
4. Shrews

Choose the correct option.

- a. 1, 2 and 3 only
- b. 1, 2 and 4 only
- c. 1 and 4 only
- d. 1, 2, 3 and 4

31) With respect to Birsa Munda and Munda rebellion, consider the following statements:

1. He started the 'Birsait' faith which was joined by the Munda and Oraon communities.
2. The 'Ulgulan' movement aimed at establishing Munda Raj.
3. The State of Jharkhand was carved out of Bihar to commemorate the birth anniversary of Birsa Munda.

Which of the above statement(s) is/are correct?

- a. 1 and 3 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3

32) Consider the following statements with regards to Government Security (G-Sec):

1. A G-Sec is a tradable instrument issued by the Central Government only.
2. Short term securities are called Government bonds or dated securities while long term securities are called treasury bills.
3. The Central Government issues both bonds or dated securities and bills while the State Government issues only bonds.
4. The bond issued by the State Government is called the State Development Loans (SDLs).

Which of the above statement(s) is/are correct?

- a. 3 and 4 only
- b. 1, 2 and 3 only
- c. 2 and 4 only
- d. 2, 3 and 4 only

33) Consider the following statements with respect to NASA's Moon Missions:

1. Artemis program of NASA aims to land the first woman and a person of colour on the moon.
2. The Lunar Crater Observation and Sensing Satellite (LCROSS) is designed to search for water and ice on the moon's surface.
3. Chang'e 5 mission aims to collect lunar samples and bring it back to earth.

Which of the above statements are correct?

- a. 2 and 3 only
- b. 1 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3

34) Consider the following statements about Pallava Dynasty:

1. Mandalam was the biggest unit of the Pallava Kingdom and the King himself is the head of it.
2. Sabhas were responsible for maintaining the record of village lands and local affairs.
3. Devdhana was the granting of lands to Brahmins and Brahmadeya was the land grants given to temples.

Which of the above statement(s) is/are correct?

- a. 2 only
- b. 1 and 2 only
- c. 1 and 3 only
- d. 2 and 3 only

35) Consider the following statements:

1. India is the third largest producer of Bamboo after China and Sri Lanka.
2. In India, the Barak Valley region is best suited for bamboo cultivation due to best soil and perfect climate conditions.
3. The bamboo plantation grows well in hot to warm temperate climatic conditions.

Which of the above statement(s) is/are correct?

- a. 1, 2 and 3
- b. 1 and 3 only
- c. 1 and 2 only
- d. 2 and 3 only

36) Identify the conditions favorable for the formation of a cyclone:

1. The temperature of the surface layer of ocean water must be 26.5 degree Celsius or warmer and must be at least 50 meters deep.
2. A preexisting atmospheric circulation must be located near the surface warm layer.
3. The wind speed must change slowly with the height through the troposphere.
4. The developing system must be closer to the equator.

Which of the above statement(s) is/are correct?

- a. 1, 2 and 3 only
- b. 2, 3 and 4 only
- c. 1, 3 and 4 only
- d. 1, 2 and 4 only

37) Consider the following statements regarding 'Matosinhos Manifesto':

1. The scheme is the brainchild of the National Aeronautics and Space Administration (NASA).
2. The manifesto aims to accelerate the use of space in the United States in order to tackle the urgent and unprecedented challenges faced by its citizens.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 only
- c. Neither 1 nor 2
- d. Both 1 and 2

38) Consider the following statements regarding The Personal Data Protection Bill:

1. The bill seeks to provide for protection of personal data of individuals and establishes a Data Protection Authority for the same.
2. The Bill governs the processing of personal data by the government only.
3. Under the bill, the fiduciaries can process the bill without the consent of the individual.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3



39) Identify the areas where direct FDI is prohibited in India:

1. Lotteries
2. Agricultural or Plantation Activities
3. Insurance Sector
4. Banking Public Sector

Choose the correct option.

- a. 1 and 2 only
- b. 2 and 4 only
- c. 1 and 3 only
- d. 3 and 4 only

40) Which of the following organizations/institutions release the Global State of Democracy Report?

- a. Institute of Economics and Peace (IEP)
- b. International Institute for Democracy and Electoral Assistance
- c. International Monetary Fund
- d. World Bank

41) Consider the following statements regarding Cross Border Insolvency Framework:

1. It is based on the United Nations Commission on International Trade Laws (UNCITRAL) on cross-border insolvency.
2. Cross-border insolvency provisions will apply to both corporate debtors and individuals.
3. It enables Indian firms to claim their dues from foreign companies while allowing foreign creditors to recover loans from Indian companies.

Which of the above statement(s) is/are correct?

- a. 1 and 3 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3

42) With respect to Flash Droughts, consider the following statements:

1. It is characterized by lack of rainfall coupled with increased evapotranspiration.
2. It occurs when low precipitation is accompanied by abnormally high temperatures.
3. The highest frequency of flash drought occurrence is primarily found in the tropics and subtropics region.
4. Majority of the flash drought events in India occurred during the monsoon season in central, northwest and northeast regions.

Which of the above statement(s) is/are correct?

- a. 1, 2 and 3 only
- b. 2, 3 and 4 only
- c. 1, 2, 3 and 4
- d. 1, 3 and 4 only

43) Consider the following statements with respect to Main-sequence Radio Pulses (MRPs)

1. These are stars hotter than the Sun with unusually weak magnetic fields.

2. These are much stronger than stellar wind, a continuous flow of gas from a star's upper atmosphere.

Which of the above statement(s) is/are **incorrect**?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

44) Consider the following statements regarding Virus:

- 1. The genomes of organisms are all composed of DNA, whereas viral genomes can be of DNA or RNA.
- 2. RNA viruses mutate faster than DNA viruses, and single-stranded viruses mutate faster than double-strand virus.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

45) Identify the dimensions used in measuring the Global Multidimensional Poverty Index (MPI):

- 1. Education
- 2. Standard of Living
- 3. Health
- 4. Purchasing Power Parity (PPP)

Choose the correct answer.

- a. 1 and 2 only
- b. 2 and 4 only
- c. 2 and 3 only
- d. 1, 2 and 3 only

46) Consider the following statements about Earthquake:

- 1. Primary or Longitudinal waves are analogous to the light waves.
- 2. Secondary or Transverse waves are analogous to the sound waves.
- 3. Surface or Long-period waves originate when secondary waves hits the surface.

Which of the above statement(s) is/are **incorrect**?

- a. 1 only
- b. 1 and 2 only
- c. 3 only
- d. 1, 2 and 3

47) Consider the following statements regarding River Cities Alliance (RCA):

- 1. It is a dedicated platform for river cities in India for sustainable management of urban rivers.
- 2. Ministry of Earth Sciences and Ministry of Jal Shakti is the nodal agency for implementing the programme.

Which of the above statement(s) is/are correct?

- a. 1 only



- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

48) Consider the following statements:

- 1. Only the speaker of Lok Sabha can direct an MP to withdraw from the legislative chamber for grossly disorderly conduct.
- 2. The motion moved by the parliamentary affairs minister for suspending a MP will last until the end of the session.

