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OCTOBER 2021

G.S PAPER I

1. GEOGRAPHY

1.1 The Problem with Monsoon

What is the issue?

The recent flash floods and landslides in Kerala is a matter of concern as variations in the monsoon pattern and intensity are increasingly witnessed.

What is the recent happening in Kerala?

- The torrential rain in Kerala has killed at least 35 people so far and red alert has been declared for 10 dams including Idukki.
- It has caused alarm as the Northeast monsoon lies ahead.
- The IMD has issued an alert for more heavy rainfall in Kerala from October 20.
- The Health Department has sounded an alert against the outbreak of infectious diseases due to heavy rains.
- The inundation of towns in 2018 and mudslides in 2019 had catastrophic effect in the State.

What is causing frequent floods in Kerala?

- **Relief** -Kerala hosts a vast stretch of Western Ghats with almost no break between severe spells of rainfall.
- **Cloudburst phenomenon** - Mini cloud bursts are marked by intense short spells, which may not exceed 10cm in one hour.
- For example, Mini cloudburst caused 2019 floods in Kerala.
- **Human intervention** - Illegal quarrying and mining activity has resulted in stones and rubble silting the streams and rivers thus increasing the magnitude of the damage.
- Timber felling, improper tree cutting has also had an adverse impact.
- **Premature silting up of reservoirs** - Premature silting up of reservoirs especially in the steep valleys in the Western Ghats is a major concern.
- **Unplanned constructions** - The construction of Athirappilly dam on the Chalakudy river in Kerala's Thrissur district has been strongly opposed.
- **Unscientific and improper water management** - poor management of reservoirs as happened in 2018 floods aggravates the situation
- **Inefficient legal framework** - The Kerala Conservation of Paddy Land and Wetland Act, 2008 has not been able to prevent construction of houses and other buildings in paddy fields and riverbeds

What efforts have been taken to minimise the losses?

- The Kerala government has upgraded its Orange Book for Disaster Management, which includes the standard operating procedures (SOP) and protocols for disaster management in the state.
- **Disaster management at taluk-level**- As part of an Incident Response System, individual officers at district and taluk level have been assigned to handle any emergencies.
- 33 hazard prone zone maps have been given to local bodies for increased preparedness.
- **Multiple weather inputs** - The state is taking inputs from IMD, Skymet, IBM, etc. for situational awareness.
- **Resilient Kerala Program** – The Government of India, the Government of Kerala and World Bank has signed a loan agreement of USD 250 million to boost disaster preparedness.

What measures have to be taken for increased preparedness?

According to an estimate by researchers in 2017, quarrying area in Kerala accounts for over 7,157 hectares, much of it in central districts that were hit later by mudslides.

- Nurturing the health of rivers by proper silting
- Keeping the rivers free of encroachments
- Ending mining and deforestation in unstable areas
- Avoiding incompatible constructions
- Accurately mapping the hazard zones
- A more benign development policy treating nature as an asset
- Implementation of **Madhav Gadgil committee** report on Western Ghats
- Gadgil report (2011) recommended designating the entire hilly region of Western Ghats as an Ecologically Sensitive Area.
- The Kasturirangan panel that was constituted to examine the Gadgil report recommended reducing the area to be protected ecologically in Western Ghats to only 37 per cent.
- Following best practices – For instance, **Hakku initiative** in Hyderabad involves a team of six people to identify and visit risk-prone areas and pushes them towards solutions.

G.S PAPER II

2. POLITY

2.1 Constitutionalisation of Political Parties

What is the issue?

Political parties are the breathing air of the political system and they need to be constitutionalized to ensure in-party democracy and to make them transparent.

What is so remarkable about political parties?

- A political party is an organised group of citizens who hold common views on governance and act as a political unit that seeks to obtain control of government with a view to further the agenda and policy they profess.
- They are indispensable links between the people and the representative machinery of government.
- Political parties maintain a continuous connection between the people and those who represent them either in government or in the opposition.
- Political parties are important institutes in almost every democratic country.

What are the legal provisions with respect to political parties?

- Political parties in India are extra-constitutional.
- The right to form political parties is not mentioned in the Constitution of India.
- **Section 29A (5)** of the **Representation of the People Act, 1951** – It is the only major statutory provision dealing with political parties in India.
 - It sets down certain conditions for a political party for the formation and registration by ECI.
 - 1. It must consist only of Indian citizens
 - 2. It must call itself a political party set up for the purpose of contesting elections to the Parliament and State Legislatures and for no other purpose.
 - 3. It must have at least 100 registered electors as its members.

- It orders that a political party shall bear true faith and allegiance to the Constitution of India as by law established, and to the principles of socialism, secularism, democracy, and would uphold the sovereignty, unity and integrity of India
- **Deregistration of parties** - The ECI is not empowered to de-register parties on the grounds of violating the Constitution or breaching the undertaking given to it at the time of registration.
- A party can only be de-registered
 1. if its registration was obtained by fraud;
 2. if it is declared illegal by the Central Government;
 3. if a party amends its internal Constitution and notifies the ECI that it can no longer abide by the Indian Constitution.

What is the case of political parties in other countries?

- **The German model** - Germany gives constitutional status to political parties and deals with their status, rights, duties and functions.
- **The U.K. model** - In U.K., the Conservative Party has National Conservative Convention, Central Council and an Executive Committee to maintain high levels of internal democracy.
- **The U.S. model** - In the U.S., both the Democratic and the Republican Party have National Committee that plays an important role in the presidential election and agenda setting.

What is the need for constitutionalisation of political parties?

- Most of the parties in India are openly caste- or religious-based.
- The finances of most of the parties are dubious and opaque.
- Almost all the parties are family fiefdoms. i.e. engaged in dynasty politics.
- There are no periodical in-party elections in Indian parties.
- Since, political parties are the agents of democracy and safety valves in the political system, they desperately need reform.
- Hence, it is high time to constitutionalise political parties to ensure in-party democracy, to impart transparency in their finances, and to de-communalise them.

2.2 How Political Parties are Registered in India

What is the issue?

Former Punjab chief minister Captain Amarinder Singh announced that he will be forming his own political party in Punjab which will be registered with the Election commission.

What is the procedure for registering political parties?

- **Article 324** of the Indian Constitution and **Section 29A of the Representation of the People Act, 1951** has conferred power to the Election Commission to prescribe guidelines for registration of parties.
- Election Commission has provided that any party seeking registration has to submit an application to the Commission within a period of 30 days following the date of its formation.
- The applicant has to publish a proposed party name in two national daily newspapers and two local daily newspapers.
- The notice for publication is also displayed on the website of the Election Commission.
- An application for registration has to be sent to the Secretary to the Election Commission within 30 days following the date of formation of the party in the prescribed format.
- The application must be accompanied by a demand draft for Rs.10,000, printed copy of the memorandum, rules and regulations or constitution of the party.
- It also needs to have the latest electoral rolls in respect of at least 100 members of the party to show that they are registered electors.
- The application would also need an affidavit duty signed by the President or General Secretary of the party and sworn before a First Class Magistrate/Oath Commissioner) / Notary Public.

- Individual affidavits from at least 100 members of the party would also be needed to ensure that they are not a member of any other political party registered with the Commission.

What is the significance of registering parties with the EC?

- It is **not mandatory** to register with the Election Commission
- Registering a political party with the EC has its advantage under the provisions of the Representation of the People Act, 1951.
- The candidates of the registered political party will get preference in the matter of allotment of free symbols over independent candidates.
- These registered political parties can get recognition as a 'state party' or a 'national party' subject to the fulfilment of the conditions prescribed in the **Election Symbols (Reservation and Allotment) Order, 1968**.

How EC recognises a political party as a state or national party?

- Several conditions are followed by the Election Commission to recognise the parties as a state or national party.
- **State Party** – The registered party has to satisfy any of the 5 conditions.
 1. Secure at least 6% of the valid vote & win at least 2 seats in an Assembly General Election
 2. Secure at least 6% of the valid vote & win at least 1 seats in a Lok Sabha General Election
 3. Win at least 3% of the seats or at least 3 seats , whichever is more, in an Assembly General Election
 4. Win at least 1 out of every 25 seats from a state in a Lok Sabha General Election
 5. Secure at least 8% of the total valid vote in an Assembly or a Lok Sabha General Election
- **National Party** - The registered party has to satisfy any of the 3 conditions.
 1. Secure at least 6% of the valid vote in an Assembly or a Lok Sabha General Election in any four or more states and won at least 4 seats in a Lok Sabha General Election from any State or States
 2. Win at least 2% of the total Lok Sabha seats in a Lok Sabha General Election and these seats have to be won from at least 3 states
 3. The party is recognized as a State Party in at least four states
- These conditions have to be fulfilled by the parties before every Lok Sabha and Assembly elections to make sure they don't lose their status.

What are the perks of recognition as a state or national party?

- A party recognized as a state party gets a reserved symbol within the state whereas for a national party, the reserved symbol can be used across the country by its contesting candidates.
- Such parties need only one proposer for filing the nomination.
- They are also entitled for two sets of electoral rolls free of cost.
- They are entitled to broadcast/telecast facilities over state-owned Akashvani/Doordarshan during the general elections.
- There are also other advantages to the recognized parties like subsidized land for party offices,etc.

2.3 Failure of Anti-defection Law to Discourage Defection

What is the issue?

As on 2019, India had **7 national parties**
(All India Trinamool Congress, Bahujan Samaj Party, Bharatiya Janata Party, Communist Party of India, Communist Party of India (Marxist), Indian National Congress and Nationalist Congress Party).
There are over **60 regional parties** and more than 2,000 registered but unrecognised parties in India.



There have been accusations on anti-defection law being failed to discourage defection with varying suggestions from Former Vice President Hamid Ansari, ECI and Supreme Court.

What is the anti-defection law?

- The anti-defection law punishes individual MPs/MLAs for leaving one party for another.
- It was added by **52 nd Constitutional Amendment Act** as the **Tenth Schedule** in 1985.
- Its purpose was to bring stability to governments by discouraging legislators from changing parties.
- It was a response to the toppling of multiple state governments by party-hopping MLAs after the general elections of 1967.
- The Presiding Officers of the Legislature (Speaker, Chairman) are the deciding authorities in such cases.
- The decision can be challenged before the higher judiciary.

What constitutes defection?

- The law covers three kinds of scenarios.
 1. When legislators elected on the ticket of a political party **voluntarily** give up membership of that party or vote in the legislature against the party's wishes.
 2. When an MP/MLA who has been elected as an independent joins a party later.
 3. When nominated legislators join a political party after **six months** of being appointed to the House.
- Violation of the law in any of these scenarios can lead to a legislator being penalised for defection.
- But it allows a group of two-third MP/MLAs to join (i.e. merge with) another political party without inviting the penalty for defection.

What are the loopholes in defection law?

- The law does not provide a time-frame within which the presiding officer has to decide a defection case.
- There have been many instances where a Speaker has misused this in not determining the case of a defecting MLA until the end of the legislature term.
- Parties often sequester MLAs in resorts to prevent them from changing their allegiance or getting poached by a rival party.
- Recent examples are Rajasthan (2020), Maharashtra (2019), Karnataka (2019 and 2018), and Tamil Nadu (2017).

Have any suggestions been made to improve the law?

- Last year, the Supreme Court held that ideally Speakers should take a decision on a defection petition within **three months**.
- It also said that Parliament should set up an independent tribunal headed by a retired judge of the higher judiciary to decide defection cases swiftly and impartially.
- The Election Commission has suggested it should be the deciding authority in defection cases.
- Former Vice President Hamid Ansari has suggested that anti defection should be applicable only to save governments in no-confidence motions.