Which of the above statement(s) is/are correct?

- a. 1 only
- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

49) Consider the following statements regarding Digital Service Tax (DST):

- 1. These are taxes charged on the revenues that companies generate from providing certain digital services.
- 2. India, Italy and Turkey are the only nations to charge digital services taxes.
- 3. Indian companies are exempted from digital service taxes.

Which of the above statement(s) is/are correct?

- a. 1 and 2 only
- b. 2 and 3 only
- c. 1 and 3 only
- d. 1, 2 and 3

50) Identify the committee(s) associated with Crypto/Virtual Currency in India:

- 1. Subash Chandra Garg Committee
- 2. Dinesh Sharma Committee
- 3. Rangarajan Committee
- 4. Rajiv Mehrishi Committee

Choose the correct option.

- a. 2 and 3 only
- b. 1, 3 and 4 only
- c. 4 only
- d. 1 and 2 only

Answers

1. d

- Mr Modi made the pledge as one of five commitments from his country.
- Indian PM Narendra Modi announced the five major commitments on behalf of India, to mitigate climate change.
- Terming the commitments as "**Panchamrit**", India's gift to the world, the PM reiterated that India is working very hard on tackling climate change-related issues.



Panchamrit (5 commitments)

1. India will achieve net-zero emissions by 2070
2. India will bring its non-fossil energy capacity to 500 GW by 2030
3. India will bring its economy's carbon intensity down to 45 per cent by 2030
4. India will fulfill 50 per cent of its energy requirement through renewable energy by 2030
5. India will reduce 1 billion tonnes of carbon emissions from the total projected emissions by 2030

Background

- India is the world's fourth biggest emitter of carbon dioxide after China, the US and the EU.
- But its huge population means its emissions per capita are much lower than other major world economies.
- India emitted 1.9 tonnes of CO₂ per head of population in 2019, compared with 15.5 tonnes for the US and 12.5 tonnes for Russia that year.

2. b

India's Net Zero Emissions

- India will achieve Net Zero Emissions latest by 2070, Prime Minister Narendra Modi said at the COP26 summit in Glasgow.
- Until the recent commitment made, India was the only major emitter that hadn't committed to a timeline to achieve net zero.

Net Zero Emissions

- Net Zero is a commitment which sets a year by which it would ensure its net carbon dioxide emissions would be zero.
- It is also referred to as carbon-neutrality.
- It does not mean that a country would bring down its emissions to zero.
- Rather, net-zero is a state in which a country's emissions are compensated by absorption and removal of greenhouse gases from the atmosphere.
- Absorption of the emissions can be increased by creating more carbon sinks such as forests, while removal of gases from the atmosphere requires futuristic technologies such as carbon capture and storage.
- This way, it is even possible for a country to have negative emissions, if the absorption and removal exceed the actual emissions.
- A good example is Bhutan which is often described as carbon-negative because it absorbs more than it emits.
- Several other countries, including the UK and France, have already enacted laws promising to achieve a net-zero emission scenario by the middle of the century.
- The European Union is working a similar Europe-wide law, while many other countries including Canada, South Korea, Japan and Germany have expressed their intention to commit themselves to a net-zero future.
- China has promised to go net-zero by 2060.

3. c

- India has officially endorsed a website, made by the Indian climate experts, that lists the historical carbon dioxide emissions of developed countries.
- The website is intended to debunk the narrative provided by many developed countries, and global non-government organisations that focus attention continually on what developing countries must do, constantly demanding greater commitment and action from them.

Climate Equity Monitor (CEM)

- It is an online dashboard for assessing equity in climate action in relation to climate mitigation, energy and resource consumption, and climate policy across the entire world.
- CEM is believed to be the first such initiative from the global South that will compare the policies and actions of Annex-I and Non Annex-I Parties from the perspective of equity and CBDR-RC.



- The database aims to highlight the disparity between the emissions of developed and developing countries with countries including
- the United States, Canada, Australia and in Western Europe shown as having a net carbon debt while developing countries, including India and China, having net credit.
- The key fact that the database highlights is that it is only fair that developed countries must commit to steeper targets towards curbing emissions than developing countries.
- The website and data tracker is an effort undertaken by the Climate Change Group at the M.S. Swaminathan Research Foundation (MSSRF), Chennai.
- The analysis and assessment for the website has been carried out by the Climate Change Group at the MSSRF, some members of the Energy, Environment & Climate Change Programme at the National Institute for Advanced Studies (NIAS) Bengaluru, and other independent researchers.

4. c

Guru Nanak Dev

- He is a philosopher, poet, traveler, political rebel, social leveler, mass communicator and a spiritual master-on whose teachings the religion of Sikhism is founded.
- Guru Nanak Dev (1469-1539) was born in a village, Talwandi Rai Bhoe, near Lahore.
- Guru Nanak Dev initiated inter-faith dialogue way back in the 16th century and had conversations with most of the religious denominations of his times.
- Guru Nanak Dev travelled far and wide during the 15th and 16th centuries.
- From Mecca to Haridwar, from Sylhet to Mount Kailash, Guru Nanak visited hundreds of interfaith sites related to Hinduism, Islam, Buddhism, and Jainism throughout his journeys (also called udaasis).
- His travels were documented in texts called 'Janamsakhis'.
- These sites are now spread across nine nations as per current geographical divisions — India, Pakistan, Iran, Iraq, China (Tibet), Bangladesh, Saudi Arabia, Sri Lanka, and Afghanistan — and some are even inaccessible due to travel restrictions or being located in conflict zones.
- Guru Nanak Dev, along with his companion Bhai Mardana, undertook most part of his journeys on foot.
- The founder of Sikhism, made walking an integral part of the "Sikh culture".
- Each gurdwara now has "parikrama".

5. c

Indian Dolphins

Gangetic Dolphins

- Gangetic dolphins in general are blind and catch their prey using ultrasonic sound waves.
- Killing the Gangetic River Dolphin is a punishable offence under the Wildlife Protection Act, 1972.
- Ganges river dolphins live in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh.
- The Ganges river dolphin can only live in freshwater and is essentially blind.
- It has been declared endangered under the International Union for the Conservation of Nature (IUCN).
- Vikramshila Gangetic Dolphin Sanctuary is in the state of Bihar.

Indus Dolphins

- Indus river dolphins are one of only four river dolphin species and subspecies in the world that spend all of their lives in freshwater.
- The Indus river dolphin is the second most endangered freshwater river dolphin.
- At present, there are only around 1,800 of these in the Indus in Pakistan. Their population in the Beas River is between 8 to 10.
- IUCN status: Endangered.
- Punjab Government has declared the Indus river dolphin as Punjab's state aquatic animal in 2019.

6. b

- Leaders at the CoP-26 global climate conference in Glasgow have pledged to stop deforestation by the end of the decade and slash emissions of the potent greenhouse gas methane to help slow climate change.