'FINISH PROCEEDINGS IN 3 MTHS'

► SC sets three months as the outer limit for Speakers to conclude disqualification proceedings against defectors	the 10th Schedule is vital to democracy's functioning
► Recommends that Parliament should amend Constitution to set up a permanent tribunal to decide cases. Tribunal can be headed by retired SC judge or HC CJ	► SC decision came in a case related to Manipur Congress MLA T Shyam Kumar , who switched to BJP and became a minister after the party formed govt in 2017
► SC emphasises that ensuring purity of anti-defection law under	► A dozen pleas seeking Shyam's disqualification were filed but Speaker sat over them. SC asks Speaker to decide in four weeks

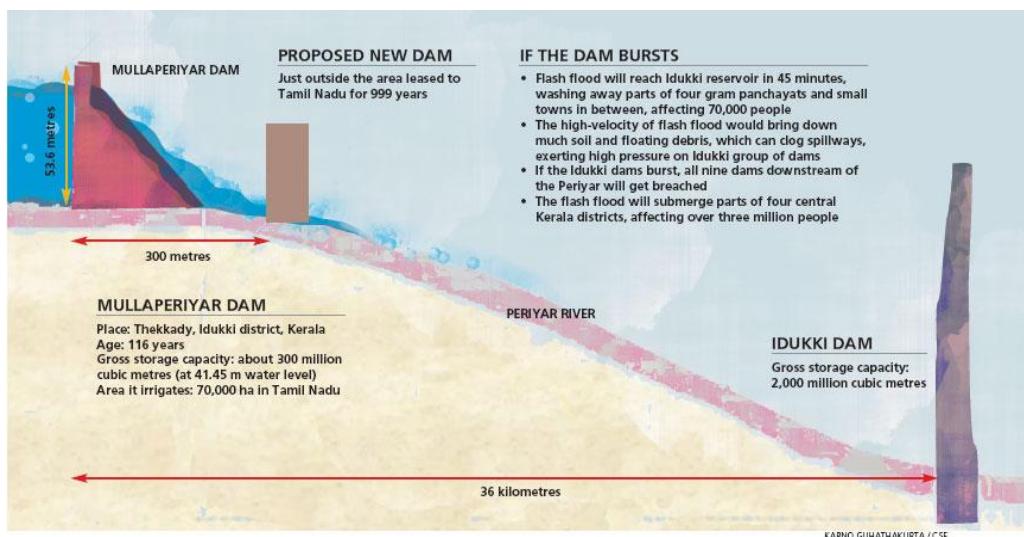
2.4 Controversies around Water Sharing between Tamilnadu and Kerala

What is the issue?

The issue of the maximum water level in the Mullaperiyar dam and the possibility of a dam-break has revived the controversy surrounding the Tamilnadu-Kerala relations.

What is the history of the Mullaperiyar dam?

- The 130-year old Mullaperiyar dam is located on the confluence of the **Mullayar and Periyar River** in Kerala's 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.
- 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.



What is the genesis of the dispute?

- In 1979, a problem erupted over the safety of the dam which led to a tripartite meeting that decided to bring the water level from the full reservoir level of **152 ft to 136 ft**.
- By mid-1990, Tamil Nadu started demanding restoration of the water level in the Mullaperiyar as it had completed the dam strengthening works.
- When no consensus was reached through negotiations, the Supreme Court was approached.
- The Supreme Court in February, 2006 allowed Tamil Nadu to raise the water level of the dam to 152ft.
- In response to that, Kerala government enacted **Irrigation and Water Conservation (Amendment) Act, 2006** and put the second schedule of Mullaperiyar Dam as endangered and fixed its maximum water level to 136ft.
- In 2014, the apex court declared the Act unconstitutional and restrained Kerala from interfering with the rights of Tamil Nadu in raising the water level in the dam to **142 feet**.
- The Kerala government has been at many times emphasising the urgent need for the gradual release of water.

What is the standpoint of Kerala government?

- Dam safety-** The Mullaperiyar dam suffers from structural issues and the possibility of a dam-break cannot be ruled out.
- The dam is located in an earthquake-prone area and small-time earthquakes that had happened in 1979 and 2011 caused some cracks in the dam.
- The leakage in the dam is another cause of concern.
- The technology which was put into use for constructing the dam 130 years ago was obsolete compared to the sophisticated construction methods used now.
- According to the UN University report, 35 lakh people in Kerala will be directly hit in the case of a dam-break.
- It will also have its impact on the National Periyar Park which hosts some of the endangered species.

What is TamilNadu's position regarding the dispute?

- For Tamil Nadu the Mullaperiyar dam is like a lifeline for the people of Madras Presidency for irrigation and drinking
- The dam is also significant for the generation of the power in lower Periyar water station as the region is shadow and arid.
- So, the government of Tamil Nadu insists on raising the water level in the dam pointing out the failure of crops.

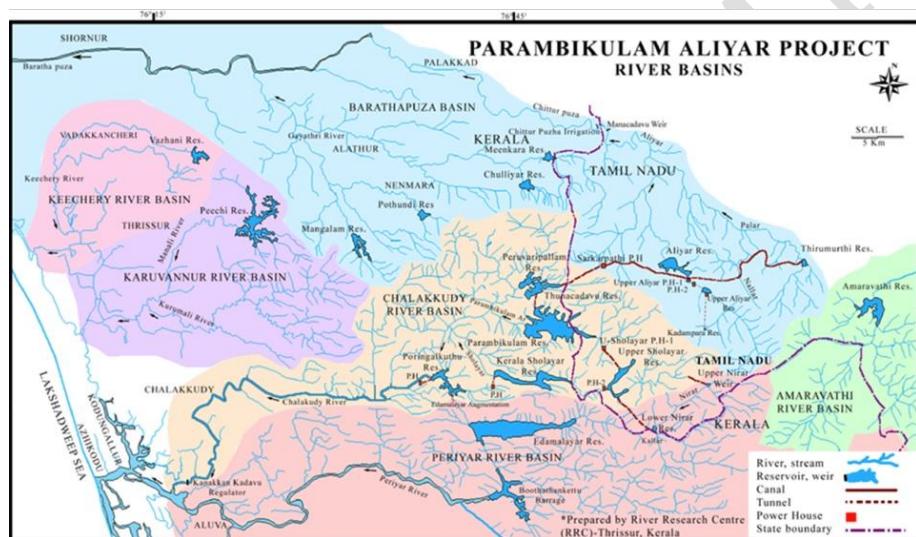
- The government has also asserted that it has full right over the control of the dam.
- Tamil Nadu has challenged the Kerala's proposal for decommissioning of the dam and construction of a new dam.

What are the other river water issues between both the states?

- An element of uneasiness is present in the ties between Tamil Nadu and Kerala on the subject of water which is far more complex than those of Tamil Nadu with Karnataka.
- Parambikulam-Aliyar, Siruvani of the Bhavani sub-basin, Neyyar, and the proposal for linking the Pamba and Achankovil rivers of Kerala with Vaippar of Tamil Nadu, etc. are the issues.

What is the Parambikulam-Aliyar Project issue?

- The project was signed between Tamil Nadu and Kerala in **1970** with retrospective effect from November 1958 to divert and integrate **8 West flowing rivers** - 6 in the Anaimalai Hills and 2 in the plains.
- The objective is to benefit the drought-prone areas in the Coimbatore and Erode district of Tamil Nadu State and to stabilize the existing irrigation system in Chittoorupuzha of Kerala State.
- The agreement ensures Kerala's riparian share in the Sholayar and Chittoorupuzha sub-basins as a guaranteed annual entitlement without applying the distress-sharing formula.
- It also ensures four months' flow (from the Northeast monsoons) from the Upper Nirar weir for Kerala's exclusive use in the Periyar basin.
- The agreement provides for review every 30 years since November 9, 1958 but it remains inconclusive.
- Kerala's concerns** - Kerala has reservations on the non-realisation of its share of 2.5 tmc of water from the Parambikulam group of rivers for the exclusive use of Chittoorupuzha valley.
- Construction of some structures in the project area without Kerala's concurrence is another area of concern.
- Tamil Nadu's stand** - It has proposed new constructions to augment its share — the Nirar-Nallar Project and Balancing Reservoir above Manacadavu for which Kerala has not consented.
- In the last 20 years, the Chalakudy basin experienced overflow in 12 years and a sizeable portion of the water is also lost as unutilisable flows.
- The way forward lies in trapping the existing spill at Chalakudy and Bharathappuzha through new reservoirs.



What are the provisions for distribution of water in Indian Constitution?

- Entry 17 in the State List** – It makes water a state subject.
- Entry 56 in the Union List** – The Central Government is conferred with powers to regulate and develop inter-State rivers to the extent declared by the Parliament by law to be expedient in the public interest.
- Article 262** – It provides that Parliament may adopt legislation for the settlement of disputes or complaints concerning the transboundary waters in a river or river valley.

What is the need of the hour?

- Kerala must give its permission for completing the remaining works to strengthen the dam at the earliest.
- Tamil Nadu should ensure that all the instruments for monitoring the safety and health of the dam are installed and are functioning properly.

- Both the players should adopt a rational approach while deciding on the storage levels and safety aspects of the dam.

3. GOVERNMENT ACTS AND POLICIES

3.1 The Electricity (Amendment) Bill, 2020

What is the issue?

With increasing problems in India's energy sector, the Electricity (Amendment) Bill, 2020 aims to drive the long pending reforms in the power sector.

What are the problems in the power sector?

- Weak distribution sector with aggregate technical and commercial losses (AT&C) hovering around 20%
- Inefficiency of Regulatory Commissions in many states
- Expensive long-term power purchase agreements
- Poor infrastructure
- Leakages
- Weaknesses in State-level tariff policies

What is the Electricity (Amendment) Bill, 2020 about and how will it address the problems?

- The bill is an amendment to the earlier 2003 version of the Act that aims to transform the power sector.
- **Delicensing the power distribution** - It aims to de-license power distribution and increase competition, thereby unleashing next-generation power sector reforms in India.
- It will provide the consumers with an option of choosing the service provider and to switch their power supplier.
- **Dismantling state monopoly** - Union Finance Minister has proposed to open up the distribution sector to end the monopoly of state-run distribution companies.
- **Tariffs** - Cost reflective tariffs are to be provided that will facilitate reduction in cross subsidies.
- Electrical energy should be covered under GST, with a lower rate of GST, as this will make it possible for power generator/transmission/distribution utilities to get a refund of input credit, which in turn will reduce the cost of power.
- **Technological upgrades** - Smart metering and infrastructure advancements will reduce the huge AT&C losses the industry is currently suffering from.
- DBT of power subsidies - Introduction of DBT of power subsidies will ensure greater transparency and accountability and ensure that the subsidy reaches people who are entitled to it.
- **Promotion of indigenisation** - The reduction in power costs through higher indigenisation will give a boost to the government's Aatmanirbhar Bharat campaign.
- **Strengthening the regulatory regime** - Appointing a member with a legal background in every electricity regulatory commission and strengthening the Appellate Tribunal for Electricity will ensure faster resolution of long-pending issues.
- **Renewable Energy** – The bill encourages roof-top solar plants and imposes penalty for not meeting renewable energy purchase obligations thus stressing the importance of green energy adoption in mitigating climate change.
- **Enforcement Authority** - Creation of an Electricity Contract Enforcement Authority ensures the supervision of the fulfillment of contractual obligations.
- The Electricity (Amendment) Bill will be a game-changer and its early passage is critical to unleash a path-breaking reform for bringing efficiency and profitability to the distribution sector.