Global Methane Pledge

- It is a joint effort led by the United States and European Union.
- It aims to slash emissions of the potent greenhouse gas methane 30% by 2030 from 2020 levels.
- The Global Methane Pledge, first announced in September, 2021 now covers emissions from two-thirds of the global economy.
- Nearly 90 countries have joined effort to slash emissions of methane.
- Among the new signatories was Brazil - one of the world's biggest emitters of methane.
- The pledge now includes six of the world's 10 biggest methane emitters: the United States, Brazil, Indonesia, Nigeria, Pakistan and Mexico.
- China, Russia, India and Iran, also top-10 methane emitters, have not signed up.
- Australia has said it will not back the pledge.
- Those countries were all included on a list identified as targets to join the pledge.
- The 30% methane cut, which is not legally binding, would be jointly achieved by the signatories, and cover all sectors. Key sources of methane emissions include leaky oil and gas infrastructure, old coal mines, agriculture and landfill sites.

7. c

Methane & Carbon dioxide

- Methane is more short-lived in the atmosphere than carbon dioxide but 80 times more potent in warming the earth.
- Cutting emissions of the gas, which is estimated to have accounted for 30% of global warming since pre-industrial times, is one of the most effective ways of slowing climate change.

8. d

Key sources of methane emissions include

1. Old coal mines
2. Cows' Digestive Systems
3. Agriculture and landfill Sites
4. Leaky oil and gas infrastructure

9. d

Solar Flares

- The solar magnetic cycle that works in the deep interior of the Sun creates regions that rise to the surface and appear like dark spots and are often called as Sunspots.
- Solar flares are highly energetic phenomena that happen inside the sunspots.
- In a solar flare, the energy stored in the sun's magnetic structures is converted into light and heat energy.
- This causes the emission of high energy x-ray radiation and highly accelerated charged particles to leave the sun's surface.
- Sometimes solar flares also cause hot plasma to be ejected from the Sun, causing a solar storm, and this is called Coronal Mass Ejection (CME).
- Coronal Mass Ejections can harbour energies exceeding that of a billion atomic bombs.

10. d

Battle of Bhima Koregaon

- It was a part of third Anglo-Maratha battle that took place on 1 January 1818 in Bhima, Koregaon.



- It was fought between the troops of Maratha Ruler Baji Rao Peshwa II and the British East India Company (EIC).
- The Mahars, though untouchables, had been valued for their military skills for centuries and formed a significant portion of Shivaji's army.
- However under the Peshwas they were ill-treated and lost their military glory.
- In the battle, the EIC represented by majority of Mahar soldiers successfully resisted Peshwa troops in which Peshwa lost 600 of his soldiers after which he withdrew and gave up plans to attack Pune.
- British constructed a tower to commemorate this victory.
- In 1921, on January 1, Dr B.R. Ambedkar visited the site which resulted in the initiation of an annual tradition to commemorate the occasion.

11. d

Mullaperiyar dam

- The 130-year old Mullaperiyar dam is located on the confluence of the Mullayar and Periyar River in Kerala's Idukki district.
- The Maharaja of Travancore signed a 999-year Periyar Lake lease agreement with the British government on October 29, 1886, for the construction of the Mullaperiyar dam across the Periyar in the present Idukki district.
- It was built by Pennycuick to create a harmonious atmosphere in the east coast by taking the water there and have people cultivate crops.
- It is a gravity dam built using lime-surkhi (burnt brick powder) mortar.
- Although the dam is located in Kerala, it is operated by Tamil Nadu following an 1886 lease indenture for 999 years that was signed between the Maharaja of Travancore and the Secretary of State for India.
- The water supplied from it through a tunnel to the water-scarce southern region of Tamil Nadu, especially the Vaigai basin, would be the lifeline for farmers of Theni, Dindigul, Madurai, Sivaganga and Ramanathapuram districts.

12. b

- Velakali a stylised, martial dance of Kerala blends movements and postures of Kathakali and Kalaripayattu was originated in Ambalappuzha.

13. d

Effects of Solar Storm

- The energy and radiation and high energy particles emitted by flares can affect Earth bound objects and life on Earth – it can affect the electronics within satellites and affect astronauts.
- Very powerful Earth-directed coronal mass ejections can cause failure of power grids and affect oil pipelines and deep-sea cables.
- They can also cause spectacular aurorae in the high-latitude and polar countries.
- The last time a major blackout due to a coronal mass ejection was recorded was in 1989 – a powerful geomagnetic storm that took down the North American power grid, plunging large parts of Canada into darkness and triggering spectacular aurorae beyond the polar regions.

14. d

Unlawful Activities Prevention Act (UAPA)

- The Act gives special procedures to handle terrorist activities, among other things.
- It aims at the effective prevention of unlawful activities associations in India.
- Unlawful activity refers to any action taken by an individual or association intended to disrupt the territorial integrity and sovereignty of India.
- According to the Act, the union government may proclaim or designate an organization as a terrorist organization if it: (i) commits or participates in acts of terrorism, (ii) prepares for terrorism, (iii) promotes terrorism, or (iv) is otherwise involved in terrorism.
- The Bill also empowers the government to designate individuals as terrorists on the same grounds.



- UAPA has the death penalty and life imprisonment as the highest punishments.
- The Act assigns absolute power to the central government, by way of which if the Centre deems an activity as unlawful then it may, by way of an Official Gazette, declare it so.
- Under UAPA, both Indian and foreign nationals can be charged.
- The offenders will be charged in the same manner whether the act is performed in a foreign land, outside India.

15. a

Coal

- Coal is a sedimentary, organic rock which is flammable.
- Coal is composed primarily of carbon along with other elements such as hydrogen, Sulphur, oxygen, and nitrogen.
- Coal is mostly used for power generation and metallurgy.
- Peat – Stage One: vegetable matter is oxidized to water and carbon dioxide.
- plant material accumulates underwater, oxygen is not present and so only partial decomposition occurs.
- Lignite – Stage Two: the second stage, is formed when peat is subjected to increased vertical pressure from accumulating sediments.
- Lignite is dark brown in colour and like peat, contains traces of plants.
- Bituminous Coal – Stage Three: Bituminous Coal is the third stage. Added pressure has made it compact and virtually all traces of plant life have disappeared.
- Also known as “soft coal”.
- Anthracite – Stage Four: Anthracite, the fourth stage in coal formation, is also known as “hard coal” because it is hard and has a high luster.
- It appears to have been formed as a result of combined pressure and high temperature.

16. d

Mass Extinction of Earth

Ordovician-Silurian extinction 485 to 444 million years ago

- This may have been triggered by the rise of North America's Appalachian Mountains.
- The large-scale weathering of these freshly uplifted rocks sucked carbon dioxide out of the atmosphere and drastically cooled the planet.
- As a result, sea levels plummeted by hundreds of feet. Creatures living in shallow waters would have seen their habitats cool and shrink dramatically, dealing a major blow.

Late Devonian extinction - 383-359 million years ago

- This extinction event eliminated about 75 percent of all species on Earth over a span of roughly 20 million years.
- Volcanism could be a possible trigger for this extinction. Asteroids may also have contributed.
- During the Devonian, plants hit on several winning adaptations, including the stem-strengthening compound lignin and a full-fledged vascular structure.

Permian-Triassic extinction - 252 million years ago

- Of the five mass extinctions, the Permian-Triassic is the only one that wiped out large numbers of insect species.
- Marine ecosystems took four to eight million years to recover.

Triassic-Jurassic extinction - 201 million years ago

- This mass extinction caused the extinction of 80 percent of all land and marine species.
- At the end of the Triassic, Earth warmed an average of between 5 and 11 degrees Fahrenheit, driven by a quadrupling of atmospheric CO₂ levels.



- This was probably triggered by huge amounts of greenhouse gases from the Central Atlantic Magmatic Province, a large igneous province in central Pangaea.

Cretaceous-Paleogene extinction - 66 million years ago

- The Cretaceous-Paleogene extinction event is the most recent mass extinction and the only one definitively connected to a major asteroid impact.
- Global warming fueled by volcanic eruptions at the Deccan Flats in India may have aggravated the event.

17. a

Financial Inclusion Index

- Released by Reserve Bank of India.
- The index has been conceptualized as a comprehensive index incorporating details of banking, investments, insurance, postal as well as the pension sector in consultation with the government and respective sectoral regulators.
- It will be published annually in July every year.
- It has been constructed without any 'base year' and as such it reflects cumulative efforts of all stakeholders over the years towards financial inclusion.
- It aims to capture the extent of financial inclusion across the country.
- It captures information on various aspects of financial inclusion in a single value ranging between 0 and 100, where 0 represents complete financial exclusion and 100 indicates full financial inclusion.
- It comprises three broad parameters (weights indicated in brackets) viz., Access (35%), Usage (45%), and Quality (20%) with each of these consisting of various dimensions, which are computed based on a number of indicators.
- The index is responsive to ease of access, availability and usage of services, and quality of services for all 97 indicators.

18. c

UNESCO Creative Cities Network (UCCN)

- The UNESCO Creative Cities Network (UCCN) was created in 2004 to promote cooperation with and among cities that have identified creativity as a strategic factor for sustainable urban development.
- Objective: placing creativity and cultural industries at the heart of their development plans at the local level and cooperating actively at the international level.
- Recently Srinagar was added to the list.
- UCCN sites in India:
 - Jaipur – Crafts and Folk Arts (2015)
 - Varanasi – Creative city of Music (2015)
 - Chennai – Creative city of Music (2017)
 - Mumbai – Film (2019)
 - Hyderabad – Gastronomy (2019)
 - Srinagar – Craft and Folk Arts (2021)
- To date, the UCCN has granted membership to 246 cities around the world.

19. d

Olive Ridley

- Olive Ridley look very similar to Kemp's Ridley sea turtles. The two species are the smallest of all sea turtles.
- Olive ridley turtles are an olive/grayish-green with a heart-shaped carapace (top shell) having 5 to 9 pairs scutes.
- Each of the four flippers of an olive ridley has one or two claws.

- The size and form of the olive ridley varies from region to region, with the largest animals observed in West Africa.
- Solitary nesting occurs extensively throughout this species' range, and nesting has been documented in approximately 40 countries worldwide.
- The olive ridley is mainly a pelagic (open ocean) sea turtle, observed by trans-Pacific ships over 2,400 miles from shore, but they are also known to inhabit coastal areas.
 - Pelagic: being neither close to the bottom nor near the shore.
- Olive ridleys are globally distributed in the tropical regions of the Atlantic, Pacific, and Indian oceans. In the Atlantic Ocean, they are found along the coasts of West Africa and South America. In the Eastern Pacific, they occur from Southern California to Northern Chile.
- Herring is a type of fish also found in the Pelagic zone.

20. b

Top 5 states having highest forest cover as a percentage of total geographical area

- Mizoram (85.41%)
- Arunachal Pradesh (79.63%)
- Meghalaya (76.33%)
- Manipur (75.46%)
- Nagaland (75.31%)

Top 5 states having highest forest cover area-wise

- Madhya Pradesh
- Arunachal Pradesh
- Chhattisgarh
- Odisha
- Maharashtra

The top five States (UT) in terms of increase in forest cover

- Karnataka
- Andhra Pradesh
- Kerala
- Jammu & Kashmir
- Himachal Pradesh

21. c

Great Rift Valley

- The Great Rift Valley is a geographical feature running north to south for around 6,400 kilometers from northern Syria to central Mozambique in East Africa.
- The northernmost part of the Rift forms the Beqaa Valley in Lebanon.
- Farther south, the valley is the home of the Jordan River which continues south through the Jordan Valley into the Dead Sea on the Israeli-Jordanian border.
- From the Dead Sea southward, the Rift is occupied by the Gulf of Aqaba and the Red Sea.
- The Afar Triangle of Ethiopia and Eritrea is the location of a triple junction.
- The Gulf of Aden is an eastward continuation of the rift, and from this point, the rift extends south-eastward as part of the mid-oceanic ridge of the Indian Ocean.
- In a southwest direction, the fault continues as the Great Rift Valley, which split the older Ethiopian highlands into two halves.



- In eastern Africa, the valley divides into the Eastern Rift and the Western Rift. The Western Rift, also called the Albertine Rift contains some of the deepest lakes in the world.

East African Rift Valley

- The Eastern Rift Valley (also known as Gregory Rift) includes the main Ethiopian Rift, running eastward from the Afar Triple Junction, which continues south as the Kenyan Rift Valley.
- The Western Rift Valley includes the Albertine Rift, and farther south, the valley of Lake Malawi.
- To the north of the Afar Triple Junction, the rift follows one of two paths: west to the Red Sea Rift or east to the Aden Ridge in the Gulf of Aden.
- The EAR transects through Ethiopia, Kenya, Uganda, Rwanda, Burundi, Zambia, Tanzania, Malawi and Mozambique.
- Before rifting, enormous continental flood basalts erupted on the surface and uplift of the Ethiopian, Somalian, and East African plateaus occurred.

22. a

Double Asteroid Redirection Test (DART) Mission

- The main aim of the Double Asteroid Redirection Test (DART) mission is to test the newly developed technology that would allow a spacecraft to crash into an asteroid and change its course.
- The target of the spacecraft is a small moonlet called Dimorphos (Greek for “two forms”).
- It is about 160-metre in diameter and the spacecraft is expected to collide when it is 11 million kilometers away from Earth.
- Dimorphos orbits a larger asteroid named Didymos (Greek for “twin”) which has a diameter of 780 metres.
- The asteroid and the moonlet do not pose any threat to Earth and the mission is to test the new technology to be prepared in case an asteroid head towards Earth in the future.
- It is a suicide mission and the spacecraft will be completely destroyed.
- Across the globe, various telescopes will work together and observe the event and study the impact of DART – changes in the moonlet’s orbit.
- DART will also carry a small satellite or CubeSat named LICIACube (Light Italian CubeSat for Imaging of Asteroids).
- It will be deployed ten days before the impact on Dimorphos.
- LICIACube is expected to capture images of the impact and the impact crater formed as a result of the collision. It can also capture images of any dust cloud formed during the impact.