4. HEALTH

4.1 Global Hunger Index & India

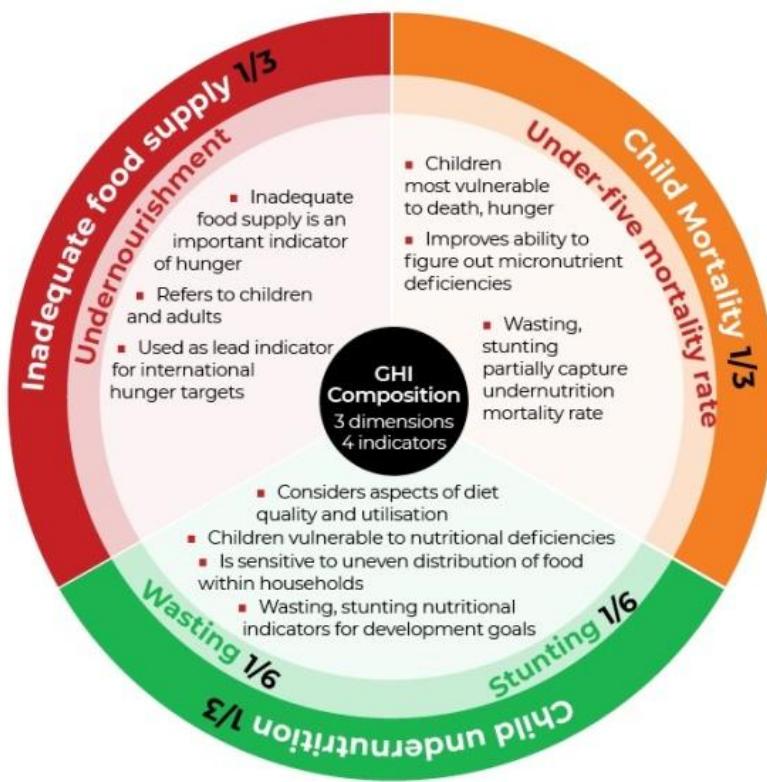
What is the issue?

- The Global Hunger Index (GHI) has ranked India at 101 out of 116 countries in the category of having a 'serious' hunger situation.
- The Government has objected to the methodology of the Global Hunger Index stating that it is not based on facts.

How are GHI rankings calculated?

- The GHI is a tool that measures and tracks hunger globally as well as by country and is prepared by European NGOs of Concern Worldwide and Welthungerhilfe.
- GHI rankings are based on Hunger Index Scores, which are a weighted normalised average of four indicators.
 - Percentage of undernourished in the population - PoU
 - Percentage of children under five years who suffer from wasting – CWA (low weight-for-height)
 - Percentage of children under five years who suffer from stunting – CST (low height-for-age)
 - Percentage of children who die before the age of five – CM (child mortality)
- The respective thresholds for PoU, CWA, CST and CM are 80, 30, 70 and 35, respectively.
- The standardized scores take a value from zero to 100, where zero is the lowest level of a given measure of undernourishment and 100 the highest.
- The aggregate GHI score is a weighted average of the four indicators where PoU and CM have a weight of one-third and CWA and CST have a weight of one-sixth each.
- Looking at each of these indicators separately, India shows a worsening in PoU and CWA in comparison with 2012.

Composition of Global Hunger Index



Why has the Indian government objected the methodology?

- The assessment has been made based on the results of a opinion poll which was conducted telephonically by Gallup and not based on facts.
- All the data used are from official data sources of respective national governments.
- In the absence of food consumption data in most countries, this indicator is estimated based on a modelling exercise using available data and therefore subjected to some margin of error.
- Most of the criticism of the FAO's PoU data has been about how it underestimates hunger.

What do the national reports say on India's status of hunger?

- The partial result of the National Family Health Survey-5 (2019-20) shows that stunting and wasting indicators have stagnated or declined for most States.
- The leaked report of the consumption expenditure survey (2017-18) showed that rural consumption had fallen between 2012-18.
- All these data are for the period before the COVID-19 pandemic.

- Many of the surveys find that over 60% of the respondents are eating less than before the national lockdown in 2020.
- Distruption of services such as Integrated Child Development Scheme (ICDS) and school mid-day meals would further slowdown in improvement in malnutrition.

What aggravated the situation of hunger?

- Provision of additional free foodgrains through the Public Distribution System (PDS) is the only substantial measure taken.
- And even this leaves out about 40% of the population and includes only cereals.
- Higher food Inflation, especially edible oils ia also affecting people's ability to afford healthy diets.
- Budget 2021 saw cuts in real terms for schemes such as the ICDS and the mid-day meal.
- The distant dream of diverse nutritious diets for all Indians has to be met.
- Focus has to be on the big states, where both the population of children and prevalence of undernutrition among them is big.

4.2 PM POSHAN Scheme

Why in news?

The existing Mid-Day Meal scheme which provides hot meals to students will be renamed as the **National Scheme for PM Poshan Shakti Nirman**.

What are the key features of the scheme?

- It is a Centrally-Sponsored Scheme that aims to enhance the nutrition levels of schoolchildren
- Eligibility - All school going students of classes I to VIII studying in government and government-aided schools are eligible to avail the benefits.
- Duration - For a period of five years (2021-22 to 2025-26)
- The total budget of the scheme will amount to Rs. 1, 30,794.90 crore.
- The scheme will be extended to pre-primary students or Bal Vatikas of Government and Government-aided primary schools.
- The concept of **TithiBhojan** (community participation programme in which people provide special food to children on special occasions) will be encouraged extensively.
- Government is also promoting the development of **Nutrition Gardens** in schools.
- Social Audit of the scheme is made mandatory in all the districts.
- Special provision is made for providing supplementary nutrition to children in aspirational districts and districts with high prevalence of Anemia.
- Cooking competitions will be encouraged at all levels right from village level to national level to promote ethnic cuisine.
- Involvement of Farmers Producer Organizations (FPO) and Women Self Help Groups in implementation of the scheme will be encouraged.
- While Centre bears the entire cost of food grains, their transportation, management, monitoring and evaluation, components such as cooking costs, payments to cooks and workers are split in a 60:40 ratio with states.

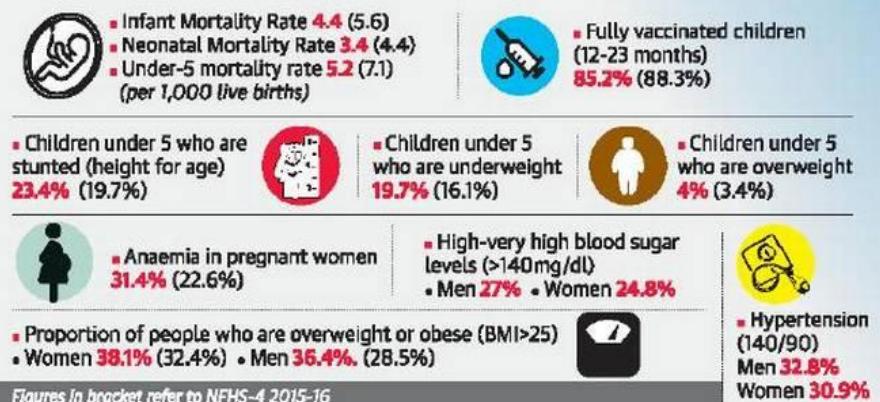
What is the need for this scheme?

- The findings in Phase I of the NFHS-5 for 22 States and Union Territories in December 2020 were shocking



- 1. Childhood stunting rose in 13 States
- 2. High prevalence of anaemia among children and women
- 3. Wasting was a serious concern in 12 States
- The worsening case of malnutrition threatens to deprive millions of children of a fully productive adult life.
- The **National Education Policy (NEP)** has also recommended that pre-school education should be formalised and this scheme is a step towards that.

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



Figures in bracket refer to NFHS-4 2015-16

Can this scheme bring the desired outcome?

- The West Bengal government accused the Centre of just changing the name of the mid-day meal scheme.
- While the NEP proposes breakfast in schools, the government has not taken any decision on that yet.
- The renewed plan should introduce a greater diversity of diets that compensates for micronutrient and protein deficiency.
- The Government must fiscally strengthen the **Saksham Anganwadi-Mission POSHAN 2.0** which amalgamates POSHAN Abhiyan and schemes covering anganwadis, creches and adolescent girls.

4.3 Combating Anemia

What is the issue?

In an effort to combat the serious problem of anaemia due to malnutrition, Indian PM made an announcement to mandate rice fortification in all social safety net schemes by 2024.

Why should anaemia be addressed immediately?

- Despite reducing anaemia among children over the last decade, anaemia still impacts more than half of children and women.
- WHO has declared anaemia among women and children as a “severe” public health problem, demanding immediate attention.
- Further, recent statistics indicate rise in anaemia levels among women and children in most States/UTs (NFHS-5).

What are the known causes?

- **Iron deficiency**-anaemia is the biggest cause of disability for the past 10 years.
- It contributed 20% direct and 50% associated maternal deaths in India.
- Its economic burden is equivalent to about 4% of GDP.
- Apart from iron, deficiency in micronutrient like vitamin B12, vitamin A, folate and zinc also contribute to rising anaemia levels.
- **Vitamin B12 deficiency** impacts one in six pre-school children and one in three adolescents.
- **Folate deficiency** affects one in three school-aged children and one in four adolescents.
- The nutritional status and associated nutrient deficiencies is primarily a reflection of **unbalanced and poor diet**.
- Low consumption of nutritious food like fruits, vegetables, milk, pulses, meat, poultry, etc is also a reason.
- Only 6% and 9% of children between 6-23 months consume the minimum acceptable diet and iron rich food, respectively.



- There is a gap of nutritious dietary intakes when compared to Recommended Dietary Allowance (RDA).
- E.g. 75% and 50% lower iron amongst rural population and adolescents; 50% lower vitamin A; and 50-75% lower folate and riboflavin.
- FAO recently attributed **affordability** of cost intensive healthy diets as a constraint in achieving the nutrition related SDGs globally.
- At \$1/person per day, India's spending on diet is significantly lower than the EAT Lancet dietary recommendations of \$3-5.
- Nearly two-thirds of the rural poor cannot afford a nutritious diet that meets India's national food-based dietary guidelines.

RICE FORTIFICATION

Fortifying rice involves grinding broken rice into powder, mixing it with nutrients like iron, folic acid and vitamin B12, and then shaping it into rice-like kernels using an extrusion process. These fortified kernels are then mixed with normal rice in a 1:100 ratio and distributed for consumption.



DALY

WHO's meta-analysis - An outlay of around ₹2,800 crore per annum for rice fortification can avert 35% of the total or 16.6 million Disability Adjusted Life Years (DALYs) per year with no known risk of toxicity.

ANAEMLIA

Amounting to only around 1% of the food subsidy bill in 2018-19, rice fortification has the potential to avert a total of 94.1 million anaemia cases that can lead to savings of ₹8,098 crore over a period of 5 years.

2024 TARGET

Universalisation of rice fortification by 2024, will cover about 100 crore target population, including about 20 crore women of reproductive age.

How is rice fortification the right option?

- If eggs and milk are included, the cost of nutrition would increase substantially.
- On the other hand, rice, a staple cereal, is consumed by 65% of the population (6.8 kg per capita per month).
- Thus, fortifying rice with micronutrients is an ideal option to address malnutrition within a short period, particularly among vulnerable populations.

What are the other measures?

Standardisation

- FSSAI is working on Fortified Rice Kernels standardisation.
- It is also enabling setting up more National Accreditation Board for Testing and Calibration Laboratories accredited labs and BIS Standardisation of Extruders/Blenders, to ensure quality.

Multi-pronged strategy

- FCI is working to ensure distribution of 13.70 lakh tonnes of fortified rice in ICDS and MDM.
- Government has included millets under NFSA as Dietary diversification is the sustainable long-term solution to combat anemia and micronutrient deficiencies.
- PM recently launched 35 crop varieties with higher nutrient-content to combat malnutrition.
- Under POSHAN 2.0, MoWCD has urged all Aspirational Districts to establish poshan vatika or nutri-garden to promote locally grown nutritious food.
- Ministry of Health in 2013 launched "**National Iron Plus Initiative**".
- Iron and Folic Acid Supplementation and Deworming for improving the haemoglobin levels were undertaken.
- **National Nutritional Anemia Control Program** aims at decreasing the incidence of anemia by promoting regular consumption of iron rich foods, providing iron and folate tablets and treatment.
- To tackle the problem of anemia due to malaria, Long Lasting Insecticide Nets and Insecticide Treated Bed Nets are being distributed.
- **Anemia Mukt Bharat (AMB)** focuses on reducing anemia amongst pregnant women (from 50% in 2016 to 32% by 2022).

- The **6x6x6 strategy** under AMB implies six age groups, six interventions and six institutional mechanisms in reducing the incidence of anemia.
- In **ICDS**, iron and folic acid tablets and megadose of vitamin A are distributed to prevent iron deficiency anaemia and xerophthalmia respectively.
- 184 High Priority Districts have been prioritized for Reproductive Maternal Newborn Child Health+ Adolescent (**RMNCH+A**) interventions for achieving improved maternal and child health outcomes.

5. GOVERNANCE

5.1 Crime in India Report

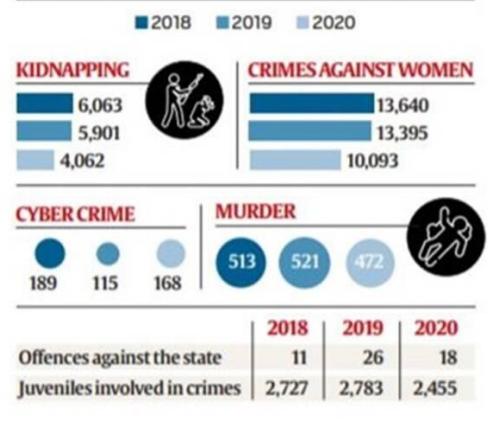
What is the issue?

The annual report, ‘**Crime in India**’ was released by NCRB to provide insights on the patterns of crimes that were registered in 2020.

What does the report say?

- Crime rate** - States/UTs such as Tamil Nadu (1808.8), Kerala (1568.4) and Delhi (1309.6) recorded the highest crime rate (crimes per one lakh people) overall.
- Crime against women** - There was an 8.3% decline and out of the total registered cases, 30.2% were of the category “cruelty by husband or his relatives”.
- Crime against Children**- A decline of 13.2% has been reported in cases registered for committing crimes against children.
- Crime against SCs and STs** - An increase of 9.4% and 9.3% respectively have been reported in 2020.
- Economic offences** - There was a reduction in the registered number of economic offences (by 12% since 2019) but cybercrimes recorded an increase of 11.8%.
- Sedition** - Cases related to sedition declined from 93 in 2019 to 73 last year having Manipur and Assam with leading cases.
- Communal riots** - communal riots registered an increase of 96% in 2020 over the previous year and caste riots saw an increase of close to 50%.
- Violent crimes** - violent crimes decreased by 0.5% but murder has registered a marginal increase of 1%.
- Offences against the State** – It include cases related to sedition, waging war against the nation, provisions of Unlawful Activities Prevention Act (UAPA), Official Secrets Act and Damage to Public Property Act.
- 2020 saw a 27% drop in cases over 2019 related to offences against the state.
- Agrarian riots** - It saw a 38% increase over 2019 due to unprecedented protests against the three farm laws passed by the Centre.

2019 VS 2020: CRIMES ARE DOWN



A JUMP IN NUMBERS

OFFENCES	2019	2020	% increase
Communal riots	438	857	96%
Caste riots	492	736	50%
Agrarian riots	1,579	2,188	38%
Andolan/Morcha riots	1,442	1,905	33%
Promoting Enmity Between Groups	1,058	1,804	70%
TOTAL RIOTS (including other causes)	45,985	51,606	12%

Offences Against The State decreased by 27%, but UP only major state where they increased

Source: NCRB

What is the impact of pandemic on the pattern of crimes?

- 2020 saw prolonged lockdowns which coincided with a high number of complaints of domestic violence.
- The lockdown also led to an overall fall in crime related to theft, burglary and dacoity.
- The COVID-19 related disruption led to a greater registration of cases due to disobedience to government order and violations of other State local laws.
- As lockdown has led to increase in digital transactions, cybercrimes also saw a rise.

6. INDIA & ITS NEIGHBORHOOD

6.1 Ladakh Standoff - India, China talks at an impasse

What is the issue?

Talks between senior military commanders of India and China to find a solution to the 17-month long Ladakh standoff have run into rough weather.

What is the past history of border point issue?

- Until 1960, China used to have a company stationed at Kongka La and Hot Springs which they increased to a regiment in the Hot Springs area by 1962.
- In 1962, China attacked India's position in Hot Springs and Galwan Valley.
- In June 2020, 20 Indian and at least four Chinese soldiers died in Galwan valley clashes.
- This is the first time after the 1962 War that soldiers have died in clashes on the India-China border in Ladakh.
- Hot Springs is the last of the friction points that the Army came up last year when China moved its troops across the LAC.
- Disengagement has been completed in other places like PP14 in Galwan Valley, PP17A in Gogra Post, and the north and south banks of Pangong Tso.
- Kongka La pass marks the border between two of China's most sensitive provinces — Xinjiang to the north and Tibet to the south.



Why did the talks end in stalemate?

- The 13th round of talks held on the Chinese side of Line of Actual Control (LAC) on Sunday were aimed at discussing disengagement of troops at Hot Springs area of eastern Ladakh.
- However, the two sides blamed each other for the deadlock.
- India pointed out that the situation has been caused by unilateral attempts of Chinese side to alter the status quo in violation of bilateral agreements.
- New Delhi says that the Chinese delegation made no constructive proposals while Beijing says that the Indian side made unreasonable demands.

What does the deadlock mean?

- It means that Indian soldiers will spend a second winter in the icy heights of Ladakh Mountains where temperatures plummet to minus 30 degree Celsius.
- It is set to deepen the chill in India-China ties, given Beijing's refusal to move its troops back from their current positions.
- Concerns are mounting over the military build-up and new infrastructure development along the disputed border by China.
- It creates a major hurdle in eventual de-escalation from the region where both sides have around 50,000 troops each, along with tanks, artillery guns, air defence assets.



6.2 Trouble in Bangladesh

What is the issue?

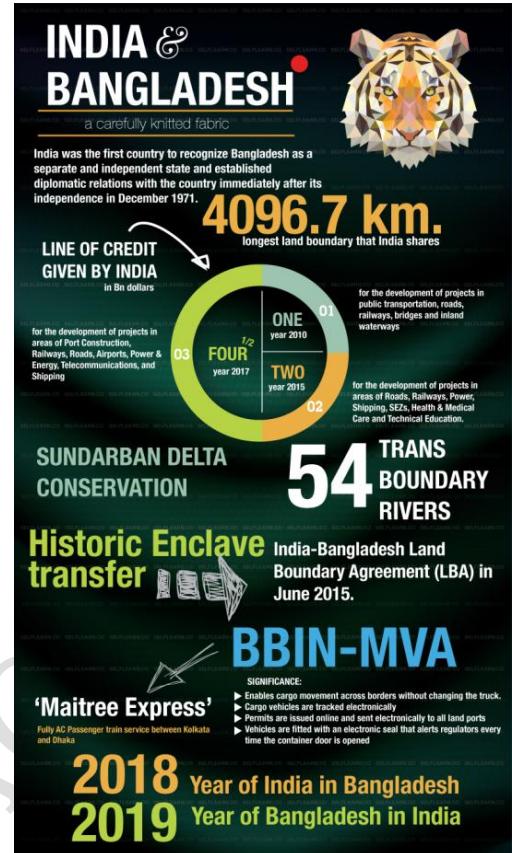
Incidents of majoritarian violence against Bangladesh's Hindu minority community during Durga Puja have been condemned by the UN, the U.S. and India.

What is the recent communal tension in Bangladesh?

- The minority Hindu community accounts for nearly 10% of the country's 160 million people.
- The mob violence appears to have begun in Comilla, in Chittagong district, where an image allegedly showing disrespect to the Koran was circulated in social media.
- It resulted in incidents of vandalism of Hindu temples and homes belonging to the minority community.
- According to the police, more than 450 people have been arrested and more than 70 cases filed in different parts of Bangladesh.

What is India's response to the violence?

- The Indian High Commission in Dhaka was in touch with law and order officials at the Centre.
- It has stepped in to meet the members of Bangladeshi Hindu community, including representatives from the ISKCON group that was attacked.
- India has raised its voice against the majoritarian violence against Bangladesh's Hindu minority community.
- The Indian government has also praised the authorities for moving quickly to take control of the situation.



What must be India cautious about?

- The Citizenship (Amendment) Act in 2019 had a widespread effect in Bangladesh and at least 12 people were killed in protests against Mr. Modi's visit to Dhaka earlier this year.
- There are chances that the Indian High Commission's act of meeting local minorities to be interpreted as an act of interference rather than an act of compassion.
- As a regional leader, India has every right to be concerned about the plight of communities in the subcontinent.
- But, India must ensure that the foreign relations are not affected.
- A non-partisan religious approach is needed to stabilise the relations between the two countries which have a shared history of cooperation over much of the past 50 years.

6.3 Exclusion of Myanmar's Military Junta

What is the issue?

ASEAN has decided to exclude Myanmar's military junta from its annual summit which is a major setback for the Generals' attempt to gain regional legitimacy for their brutal regime.

Why did the coup occur?

- The Military had a tight grip on Myanmar as the constitution guarantees it a quarter of all seats in parliament and control of its most powerful ministries.
- In the last November's general election, military-backed party- USDP-performed poorly whereas the NLD did even better than in 2015.
- This created tensions between the armed forces and the government.
- The opposition raised allegations of widespread fraud in the election which was not backed by the electoral commission.



- Later, Myanmar's military seized power after detaining Aung San Suu Kyi and other democratically elected leaders.

What was the followup of the power siegue?

- The junta has unleashed a reign of terror claiming an estimated 1,000 lives.
- Ms. Suu Kyi who had been the State Councillor for five years from 2015 heading the quasi-democratic government has been in detention.
- Thousands of others were arrested by the military for their democratic protests.
- In cities, protests turned into armed fighting between pro-democracy protesters and security personnel, while in the jungles, anti-junta groups joined hands with rebels for military training.
- The situation was so grave that the UN Special Envoy warned that Myanmar had descended into a civil war.
- Recently, Myanmar's military sentenced a close aide of ousted civilian leader Aung San Suu Kyi to 20 years in prison.

What has been the international reaction to the coup?

- US Secretary of State Antony Blinken has accused the security forces of a "reign of terror".
- The US, UK and European Union have all responded with sanctions on military officials.
- South East Asian countries have been pursuing diplomatic efforts to end the crisis.
- China blocked a UNSC statement condemning the coup, but has backed calls for the release of Ms Suu Kyi and a return to democratic norms.

What led to the exclusion of the junta by ASEAN?

- In April, Gen. Min Aung Hlaing was invited to Jakarta for emergency talks with ASEAN members which led to the **ASEAN's Five-Point Consensus**.
- The Consensus that includes immediately ending violence, starting the reconciliation process and allowing a regional special envoy to meet all stakeholders has not been met by the military regime.
- There have been reports of the junta torturing political prisoners.
- Regime violence, political crises and strikes and counter-attacks by protesters have all led to the exclusion of Myanmar.
- According to the UN, around 3 million people are in need of life-saving assistance because of conflict, food insecurity, natural disasters and COVID-19.
- The international community should continue to put pressure on the junta and urgently start a reconciliation process.

6.4 Squaring off again in the Himalayan Heights: India China Deadlock

What is the issue?

The Indian and Chinese soldiers will remain to be deployed against each other in the icy cold deserts of Ladakh this winter.

TIMELINE: MYANMAR COUP

2010	
9 Nov	Military-backed Union Solidarity and Development Party (USDP) wins election by landslide. Aung San Suu Kyi's National League for Democracy (NLD) boycotts election.
13 Nov	Aung San Suu Kyi is freed after 7 years of house arrest.
2011	
31 Jan	Elected parliament convenes for first time in half a century, charged with choosing first civilian president since 1962 coup.
2015	
8 Nov	NLD wins by landslide in Myanmar's first openly contested general election since 1990; Aung San Suu Kyi becomes de facto leader.
2020	
8 Nov	NLD captures 396 of 476 seats in lower and upper houses of parliament in general election.* USDP alleges voter fraud, challenges results.
2021	
26 Jan	Military ramps up demands for investigation into alleged voter fraud, doesn't rule out coup possibility.
1 Feb	Early morning Military detains Aung San Suu Kyi, other leaders from ruling NLD party.
	About 10:30am Military declares state of emergency for a year, hands power to Senior General Min Aung Hlaing.