23. a

Diamond-Water Paradox Theory

- Subjective value can show diamonds are more expensive than water because people subjectively value them more highly.
- However, it still cannot explain why diamonds should be valued more highly than an essential good such as water.
- The universal availability of water at little or no marginal cost (although many would argue that this is changing) relative to demand means that the equilibrium price will be low or negligible for water.
- Diamonds, on the other hand, are high in demand and are expensive to produce (and current producers have cartelized the industry) so that the supply is limited and the intersection of the supply and demand curves occurs at a high price.
- Hence water is “cheap” and diamonds are “dear.”
- A modern example of this dilemma is the pay gap between professional athletes and teachers.

Paradox of Thrift

- The paradox of thrift, or paradox of savings, is an economic theory that posits that personal savings are a net drag on the economy during a recession.



- This theory relies on the assumption that prices do not clear or that producers fail to adjust to changing conditions, contrary to the expectations of classical microeconomics.
- The paradox of thrift was popularized by British economist John Maynard Keynes.

24. d

Sedimentary Rocks

- The result of deposition of fragments of rocks.
- Sedimentary rocks are formed by lithification - consolidation and compaction of sediments.
- Hence, they are layered or stratified of varying thickness.
- Example: sandstone, shale etc.
- Sediments are a result of denudation (weathering and erosion) of all types of rocks.
- These types of rocks cover 75 per cent of the earth's crust but volumetrically occupy only 5 per cent (because they are available only in the upper part of the crust).
- Ice deposited sedimentary rocks are called till or tillite.
- Wind-deposited sediments are called loess.
- Depending upon the mode of formation, sedimentary rocks are classified into:
 - mechanically formed — sandstone, conglomerate, limestone, shale.
 - organically formed — geyserite, chalk, limestone, coal.
 - chemically formed — limestone, halite, potash.

25. a

Taxes Levied and Collected by the Union but assigned to States

- The taxes in this category are levied and collected by the Union Government although they are subsequently handed over to the states wherefrom they have been collected.
- Such taxes included duties in respect of succession to property other than agricultural land.
- State duty in respect of property other than agricultural land terminal taxes on goods or passengers carried by railways, sea or air, taxes on railway freights and fares; taxes other than stamp duties on transactions in stock exchanges and futures markets.
- Taxes on the sale or purchase of newspapers and advertisements published therein.
- Taxes on purchase or sale of goods other than newspapers where such sale or purchases take place in the course of interstate trade or commerce.

Taxes Levied by Union but collected and Appropriated by the State

- The taxes on the following items are levied by the Union Government but the actual revenue from them is collected and appropriated by the States.
- Stamp duties on bills of exchange, cheques, promissory notes, bills of landing, letters of credit, policies of insurance, transfer of shares, etc.
- Excise duties on medicinal toilet preparation containing alcohol or opium or Indian hemp or other narcotic drugs.

26. d

Onake Obavva

- From this year, the Karnataka government has decided to celebrate 'Onake Obavva Jayanti' on November 11 throughout the state.
- Onake Obavva is a woman warrior who fought the forces of Hyder Ali single-handedly with a pestle ('onake' in Kannada) in Chitradurga in the 18th century.
- She died protecting the Chitradurga Fort, which was ruled by Madakari Nayaka in the 18th century.
- Obavva is considered to be the epitome of Kannada pride and celebrated along with other women warriors of Karnataka state.

- Onake Obavva's courage and quick thinking have been praised by the people of Karnataka, especially in the Chitradurga region, where a stadium is named after her.
- Inspired by Onake Obavva, in 2018, the Chitradurga police started 'Obavva Pade', a squad of women police constables to protect and educate women in the district. This was later extended to Bangalore.

27. d

Indigenous Crop Varieties of India

- They include several varieties of rice such as colored rice, aromatic rice and medicinal rice.
- Millets, Wheat, Barley, Maize, Sorghum, Red Okra, Red Corn, Black Rice, etc are all native Indian Crops.
- Indigenous crops have high nutrition than hybrid varieties.
- They are more resistant to drought, salinity and floods.

28. b

Norovirus

- Norovirus is an animal-borne disease. It causes gastrointestinal illness including inflammation of the lining of the stomach and intestines, severe vomiting and diarrhoea.
- Norovirus, infects people across age groups.
- Norovirus is easily transmitted through close contact with people who have been infected, or by touching contaminated surfaces.
- It can also be spread by eating food that has been prepared or handled by someone with a stomach bug.
- Symptoms include diarrhoea, abdominal pain, vomiting, nausea, a high temperature, headache and body aches.
- No specific treatment for the infection. Recovery generally depends on the health of the immune system. In most people, the illness usually resolves within a few days.
- One should wash hands thoroughly with soap and water. Also, people should avoid contaminated food and water, including food that could have been prepared by someone who was sick.

29. d

One Sun One World One Grid (OSOWOG)

- This initiative was announced on the second day of COP26 by India and the United Kingdom to tap solar energy and have it travel seamlessly across borders.
- The initiative brings together the International Solar Alliance and the UK's green grid initiative and complements India's focus on harnessing the sun's energy.
- The grid will be set up over the next few years by the International Solar Alliance (ISA), another initiative authored by India initially, to transport solar power to different countries.
- The vision behind the OSOWOG is 'The Sun Never Sets' and is a constant at some geographical location, globally, at any given point of time.
- A Ministerial Steering Group will work towards accelerating the making of large solar power stations and wind farms in the best locations, linked together by continental-scale grids crossing national borders.
- The Ministerial Steering Group includes France, India, the United Kingdom and the United States, and will also have representatives from Africa, the Gulf, Latin America and Southeast Asia.
- The declaration has been endorsed by 80 ISA member countries.

30. c

Bats

- They are the only group of mammals which are capable of flight.
- This ability, coupled with the ability to navigate at night by using a system of acoustic orientation (echolocation), has made the bats a highly diverse and populous order.

Seals

- There are two types of seals: the earless, or true, seals (family Phocidae); and the eared seals (family Otariidae), which comprise the sea lions and fur seals.
- Seals use visual landmarks to navigate and can also locate areas of thin and thick ice by visually scanning the water surface and looking for differences in light patterns.

Sea Turtles

- They are highly aquatic, and most species only appear on coastal beaches for egg laying.
- Adult sea turtles are mainly denizens of tropical and subtropical seas, but the juveniles occur naturally in more temperate waters.
- They navigate at sea by sensing the invisible lines of the magnetic field, similar to how sailors use latitude and longitude.

Shrews

- In contrast to bats, shrews use echolocation only to investigate their habitats rather than additionally to pinpoint food.
- Their large incisor teeth are used like forceps to grab prey; the upper pair is hooked, and the lower pair extends forward.

31. d

Birsa Munda

- Birth: 15th November 1875, belonged to the Munda tribe in the Chotanagpur Plateau area.
- Birsa Munda is known to have mobilised the tribal community against the British and had also forced the colonial officials to introduce laws protecting the land rights of the tribals.
- Birsa started the faith of 'Birsait'.
- Members of the Munda and Oraon community joined the Birsait sect and it turned into a challenge to British conversion activities.