*Myanmar has a constitutional arrangement for 25% of parliament seats to be reserved for the military.

What is the reason behind China's aggressive focus on India?

- The PLA incursion into Barahoti, a demilitarised zone in Uttarakhand in August was a significant pointer to the renewed Chinese aggression against India.
- The incursion of Chinese patrols in Arunachal Pradesh have also increased in frequency and duration.
- The major reason for China's aggressiveness is to further the institutional interest as the army of the revolution which is currently losing its pre-eminence in Taiwan and South China Sea.
- PLA's view that the Indian military has been exerting a greater presence on Chinese territory in the border areas in the last 10-12 years is also a reason.
- The Doklam stand-off of 2017, when Indian soldiers walked onto Bhutanese territory claimed by China, was a turning point in the PLA's approach.
- Beijing's unilateral action of changing the status quo resulted in the [Ladakh crisis](#).

What was New Delhi's response to Chinese aggressions?

- The Indian military has inducted more modern military platforms backed by infrastructure construction in the China border.
- The Indian military always maintained a defensive deterrence against the PLA.
- India's advantage in dissuading a major military conflict with China is that as a lesser power, it has to only deny an outright military victory to the PLA.
- Also, India's primacy of Air Force is an added advantage.

What are the challenges?

- **Military modernisation** - The sharp decline in the Indian economy after demonetisation and the coronavirus pandemic made it difficult to generate enough resources for military modernisation.
- The parliamentary standing committee on defence has repeatedly warned about the increasing technological asymmetry with PLA.
- **Divisive majoritarian politics** - India's foreign policy in the neighbourhood is adversely affecting the Indian interests.
- The UAE brokered backchannel deal with Pakistan fell through because of New Delhi's policies in Kashmir.
- The treatment of religious minorities and the issues over the influx of Myanmar refugees in Mizoram has made India-Bangladesh relation weaker.
- **Power competition in the Indo-Pacific** – Groupings like Quad (India, the United States, Australia, Japan) does not have a 'hard power' agenda yet unlike the trilateral security pact, AUKUS.
- **Executive's shadow** - The lack of institutional checks and balances on the political executive imposes a bigger cost in decision-making on national security issues.
- The removal of an official report about Chinese presence across the LAC from the Defence Ministry's website and non-acknowledgement of Indian soldiers in Chinese captivity after the Galwan clash have been done to evade political accountability.
- Neither the Parliament has been allowed to ask questions nor the parliamentary standing committee deliberated upon the issue.

What is the future ahead?

- The Indian government's aim is to restore the *status quo* on the LAC in Ladakh that existed before May 2020 has not happened so far.
- A new *status quo* has been created which curtails Indian patrolling rights while the PLA remains to be settled in the Indian territories of Depsang, Hot Springs and Demchok.
- India now has no choice but to be prepared for all eventualities on the Sino-India border.

6.5 China's New Land Border Law and Indian Concerns

What is the issue?

China passes a new border law for the “protection and exploitation of the country’s land border areas” amid a continuing stalemate in negotiations with India.

What is the new law about?

- The law which will take effect on January 1 designates the responsibilities of various agencies in China, from the military to local authorities, in guarding the frontiers.
- It states that the sovereignty and territorial integrity of the People’s Republic of China are sacred and inviolable.
- The law asks the state to take measures to safeguard territorial integrity and land boundaries.
- The law says that the Chinese military shall carry out border duties to prevent, stop and combat invasion, encroachment, provocation and other acts.
- It suggests a push to settle civilians in the border areas.
- It also asks the state to follow the principles of equality, mutual trust, and friendly consultation and handle land border related-affairs with neighbouring countries through negotiations.



What is the status of China's land border dispute?

- China shares its 22,457-km land boundary with 14 countries including India, the third longest after the borders with Mongolia and Russia.
- Unlike the Indian border China's borders with these two countries are not disputed.
- The only other country with which China has disputed land borders is Bhutan (477 km).

What does China's action signal India?

- The announcement of new law at this time sends a clear signal to New Delhi that Beijing is in no mood to quickly end the 18-month-long crisis along the LAC.
- India has reacted sharply, telling China that it must not use legislation as a pretext to formalise the PLA's actions to unilaterally alter the LAC.
- The Chinese Foreign Ministry said the law would not affect the implementation of existing agreements.
- It makes the negotiations more difficult and the Chinese are clearly indicating that they will resolve the boundary through use of force.
- China has been building border defence villages across the LAC in all sectors to use the civil population to reinforce their claims.
- The law is the latest signal that the continuing deployments by both sides in forward areas and a build-up of infrastructure is likely to continue over the longer term.

6.6 Aiding Afghans

What is the issue?

The Prime Minister has called for the international community to provide Afghanistan with immediate and unhindered access to humanitarian assistance.

What is the current crisis in Afghanistan?

- In Afghanistan, banks are running out of money, civil servants have not been paid and food prices have soared, leaving millions at risk of severe hunger.

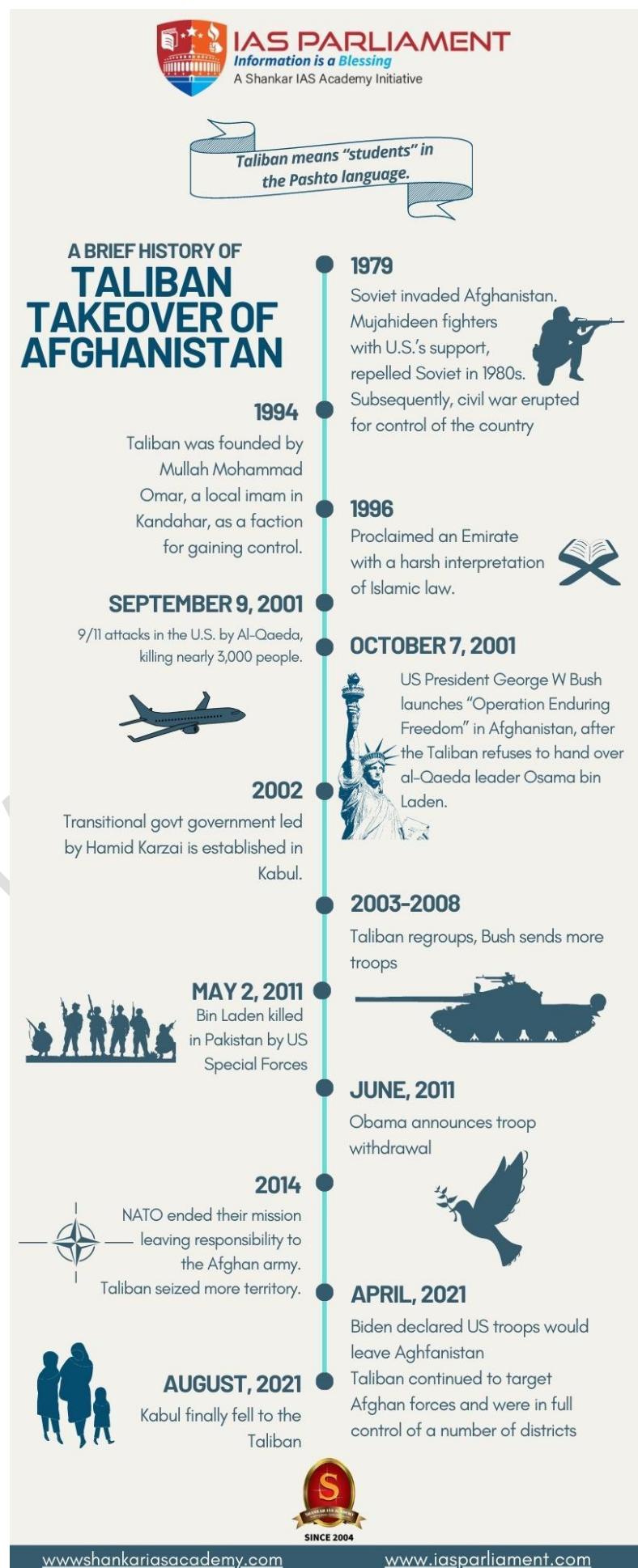
- The country is struggling with drought and severe poverty following the decades of war.
- The U.S. has frozen the reserves of Afghanistan making the situation vulnerable.
- The Taliban government's refusal to allow women to work and stopping girls from schooling have complicated the issue.

What does UNHCR report say?

- UNHCR has published a report that states that half the population in Afghanistan (more than 20 million people) are in need of lifesaving humanitarian assistance.
- An estimated 270,000 Afghans have been newly displaced inside the country since January 2021.
- The number of civilian casualties has risen 29 per cent during the first quarter of this year compared to 2020.
- The UN has received only 35% of the funds needed for its relief operations.

How can the situation be eased?

- EU has already committed \$1.15 billion for Afghanistan and neighbouring countries where refugees have fled.
- The U.S. and China pledged \$1.1 billion at a donor conference in Geneva last month.
- G20 leaders have also pledged to help for Afghan humanitarian crisis at special summit.
- Maintaining links with terror groups including those that target India leaves little space for government to increase its engagement or to send aid directly to the new regime.
- Coordinating with the Taliban did not mean recognising their administration and hence India could contribute to international agencies that are working with displaced Afghans.
- The government could also consider liberalising its visa regime for Afghans.
- As a goodwill gesture, India could send food aid, including wheat, grain, fortified biscuits and other packaged food directly to Kabul.
- Regional leader like India have to play a key role in unfolding the humanitarian crisis because not only Afghans but also the rest of the world will pay a heavy price.



7. BILATERAL RELATIONS

7.1 India's Central Asian Outreach

What is the issue?

The dramatic developments in Afghanistan have thrown up renewed challenges for India's regional and bilateral ties with Central Asia.

Why is Central Asia significant to India?

- The Central Asian region is considered to be the part of India's "**extended neighborhood.**"
- Over the past decade, the region has become the site of great power tussles over energy resources.
- At the same time, the world witnessed India's rise as an economic power and a regional power.
- China's deep inroads in the Central Asian republics in terms of investment is also a concern.
- Central Asia's geostrategic position as an access point between Europe and Asia is of greater significance in terms of trade.

What interventions were made by India in Central Asia?

- After the breakup of the Soviet Union and the formation of the independent republics in Central Asia, India reset its ties with the strategically critical region.
- New Delhi signed the **Strategic Partnership Agreements** (SPA) with Kazakhstan, Tajikistan and Uzbekistan to stimulate defence cooperation and deepen trade relations.
- India formulated its **Connect Central Asia Policy** which is a broad-based approach including political, security, economic, and cultural connections.
- India signed MoUs with Iran in 2015 to develop the **Chabahar port** in the Sistan-Baluchistan province to diversify the export markets and control China's ambitions.
- The government has also proposed to include the strategic Chabahar Port in the International North-South Transport Corridor(INSTC).
- The Central Asian countries have admitted New Delhi into the **Ashgabat Agreement** allowing India to facilitate trade and commercial interactions with Central Asia and Eurasia.
- India has extended a credit line of \$200 million for the support of development projects in Kyrgyzstan.
- It has signed an memorandum of understanding (MoU) on High-Impact Community Development Projects (HICDP).
- Mr. Jaishankar has become the first Indian External Affairs Minister to visit Armenia.
- India has supported efforts for a peaceful solution of the Nagorno-Karabakh conflict between Azerbaijan and Armenia.

What are the present challenges in the relation?

- **Re-establishment of Taliban** - The Taliban re-gaining its supremacy over Afghanistan has exposed the weakness of coalitions such as Shanghai Cooperation Organization whose major aim is to counter terrorism.
- **Chinese presence** – There are growing geostrategic and security concerns regarding the BRI's China-Pakistan Economic Corridor (CPEC) and its violation of India's sovereignty.
- India needs clear recalibration of its regional engagement with Central Asian countries.



8. INTERNATIONAL ISSUES

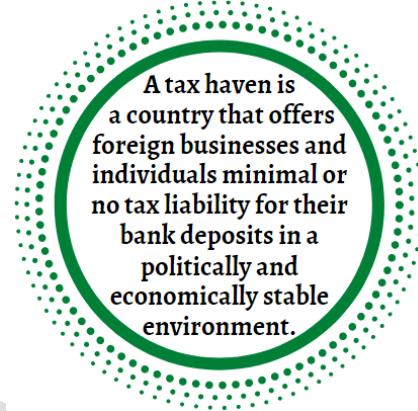
8.1 Pandora Papers: How US states help rich foreigners shield assets

What is the issue?

The release of the Pandora Papers report by **International Consortium of Investigative Journalists** has shed light on the financial dealings of the elite and the corrupt.

What is the report about?

- The report mentions how the elite and the corrupt have used offshore accounts and tax havens to shield trillions of dollars in assets.
- It has disclosed secret accounts in trusts scattered throughout the United States, including 81 in South Dakota, 37 in Florida and 35 in Delaware.
- Among those who have used South Dakota trusts as tax havens are Guillermo Lasso, president of Ecuador, and family members of Carlos Morales Troncoso, former vice president of Dominican Republic.



What attracts money to these states?

- Elimination of **rule against perpetuities** by tax havens allow the establishment of so-called dynasty trusts in which wealth can be passed across generations while avoiding federal estate taxes.
- *Rule against perpetuity limits the maximum time period beyond which property cannot be transferred.*
- Laws in South Dakota and Delaware allow **asset protection trusts** which aid wealthy lawyers and doctors to shield their assets from malpractice claims.
- They can be used to protect assets from ex-spouses, future spouses, disgruntled business partners or angry clients.
- They also provide wealthy people with considerable flexibility in establishing, controlling and modifying trusts as they see fit.
- Trusts established in Delaware are not subject to state income tax if the beneficiaries are not Delaware residents.
- South Dakota does not tax personal income, corporate income or capital gains.
- South Dakota provides extensive privacy protections for assets held in trusts while Delaware registers limited liability companies, including shell companies to hide assets or financial transactions.

How do the states benefit?

- Delaware collected almost \$81 million in franchise taxes from banks and trust companies in fiscal 2020.
- A 2011 report estimated that out-of-state trusts had contributed between \$600 million and \$1.1 billion per year to Delaware's economy.

What have been done about it?

- Tighter scrutiny of trust companies working with foreign clients has been called.
- **The Corporate Transparency Act** requires many businesses to identify their beneficial owners who exercise substantial control or who own or control at least 25% of the ownership interests.
- The law also aims at banning anonymous shell companies that have been used to hide financial dealings and launder money, but it includes several exemptions.

8.2 Implications of US-China Trade War

What is the issue?

The trade-and-technology war between the US and China that began in 2018 has hardly made a reduction in US trade deficit.

How the trade war started?

- In 2018, US President Donald Trump unilaterally imposed a 25 per cent tariff on Chinese imports of around \$34 billion and further tariffs in 2018 and 2019.
- He accused China for “**unfair trade practices**” and “**technology theft**”.
- The trade war was continued by the administration of President Joe Biden and was morphed into a technology war.
- The US has denied China both the knowledge and inputs for producing frontier goods and services as well as access to markets, affecting semiconductor production and 5G technology.

What are the concerns of U.S.?

Trade deficit - The broader context of the trade war was the growing merchandise trade deficit of the US which was \$735 billion in 2016.

- **Pandemic reliance** - Imports into the US from China in the first half of 2021 were on average 46% higher than in the first half of 2020.
- **Hi-Tech imports** - One of the more obvious concerns of US trade policy with regard to China is the growing significance of high-technology imports.
- **Security fears** – U.S has recently restricted China's access to semiconductor chips that are essential for new 5G-enabled smartphones.
- Sanctions have been imposed on Chinese telecom giants ZTE and Huawei for alleged espionage and ties to the “techno-authoritarianism” of the Chinese state.

To know more about US – China relations, click [here](#)

What will be the implications of the U.S. policy towards China?

- The aggressive strategy by the US is putting the economic territory of the future (whether in the form of communication technologies like 5G or renewable energy solutions) at risk.
- The trade war has hardly made any reduction on US trade deficit.
- The macroeconomic processes within the US that were likely to generate trade deficits have to be looked upon rather putting the blame on China.

8.3 China-Taiwan Tussle

What is the issue?

Coinciding with the 72nd anniversary celebrations, China flew over 100 fighter jets into Taiwan's air defence identification zone setting off alarm around the world that it was prepping to take over the island by force.

What is the history of China-Taiwan relation?

- Taiwan earlier known as Formosa and formally as the Republic of China (ROC) is a self-ruled island that lies about 161 kilometres off the coast of mainland China. It is a democracy with a separate government and a military.
- The Republic of China (ROC) was founded in 1912 in China.

Chart 1

Stubborn US deficit

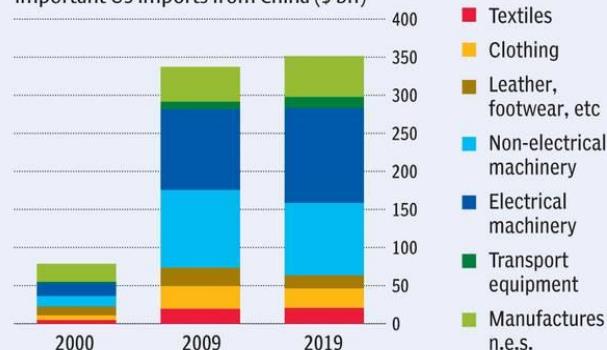
US merchandise trade balance (\$ bn)



Chart 4

Tech dominance

Important US imports from China (\$ bn)



- At that time, Taiwan was under Japanese colonial rule as a result of the 1895 Treaty of Shimonoseki, by which the Qing ceded Taiwan to Japan.
- The ROC government began exercising jurisdiction over Taiwan in 1945 after Japan surrendered at the end of World War II.
- The ROC government relocated to Taiwan in 1949 while fighting a civil war with the Chinese Communist Party.
- The ROC, the non-communist frontier against China was the only China recognised at the UN until 1971.
- In 1971, the UNGA recognised the People's Republic of China (PRC) as the only legitimate representative of China to the global body which led to the withdrawal of ROC from the U.N.
- The PRC believed that Taiwan must be reunified with the mainland while the ROC has held out as an independent country.
- The US backs Taiwan's independence, maintains ties with Taipei, and sells weapons to it but officially subscribes to PRC's "**One China Policy**".
- The "One-China policy" is a policy asserting that there is only one sovereign state under the name China, as opposed to the idea that there are two states, the PRC and the ROC.
- As the British prepared to exit Hong Kong in 1999 the "**One Country, Two Systems**" solution was offered to Taiwan but it was rejected by the Taiwanese.
- The One Country Two Systems policy was originally proposed by Deng Xiaoping in the late 1970s. Currently Hong Kong and Macau Special Administrative Regions have been placed under this system.
- In 2004, China started drafting an anti-secession law aimed at Taiwan.
- In 2009, Taiwan attended the World Health Assembly as an observer, marking its first participation in an activity of the U.N. since its withdrawal in 1971.



China-Taiwan timeline

First meeting scheduled between the leaders since end of civil war 1949

A history of animosity

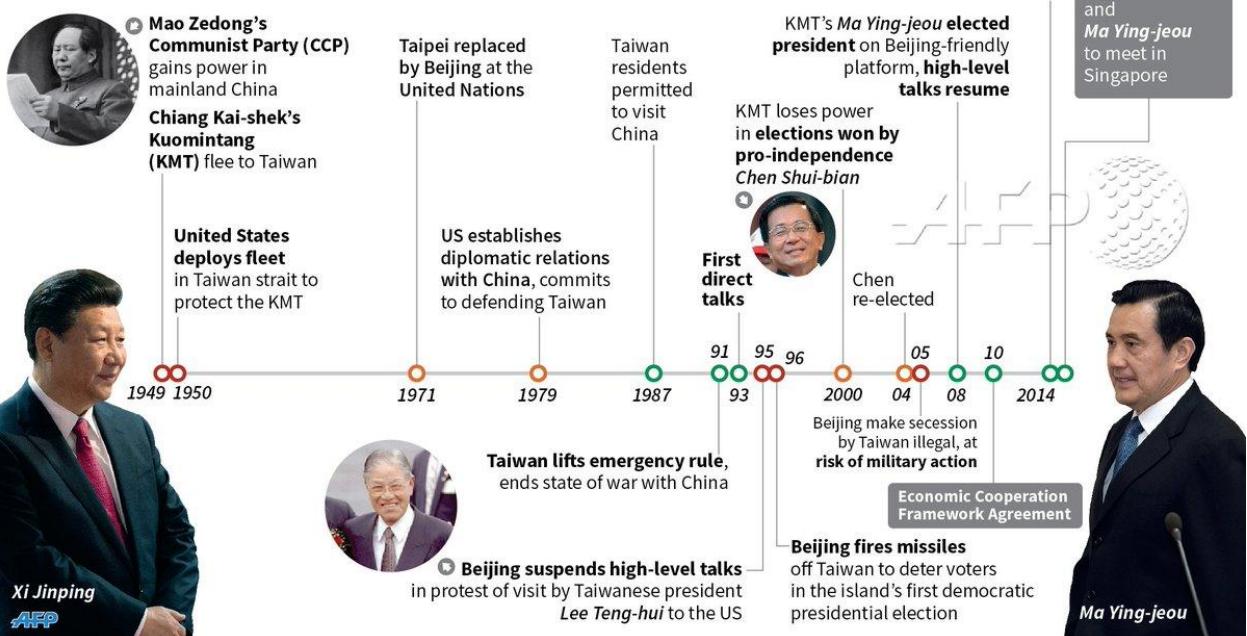
Hostile development

Diplomatic or domestic

Improvement

November, 2015

Chinese President Xi Jinping and Ma Ying-jeou to meet in Singapore



What is the current tension about?

- The 2016 election of President Tsai marked the onset of a sharp pro-independence phase in Taiwan and the current tensions coincided with her re-election in 2020.
- Last year, Chinese conducted a military exercise in the Taiwan Strait, which separates Taiwan from mainland China.
- In October 2020, President Xi Jinping asked the Chinese army to prepare for war triggering alarm in Taiwan.
- Taiwan reported repeated incursions of Chinese jets in its air defence zone.
- In October 10, Xi spoke about peaceful reunification of the motherland.

What is the challenge for the U.S.?

- President Joe Biden has so far walked a thin line between pledging support for Taiwan and keeping the lid on tensions with Beijing.
- Recently, the U.S. and China had agreed to abide by the “**Taiwan Agreement**”, under which it supports for the “One China Policy”.
- Taiwan agreement allows Washington to maintain a robust unofficial relationship with Taiwan.
- **The AUKUS pact** among the US, UK, and Australia which has imparted a new dimension to the security dynamics of the Indo-Pacific was criticised by China.

What will be the implications for India?

- India and Taiwan currently maintain “trade and cultural exchange” offices in each other’s capitals.
- Talks with Taipei are ongoing to bring a \$7.5-billion semiconductor or chip manufacturing plant to India.
- India should review its One China Policy and develop more robust relations with Taiwan to send a message to Beijing.

G.S PAPER III

9. ECONOMY

9.1 Is the economic recovery V, K or W shaped?

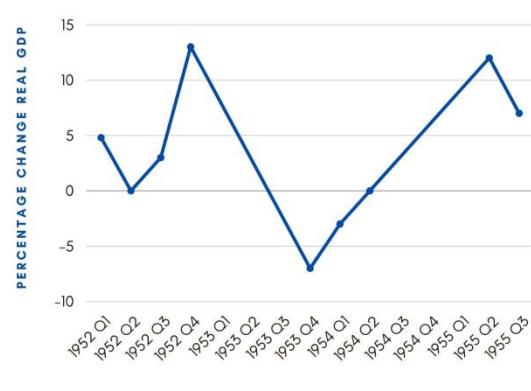
What is the issue?