Munda Rebellion

- It was led by Birsa Munda in the south of Ranchi in 1899-1900.
- Causes for the rebellion:
 - The land policies of the British were destroying their traditional land system.
 - Hindu landlords and moneylenders were taking over their land.
 - Missionaries were criticising their traditional culture.
- The 'Ulgulan' or the 'Great Tumult' as the movement came to be called, aimed at establishing Munda Raj by driving out the British.
- They raised the white flag as a symbol of Birsa Raj.
- Birsa died of cholera in the jail and the movement faded out.

32. a

Government Security (G-Sec)

- A Government Security (G-Sec) is a tradable instrument issued by the Central Government or the State Governments.
- It acknowledges the Government's debt obligation.
- Such securities are short term (usually called treasury bills, with original maturities of less than one year) or long term (usually called Government bonds or dated securities with original maturity of one year or more).
- In India, the Central Government issues both, treasury bills and bonds or dated securities while the State Governments issue only bonds or dated securities, which are called the State Development Loans (SDLs).
- G-Secs carry practically no risk of default and, hence, are called risk-free gilt-edged instruments.

33. c



NASA Moon Mission

- Artemis Program will land the first woman and first person of colour on the Moon.
- The Moon plan is twofold: it's focused on achieving the goal of an initial human landing by 2024 with acceptable technical risks, while simultaneously working toward sustainable lunar exploration in the mid- to late 2020s.
- Chang'e 5 is a Chinese National Space Administration (CNSA) mission.
- The mission goal was to land in the Mons Rumker region of Oceanus Procellarum, operate for up to one lunar day (two weeks) and return a roughly 2 kg sample of lunar regolith, possibly from as deep as 2 meters.
- The sample was returned to Earth in the return capsule, landing in the Siziwang Banner grassland of the autonomous region of Inner Mongolia in China.
- The Lunar Crater Observation and Sensing Satellite (LCROSS) is designed to search for water ice on the Moon's surface by directing a 2000 kg Centaur upper stage into an impact with the Moon while observing the collision from behind.

34. a

Pallava Dynasty Administration

- Kingship was hereditary.
- King was accompanied by a council of ministers who assisted him.
- Mandalam was the biggest unit of the Pallava Kingdom and Yuvaraja was appointed as its head by the King.
- Mandalam was further divided into Kottams (provinces). Thondaimandalam was divided into twenty-four Kottams.
- The next administrative unit was Nadu and it consisted of several villages. Nattar was responsible for its administration.
- Oor was the smallest administrative unit and it was under the control of Sabha.
- Sabhas were responsible for maintaining the record of village lands and local affairs.
- Committees under the sabha are known as Variyam which was responsible for temple administration, irrigation tanks, etc.
- Devdhana was the granting of lands to temples and Brahmadeya was the land grants given to Brahmins.
- Except for the lands under devdhana and brahmadeya, land tax was levied on all the lands.

35. d

Bamboo Cultivation

- Bamboo is a flowering, permanent and evergreen plant, which belongs to the grass family of Poaceae.
- Bamboo is also considered the fastest growing woody plant on earth.
- Bamboo is one of the commercially cultivated crops in India and it is also considered as 'a poor man's timber'.
- India is the second largest producer of Bamboo in the world after China.
- The bamboo shoots are consumed as food and are considered good source of nutrition.
- The northeastern states are the major bamboo producing states in the country.
- The bamboo plantation grows well in hot to warm temperate climatic conditions.
- It doesn't require temperature below 15 degree Celsius in the summers.
- Since the bamboo has thin roots as well as ample growth, it must be protected from strong winds.
- Bamboos can be grown and cultivated on a wide variety of soils except for rock-strewn soils.
- Bamboo plantation also requires well drained sandy soil to clay soil.
- In India, the Barak Valley region is best suited for bamboo cultivation due to best soil and perfect climate conditions.

36. a

Conditions favorable for the formation of a cyclone

- The temperature of the surface layer of ocean water must be 26.5 °C (80 °F) or warmer, and this warm layer must be at least 50 metres (150 feet) deep.
- A preexisting atmospheric circulation must be located near the surface warm layer.
- The atmosphere must cool quickly enough with height to support the formation of deep convective clouds.
- The middle atmosphere must be relatively humid at a height of about 5,000 metres (16,000 feet) above the surface.
- The developing system must be at least 500 km (300 miles) away from the Equator.
- The wind speed must change slowly with height through the troposphere—no more than 10 metres (33 feet) per second between the surface and an altitude of about 10,000 metres (33,000 feet).

37. c

Matosinhos Manifesto

- The European Space Agency (ESA) council has approved a manifesto to accelerate the use of space in Europe.
- It lays down a vision for the continent in terms of maintaining and expanding its activities in space.
- The ESA council approved the manifesto to accelerate the use of space in Europe to tackle the urgent and unprecedented societal, economic and security challenges faced by Europe and its citizens.
- At the Ministerial Meeting that was held in Matosinhos, Portugal, the Council of Ministers unanimously adopted this resolution that lays down a vision for the continent in terms of maintaining and expanding its activities in space.
- The resolution defines three accelerators to further advance Europe's space ambitions:
 - The first accelerator is ESA to start working towards the "Space for a Green Future" so that people are better able to understand the current state of the planet and to develop scenarios and solutions for sustainable life on earth. This is in line with achieving net-zero greenhouse gas emission targets by the year 2050.
 - The second accelerator is called 'Rapid and Resilient Crisis Response', and it aims to support governments to act decisively on crises facing Europe, from flooding and storms to wildfires.
 - The third accelerator mentioned in the resolution is 'Protection of Space Assets', whose objective is to safeguard ESA astronauts and assets from interference by space debris and space weather.

38. a

The Personal Data Protection Bill, 2019

- The Bill seeks to provide for the protection of the personal data of individuals and establishes a Data Protection Authority for the same.
- The Bill governs the processing of personal data by the government, companies incorporated in India, and foreign companies dealing with the personal data of individuals in India.
- Personal data is data that pertains to characteristics, traits or attributes of identity, which can be used to identify an individual.
- The Bill categorizes certain personal data as sensitive personal data.
- This includes financial data, biometric data, caste, religious or political beliefs, or any other category of data specified by the government, in consultation with the Authority and the concerned sectoral regulator.
- A data fiduciary is an entity or individual who decides the means and purpose of processing personal data.
- Such processing will be subject to certain purposes, collection, and storage limitations.
- The Bill sets out certain rights of the individual (or data principal). These include the right to obtain confirmation from the fiduciary on whether their personal data has been processed, seek correction of inaccurate, incomplete, or out-of-date personal data, have personal data transferred to any other data fiduciary in certain circumstances, and restrict continuing disclosure of their personal data by a fiduciary, if it is no longer necessary or consent is withdrawn.
- The Bill allows the processing of data by fiduciaries only if consent is provided by the individual.
- However, in certain circumstances, personal data can be processed without consent.

- These include: if required by the State for providing benefits to the individual, legal proceedings, to respond to a medical emergency.