- Since the Covid-19 pandemic has ravaged all major economies, how the economy will recover from here on is a matter of debate.
- The economists are busy describing the shape of the post-pandemic recovery given its complex nature.

What shapes of economic theory are in debate?

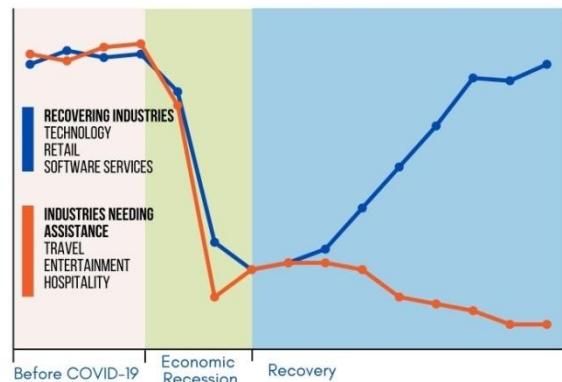
- **V-shaped recovery** - A V-shaped recovery is characterized by a quick and sustained recovery in measures of economic performance after a sharp economic decline.
- Such recoveries are generally spurred by rapid readjustment of consumer demand and business investment spending.
- Because of the speed 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 & 1953 in the U.S. are examples of V-shaped recoveries.
- The Economic Survey 2021 predicted a ‘V-shaped’ post-pandemic recovery.

V-SHAPED RECOVERY

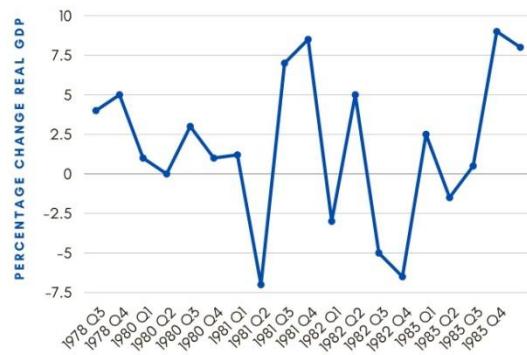


- **K-shaped recovery** - A K-shaped recovery is one in which the performance of different parts of the economy diverges like the arms of the letter "K"
- In a K-shaped recovery some parts of the economy may see strong growth while others continue to decline.
- Overall, the natural consequence of a pandemic is the widening of inequality and a K-shaped recovery.
 - 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.
- **W-shaped recovery** - A W-shaped recovery is when an economy passes through a recession into recovery and then immediately turns down into another recession.
- It is also called as the double-dip recession.
- W-shaped recessions can be particularly painful because the brief recovery that occurs can trick investors into getting back in too early.
- Some experts say that it is a W-shaped recovery, especially when growth is seen in the context of seasonally adjusted quarter-on-quarter.

K-SHAPED RECOVERY



W-SHAPED RECOVERY



Which letter explains the economy at its best?

- In 2010, then Finance minister Pranab Mukherjee said at the US-India CEO Forum that the same situation can be explained by different letters as we really do not know the answer.
- With several major cities having to implement new lockdown measures to bend the curve of infections, it's possible the shape of the recovery will not reveal itself for many more months.

9.2 Global Minimum Corporate Tax Deal

What is the issue?

Around 136 countries have signed an agreement at the OECD meeting to redistribute taxing rights and impose a global minimum corporate tax on large MNCs operating globe over.

What is the need for a global minimum corporate tax rate?

- Large MNCs have traditionally been taxed based on where they declare their profits rather than where they actually do business.
- This allowed several large companies to shift their profits to low-tax jurisdictions (tax havens).
- This has led to significant decline in Global corporate tax rates since the 1980s to well below 25% in 2020.
- The double taxation avoidance agreements have been exploited by using the mismatches between the tax laws of various countries.
- The COVID-19 pandemic has also severely battered economies and affected the tax revenues of governments.

What does the new agreement say?

- The agreement fixes the corporate tax rate at 15% on large MNCs across the world.
- It let the governments to impose a top-up tax on home companies that pay lower than 15% tax on profits they declare abroad thus adding additional annual revenues to the budgets of governments.

- The deal also allows a government to impose top-up taxes on the subsidiary of a foreign company if it declares profits through its home headquarters in a different country and pays less than 15% taxes on those profits.
- This prevent companies from profit shifting to tax havens.
- India, China, Russia, Germany and other countries have signed the agreement, which has to be implemented from 2023.

What measures have been taken earlier to prevent tax evasion?

- Digital Services Tax- Countries like Belgium, Britain, India and Indonesia brought in Digital Services Taxes on the local sales of foreign firms with online platforms.
- **Equalisation levy** – Based on the recommendations of Akhilesh Ranjan Committee in 2016, India became the first country to implement the equalisation levy
- It was levied at 6% on online advertisement services earned by non-residents and at 2% on e-commerce operators.

What are the expected benefits?

- The agreement will stop the countries racing against each other to cut taxes to attract businesses.
- It will increase the tax revenues and help governments invest in social development.

What are the challenges in the agreement ?

- Oxfam International has criticised the deal, arguing that the minimum corporate tax rate of 15% is too low.
- Some view that it may hamper the various economic benefits that come with tax competition among countries.
- The so-called tax havens such as Ireland, Switzerland, Bermuda etc. are defended as they benefit citizens of high-tax countries.
- Higher taxes in the home countries will suppress the ability of the companies to serve the consumers in their countries.
- India would have to reconsider the equalisation levy and address issues such as the share of profit allocation and the scope of subject-to-tax rules.
- Simultaneous implementation of the law by all the signatories will be a tedious process.
- India's Direct Tax Code has to be revamped in accordance with the concept of global minimum tax.
- The agreement if achieved may herald the dawn of the 'Golden Era' of direct taxes.

9.3 Unity Small Finance Bank

Why in news?

The RBI has issued a Small Finance Bank (SFB) license to the consortium of Centrum Financial Services and Digital payments platform BharatPe.

What are SFBs?

- Small Finance Banks is a specific segment of banking created by RBI with to undertake basic banking activities to un-served and underserved sections.
- The draft guidelines for licensing of small banks in the private sector were formulated and released by RBI in 2014.
- **Objectives** - The objectives of setting up of small finance banks will be to further financial inclusion by

- Provision of savings vehicles
- Supply of credit to small business units, small and marginal farmers, micro and small industries and other unorganised sector entities, through high technology-low cost operations.
- Eligible promoters include
 - Resident individuals/professionals with 10 years of experience in banking and finance
 - Companies and societies owned and controlled by residents
 - Existing NBFCs, Micro Finance Institutions and Local Area Banks that are owned and controlled by residents can opt for conversion into small finance banks
- There will not be any restriction in the area of operations of small finance banks.
- The minimum paid-up equity capital for small finance banks shall be Rs. 100 crore.

What is the significance of this SFB?

- The RBI has issued a new bank license after a gap of nearly 6 years and the new SFB has been incorporated as 'Unity Small Finance Bank'.
- The assets and liabilities of Punjab and Maharashtra Co-operative Bank will be taken over by the new entity.
- This proposal sheds light on the need for traditional lenders to expand their digital infrastructure.
- In the buy-now-pay-later (BNPL) and micro-lending models, companies like Paytm, Google Pay, Amazon Pay, etc. have partnered with NBFCs to assess creditworthiness of an existing customer and present it to the lender as a potential borrower.
- For BharatPe, an SFB licence means it could expand its lending portfolio.
- The lending rates offered by SFBs could be attractive for small merchants across the country looking to borrow to fulfil their working capital needs.

9.4 OPEC's Caution on Boosting Supply

What is the issue?

The rise of prices of natural gas, coal and electricity are putting extra pressure on oil markets and boosting the demand as industries and power generators are seeking to switch to liquid fuels.

How are oil prices decided?

- **Supply and demand** - The concept of supply and demand is the mechanism by which the prices of crude oil are controlled.
- OPEC as producers have no influence over the demand for petroleum but they tend to change its supply in order to influence the price.
- In order to keep prices of the oil stable, OPEC countries usually maintain a quota of oil supply.
- **Speculations** - Another mechanism of pricing is the future supply based on some speculations.
- These are the supply and demand based on speculations of suppliers and consumers.

What are the reasons for the current oil demand?

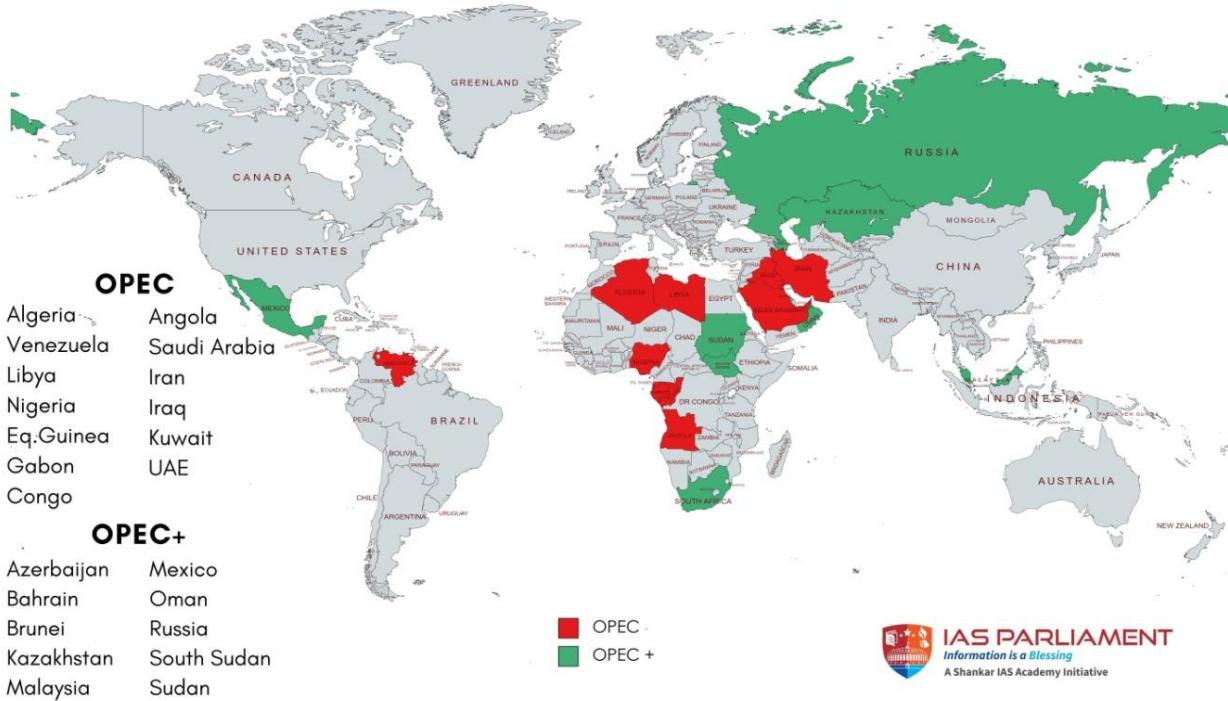
- Fuel switching from gas and coal to oil and crude is the reason for increased demand.
- Soaring natural gas prices have spiked the price by 300%
- Agencies like IEA's forecast on oil demand contributes for the reluctance of OPEC to open the taps.

What will be the future prospects of oil demand?

- Top exporter Saudi Arabia has started cutting its official selling price to its core customers to ease the price of Brent crude oil futures.
- On the demand side, China's industrial slowdown, collapse of real estate giant Evergrande, rising inflation pressure and Covid-19 disruptions could undermine oil demand growth over the next 12 months.
- But in the near term, a repeat of a cold winter across the Northern Hemisphere could cause major energy supply shortages in many leading industrial hubs.

OPEC (Organization of Petroleum Exporting Countries)

- OPEC is a permanent, intergovernmental organization created at the Baghdad Conference on September 1960 by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela.
- Aim - To coordinate and unify the petroleum policies of member countries and ensure the stabilization of oil market.
- At present, it has 13 members with its headquarters at **Vienna**
- OPEC countries produce about two-fifths of the world's crude oil.
- They possess more than 80% of the world's total crude oil reserves.