39. a

Foreign Direct Investment (FDI)

- It is an investment made by a company or an individual in one country into business interests located in another country.
- FDI is when a foreign entity acquire ownership or controlling stake in the shares of a company in one country, or establishes businesses there.
- It is different from foreign portfolio investment where the foreign entity is merely buys equity shares of a company.
- It is a major source of non-debt financial resources for the economic development of a country.
- The FDI Routes in India:
 - Automatic Route: The foreign entity does not require the prior approval of the government.
 - Government Route: The foreign entity should compulsorily take the approval of the government.
 - It should file an application through the Foreign Investment Facilitation Portal, which facilitates single-window clearance.
- There are certain sectors where any FDI is completely prohibited and they are:
 - Agricultural or Plantation Activities
 - Atomic Energy Generation
 - Nidhi Company and Lotteries
 - Investment in Chit Funds
 - Trading in TDR
 - Gambling or Betting
 - Cigars, Cigarettes, or any related tobacco industry
 - Housing and Real Estate
- Insurance Sector Comes under Automatic Route FDI and Banking Public sector comes under Government Route FDI.
- According to the new FDI policy, an entity of a country, which shares a land border with India or where the beneficial owner of investment into India is situated in or is a citizen of any such country, can invest only under the Government route.

40. b

Global State of Democracy Report, 2021

- It is released by the International Institute for Democracy and Electoral Assistance (International-IDEA).
- The International-IDEA, which is an inter-governmental organization supporting democracy, was chaired by Australia and includes India as a member-State.
- The number of countries moving towards authoritarianism in 2020 was higher than that of countries going in the other direction, towards democracy.
- Negative Trend
 - The pandemic has prolonged this existing negative trend into a five-year stretch, the longest such period since the start of the third wave of democratization in the 1970s.
 - Democratically elected Governments, including established democracies, are increasingly adopting authoritarian tactics.
 - This democratic backsliding has often enjoyed significant popular support.
 - Brazil, India and U.S. are worrying examples of democratic decline says the report.
 - However, India remained in the category of a mid-level performing democracy as it has since 2000.



- The United States and three members of the European Union (EU) – Hungary, Poland and Slovenia, which holds the chair of the EU in 2021 have also seen concerning democratic declines.
- In non-democratic regimes, the trend was deepening.
- Despite pandemic restrictions, Governments in some countries made remarkable resilience.
- The Institute of Economics and Peace (IEP), Australia releases the Global Peace Index.

41. a

Cross Border Insolvency Framework

- A panel led by Ministry of Corporate Affairs had suggested adopting the United Nations Commission on International Trade Laws on cross-border insolvency.
- UNCITRAL Model Law on Cross-Border Insolvency, 1997 (Model Law) provides legal framework to deal with cross-border insolvency issues while ensuring the least intrusion into the country's domestic insolvency law.
- The Insolvency and Bankruptcy Code, at present, does not effectively deal with cases involving cross-border insolvency.
- The government is expected to amend Section 234 and Section 235 of the IBC and introduce provisions for:
 1. Individual insolvency: new framework divides individuals into three categories: personal guarantors, proprietors and common individuals.
 2. Cross border insolvency: provisions will apply to corporate debtors and not in personal cases.
- **UNCITRAL Model Law**- The model law deals with four major principles of cross-border insolvency:
 1. Direct access to foreign insolvency professionals and foreign creditors to participate in or commence domestic insolvency proceedings against a defaulting debtor.
 2. Recognition of foreign proceedings & provision of remedies.
 3. Cooperation between domestic and foreign courts & domestic and foreign insolvency practitioners.
 4. Coordination between two or more concurrent insolvency proceedings in different countries. The main proceeding is determined by the concept of centre of main interest (COMI).
- Provisions for cross border insolvency would enable Indian firms to claim their dues from foreign companies, while allowing foreign creditors to recover loans from Indian companies.
- Will also help foreign branches of Indian banks to recover their dues in India.
- Cross border insolvency provision will bring overseas asset of a domestic corporate debtor into consideration of insolvency resolution in India and will avoid delays in resolution of stressed assets.

42. c

Flash Droughts

- Flash droughts have been defined in two ways, either as a short-lived yet severe event where soil moisture completely depletes or a multi-week period of rapid intensification toward drought.
- It is sometimes also defined as a rapidly developing drought event.
- Flash drought occurs when low precipitation is accompanied by abnormally high temperatures (e.g., heat waves), high winds, and/or changes in radiation.
- Flash flood is characterized by lack of rainfall coupled with increased evapotranspiration.
- Evapotranspiration is the combination of evaporation from the land surface and transpiration from vegetation.
- Both of these processes act to transfer water from the land surface to the atmosphere.
- Though soil moisture is replenished during the summer monsoon, a break in the monsoon along with high temperatures can quickly deplete the soil moisture.
- This rapid depletion of soil moisture results in flash droughts during the monsoon season.
- About 10 per cent–15 per cent of rice and maize grown area in each year is affected by flash droughts during the monsoon season in India.



- Flash droughts during the monsoon season in India can directly affect crop production and indirectly pose challenges for meeting increased irrigation water demands.
- A majority of the flash drought events in India occurred during the monsoon season — especially across the central, northwest and northeast regions of the country — and primarily between May and September from 1980-2015.
- The highest frequency of flash drought occurrence was primarily found within the tropics and subtropics.
- They include a large portion of Brazil, the Sahel, the Great Rift Valley and India, with composite flash drought occurrence within the 36-year time period (1980-2015) of analysis.

43. a

Main-sequence Radio Pulse (MRP)

- Astronomers from Pune-based National Centre for Radio Astrophysics (NCRA) have discovered eight stars which belong to a rare class called Main-sequence Radio Pulse emitters or MRPs.
- The MRPs are stars hotter than Sun with unusually strong magnetic fields, and much stronger than stellar wind (a continuous flow of gas from a star's upper atmosphere).
- Due to this, they emit bright radio pulses like a lighthouse.
- MRPs were discovered using 'Giant Metre-wave Radio Telescope (GMRT)' located in Pune.
- It will aid in the understanding of "exotic" radio stars and stellar magnetospheres.
- Of the total 15 MRPs known so far, 11 have been discovered by the NCRA-TIFR team alone.
- These findings will prove crucial in understanding what switches off the production of radio pulses in a hot magnetic star.

44. c

Virus

- Viruses are non-cellular, microscopic infectious agents that can only replicate inside a host cell.
- From a biological perspective, viruses cannot be classified either as living organisms or non-living.
- This is due to the fact that they possess certain defining characteristic features of living organisms and non-living entities.
- A virus is a non-cellular, infectious entity made up of genetic material and protein that can invade and reproduce only within the living cells of bacteria, plants, and animals.
- They are called non-cellular because they don't have a cell structure, rather only the genetic material.
- Some viruses partially contain DNA (DeoxyRibonucleic acid) or RNA (Ribonucleic acid) with single or double strands. It can get into the DNA of the host organism.
- Viruses are classified on the basis of genetic material – dsDNA, dsRNA, ssDNA, ssRNA (orthomyxoviruses).
- Viruses cause diseases among animals and plants. Potato mosaic and tobacco mosaic are the common viral diseases among plants; chickenpox, AIDS, and Ebola are the common viral animal diseases.
- Viroids and prions are the infecting proteins and RNA, they lack cell covers like a virus or any other eukaryotes. They were discovered by T Dienner in 1971 and these are also responsible for diseases among animals. E.g. mad cow disease.
- The genomes of organisms are all composed of DNA, whereas viral genomes can be of DNA or RNA.
- RNA viruses mutate faster than DNA viruses, single-stranded viruses mutate faster than double-strand virus.

45. d

Global Multidimensional Poverty Index (MPI)

- Global Multidimensional Poverty Index 2021 was released by the United Nations Development Programme (UNDP) and the Oxford Poverty & Human Development Initiative (OPHI).
- The Index considers data from 109 countries and 5.9 billion people.



- MPI is based on the idea that poverty is not one-dimensional (not just depends on income and one individual may lack several basic needs like education, health etc.), rather it is multidimensional.
- The index shows the proportion of poor people and the average number of deprivations each poor person experiences at the same time.
- MPI uses three dimensions and ten indicators which are:
 - **Education:** Years of schooling and child enrollment (1/6 weightage each, total 2/6);
 - **Health:** Child mortality and nutrition (1/6 weightage each, total 2/6);
 - **Standard of living:** Electricity, flooring, drinking water, sanitation, cooking fuel and assets (1/18 weightage each, total 2/6).

Indian Scenario

- As castes and tribes are a more prevalent line of social stratification in India, this index presents the incidence and intensity of multidimensional poverty among castes and tribes and among individuals who are not members of any caste or tribe.
- In India five out of six multidimensionally poor people are from lower tribes or castes.
- 9.4% of the Scheduled Tribe group lives in multidimensional poverty
- 33.3% of the Scheduled Caste group lives in multidimensional poverty.
- 27.2% of the Other Backward Class group lives in multidimensional poverty.

46. d

Earthquake

- It is the vibration of the surface of the earth that is caused due to the elasticity or the isostatic adjustment of the rocks under the surface of the earth.
- They are both natural and manmade.
- The point where the seismic waves originate is called the ‘focus’ of the earthquake, it takes place below the surface of the earth.
- The place perpendicularly above the focus, on the surface of the earth where the tremors of the earthquake are felt for the first time is called the ‘epicenter’.
- The energy that is dissipated from the focus is known as the ‘elastic energy’.
- Seismic waves are classified into three types:
 - Primary or Longitudinal waves are also known as P waves are analogous to the Sound waves.
 - Secondary or Transverse waves are also known as S waves are analogous to the Light waves.
 - Surface or Long period waves are also known as L-waves, they originate when the P waves hits the surface.
- The instrument which is sensitive to the seismic waves and helps to measure the intensity of the earthquake is called seismograph.

47. a

River Cities Alliance (RCA)

- The Ministry of Jal Shakti along with the Ministry of Housing and Urban Affairs has launched the River Cities Alliance (RCA).
- It is a dedicated platform for river cities in India to ideate, discuss and exchange information for sustainable management of urban rivers.
- It will focus on three broad themes: Networking, Capacity Building and Technical Support.
- The alliance began with the Ganga basin cities; it was extended to include cities beyond the basin as well.
- The participating cities in the River Cities Alliance are:
 - Dehradun, Haridwar, Rishikesh, Srinagar, Begusarai, Bhagalpur, Munger, Patna, Berhampore, Hooghly, Chinsurah, Howrah, Jangipur, Maheshtala, Rajmahal, Sahibganj, Ayodhya, Binjor,

Farrukhabad, Kanpur, Mathura-vrindavan, Mirzapur, Prayagraj, Varanasi, Aurangabad, Chennai, Bhubaneswar, Hyderabad, Pune, Udaipur and Vijayawada.

- The National Mission for Clean Ganga (NMCG) and National Institute for Urban Affairs (NIUA) have collaborated together to launch the RCA.
- Objectives
 1. It aims to provide member cities with a platform to discuss and exchange information on aspects that are vital for sustainable management of urban rivers.
 2. To work towards adopting and localizing national policies and instruments with key river-related directions.
 3. To prepare cities urban river management plans and develops city-specific sectoral strategies that are required for sustainable urban river management.

48. b

Member of Parliament

Powers of presiding officers to deal with MPs disrupting proceedings

- MPs are required to adhere to certain rules of parliamentary etiquette.
- Members should not shout slogans, display placards, tear up documents in protest, and play a cassette or a tape recorder in the House.
- Rajya Sabha has similar rules.
- To conduct the proceedings smoothly, the rulebook also gives certain, similar powers to the presiding officers of both Houses.
- The presiding officer of each House can direct an MP to withdraw from the legislative chamber for grossly disorderly conduct.
- The MP then has to remain absent from the proceedings of the House for the remainder of the day.
- The presiding officers can also “name” an MP for “persistently and wilfully obstructing the business” of the House.
- In such a case, usually, the Parliamentary Affairs Minister moves a motion for suspending the offending MP from the service of the House.
- The suspension can last until the end of the session.

49. d

Digital Services Tax (DST)

- It is adopted by India, Italy and Turkey against US companies.
- These are the adopted taxes on revenues that certain companies generate from providing certain digital services.
- The Organization for Economic Cooperation and Development (OECD) is currently hosting negotiations with over 130 countries that aim to adapt the international tax system.
- One goal is to address the tax challenges of the digitalization of the economy.

India's Tax on Digital Companies

- The government had moved an amendment in the Finance Bill 2020-21 imposing a 2% digital service tax (DST) on trade and services by non-resident e-commerce operators with a turnover of over Rs. 2 crore.
- This effectively expanded the scope of equalization levy that, till last year, only applied to digital advertising services.
- Earlier, the equalization levy (at 6%) was introduced in 2016 and imposed on the revenues generated on business-to-business digital advertisements and allied services of the resident service provider.
- The new levy came into effect from 1st April 2020. E-commerce operators are obligated to pay the tax at the end of each quarter.

United States Trade Representative (USTR)

- It is responsible for developing and coordinating US international trade.

- The DST in India is discriminatory because it exempts Indian companies and targets non-Indian firms.
- This hits US firms which dominate the technology industry.
- 119 companies that it identified as likely liable under the digital services tax, 86, or 72%, were American.

50. d

Subash Chandra Garg Committee

- Ban anybody who mines, hold, transact or deal with cryptocurrencies in any form.
- It recommends a jail term of one to 10 years for exchange or trading in digital currency.
- It proposed a monetary penalty of up to three times the loss caused to the exchequer or gains made by the cryptocurrency user whichever is higher.
- However, the panel said that the government should keep an open mind on the potential issuance of cryptocurrencies by the Reserve Bank of India.

Dinesh Sharma Committee

- It was constituted by the Union government to examine the existing framework with regard to virtual currencies.
- It is an inter-disciplinary committee formed to study the aspects related with virtual/digital/cryptocurrencies.

Rangarajan Committee

- It was created by the planning commission to estimate the poverty status in India

Rajiv Mehrishi Committee

- To measure the impact on the national economy and financial stability of waiving of interest and COVID-19 related moratorium.
- To give suggestions to mitigate financial constraints of various sections of society.