- **OPEC+** - It is a loosely affiliated entity consisting of the 13 OPEC members and 10 of the world's major non-OPEC oil-exporting nations.
- It includes Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan in addition to OPEC members
- Since 2016, they cooperate in fixing the global crude oil prices

9.5 RBI's Microfinance Proposals

What is the issue?

RBI's **Consultative Document on Regulation of Microfinance** which aims to promote financial inclusion of the poor and competition among lenders is likely to unfavour the poor.

To know more about Consultative Document on Regulation of Microfinance, click [here](#)

Why is microfinance crucial for rural households?

- Microfinance is becoming increasingly important in the loan portfolio of poorer rural households.
- Unsecured or collateral-free loans from private financial agencies (SFBs, NBFCs, NBFC-MFIs and some private banks) forms the major chunk.
- These loans were of disproportionate significance to the poorest households and to persons from Scheduled Castes and Most Backward Classes.
- These microfinance loans were rarely for productive activity and used mainly for house improvement and meeting basic consumption needs.

- Poor borrowers took microfinance loans, at reported rates of interest of 22% to 26% a year against the low interest offered by institutional mechanisms such as PACS.

Why are microfinance loans costlier?

- **Method of repayment** - An official flat rate of interest used to calculate equal monthly instalments which rises the effective rate of interest over time.
- **Processing fee and insurance premium** – A processing fee of 1% is added and the insurance premium is deducted from the principal.
- As the principal is insured in case of death or default of the borrower or spouse, the interest rate is higher in response to high risk of default.

What is different about the recent phase of growth of financial services?

- The privately-owned for-profit financial agencies are regulated entities and are promoted by RBI.
- Lending by small finance banks (SFBs) to NBFC-MFIs has been recently included in priority sector advances
- In the 1990s, given the lack of regulation and scope for high returns, several for-profit financial agencies such as NBFCs and MFIs emerged involving in malpractices.
- The microfinance crisis of Andhra Pradesh led RBI to formulate a regulatory framework for NBFC-MFIs in 2011 based on the recommendations of the Malegam Committee.
- Later RBI permitted SFBs to take banking activities to the “unserved and underserved” sections of the population.
- The RBI’s consultative document notes, 31% of microfinance is provided by NBFC-MFIs, and another 19% by SFBs and 9% by NBFCs.

What will be the implications for the poor?

- The current share of public sector banks in microfinance (SHG-bank linked microcredit) of 41%, is likely to fall sharply.
- This privatisation of rural credit will reduce the share of direct and cheap credit from banks and leave the poor borrowers at the mercy of private financial agencies.
- It has also raised concerns about the implications for women borrowers.
- To meet the credit needs of poorer households strengthening of public sector commercial banks and firm regulation of private entities is needed.

9.6 RBI Caps IPO Funding by NBFCs

Why in news?

The RBI has issued a fresh set of rules for non-banking finance companies (NBFCs) which limits lending to IPO investors to Rs 1 crore per borrower from April 1, 2022.

What is an Initial Public Offering (IPO)?

- An initial public offering (IPO) refers to the process of offering shares of a private corporation to the public in a new stock issuance.
- Companies must meet requirements by exchanges and the Securities and Exchange Commission (SEC) to hold an IPO.
- IPOs provide companies with an opportunity to obtain capital by offering shares through the primary market.

How does IPO funding work?

- IPO Funding is a loan offered for applying in primary stock market by NBFC's to high net worth individuals (HNI).
- The investor pays only small margin for applying in IPO and rest amount is funded by the lender.
- Interest is charged between 8 to 12% and it varies by the lender.
- Through IPO Funding, an investor can leverage its own funds in primary market and thereby maximize the profits in a very short span of time.

- IPO Funding loans are short term loans, where in most cases they are for 7 days, from the IPO closing day to date of listing of IPO shares.
- Repayment of these short term loans is up to 3 months.

What are the advantages of IPO funding?

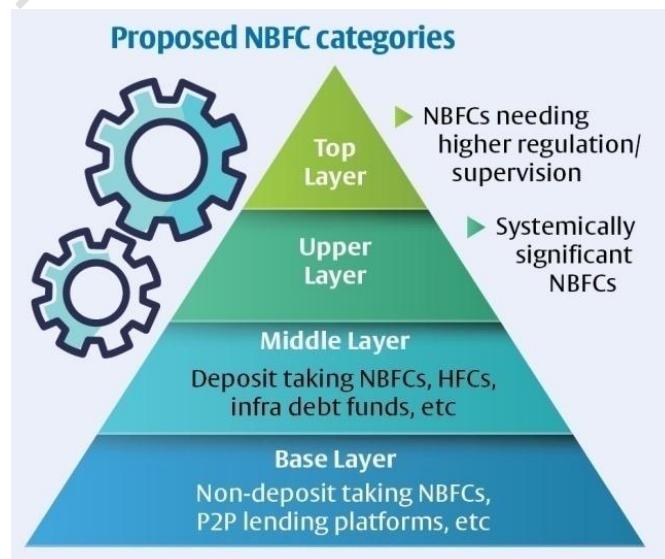
- Investor can apply for more shares, thus increasing the chances of a large allotment.
- Offers good opportunity to make huge profits in a short span.
- Only small amount of margin is needed which increases the profits multifold.
- Funding cost came down significantly in recent time because of quick IPO listings and reduced interest rates.
- Simple Documentation and streamlined speedy processing of loans.

What are the concerns of IPO funding?

- It is a high risk high reward investment that could result in massive losses.
- Since investor pays only small amount of margin money, the losses could be multi fold.
- It is not for investors applying in retail category.
- Borrowing limit varies as per the scheme launched for the IPO, and on the level of subscription under the HNI category.
- Interest rate varies as per the scheme launched for the IPO, and is charged upfront.

What is the new RBI framework?

- **Layer-based structure** - Under the new framework, the regulatory structure for NBFCs shall comprise four layers – base, middle, upper and top layer.
- The first category primarily entails non-deposit taking NBFCs with less than Rs 1,000 crore in assets.
- The second category include all deposit taking NBFCs irrespective of asset size.
- The Upper Layer will comprise the top ten eligible NBFCs in terms of their asset sizes.
- Depending on sudden risk factors, the RBI can move Upper Layer companies to the Top or fourth category, citing systemic risks.
- **Sensitive exposure** – Exposure to the capital market and commercial real estate shall be the sensitive exposure for NBFCs.
- The RBI has proposed sensitive sector exposure norms for NBFCs in the middle and upper layers.
- **Minimum net owned fund** - The regulatory minimum net owned fund for NBFC-Investment and Credit Companies, NBFC-MFI and NBFC-Factors shall be increased to Rs 10 crore by March 2027.
- **Management of NBFC affairs** - At least one of the directors should have relevant experience of having worked in a bank or an NBFC.



Why has the RBI come out with this rule?

- Non-banks are able to borrow funds at 4-5 % and interest rates on such loans have dropped to 7-8 %.
- Leveraged IPO bids unfairly tilt the allotment process in favour of short-term bettors removing the genuine long-term investors and distorting price discovery.
- The new rule aims to moderate the over-subscription numbers and listing gains.
- The RBI aims to put the NBFCs on line with banks that already has Rs.10 lakh limit.

What implication will the RBI rule have for upcoming IPOs?

- The new rules might reduce the quantum of funds available with high networth investors (HNI) for bidding in IPOs.
- The number of oversubscriptions in the HNI category will come down which will benefit the price discovery process.
- The NBFC sector has undergone considerable evolution in terms of size, complexity, and inter-connectedness and hence there is a need to align the regulatory framework for NBFCs.

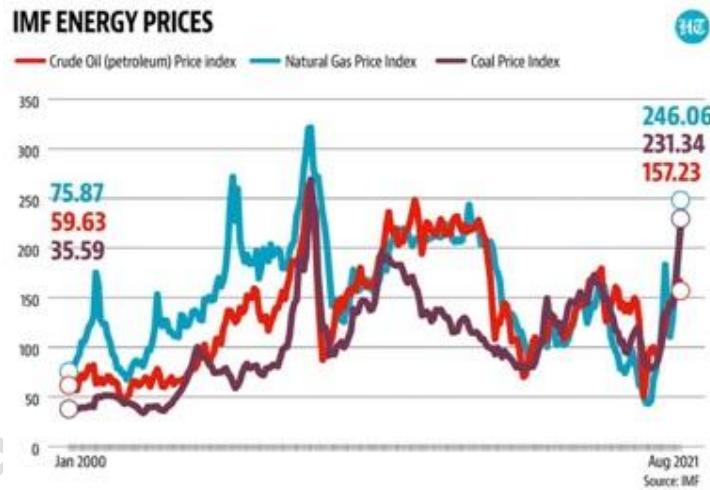
9.7 Spike in Crude Oil Prices – Impacts

What is the issue?

The recent spike in global crude oil prices above the \$80-per-barrel mark led to a dip in key indices in the stock market.

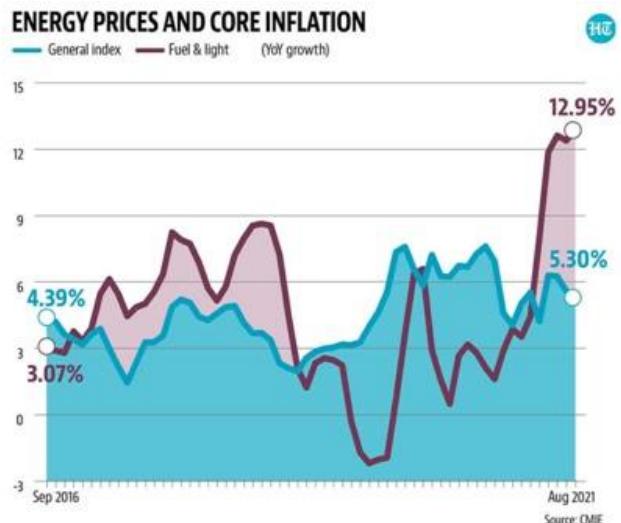
Why are oil prices rising?

- The oil prices hit a low of \$16 per barrel on April 22 last year.
- It has risen nearly 58% from about \$51.8 per barrel to about \$81 at close on Wednesday.
- Recovery in global demand as the world economy recovers from the pandemic is a major reason for increase in prices.
- Supply restrictions maintained by the OPEC+ grouping have kept international oil prices high.
- A shortage of gas in Europe and Asia has boosted demand for oil for power generation.
- High taxes by the central and state governments too have contributed to retail prices being far higher.



What will be the impact of rising oil prices?

- Impact on stocks** - A sharp surge in oil prices can create short-term panic in the equity markets.
- Equities often deliver more than the expected inflation that the oil surge may lead to.
- Impact on bonds** - Sustained high inflation can result in rising yields and falling bond prices.
- For bonds, central bank policies will play a far greater role than the direct impact of rising oil prices.
- In sectors where oil is a major cost component, a negative reaction on returns can be expected.
- Impact on currency** - Rising crude prices tend to depress the rupee as India being a major importer of oil.
- It will lead to expansion in the import bill as it is expected that Brent crude can test the \$ 90/barrel mark.
- Crude import accounts for nearly 20% of India's import bill.
- Impact on inflation** - Rise in prices could lead to a surge in inflation, forcing the RBI to go for liquidity tightening measures followed by rate hikes.
- An increase in crude prices means an increase in the cost of producing and transporting goods thus adding to inflation.



- **Impact on government finances** - A surge in crude prices tends to increase India's expenditure and adversely affects the fiscal deficit.
- It also impacts the current account deficit — a measure of value of imported goods and services exceeding the value of those exported.
- **Impact on market** - Sectors including refining, lubricants, aviation and tyres are sensitive to oil price movement.
- Rise in crude oil prices impact their input raw material cost and profitability thereby hurting their share prices.

9.8 India's Import Duty Cut on Cooking Oils

What is the issue?

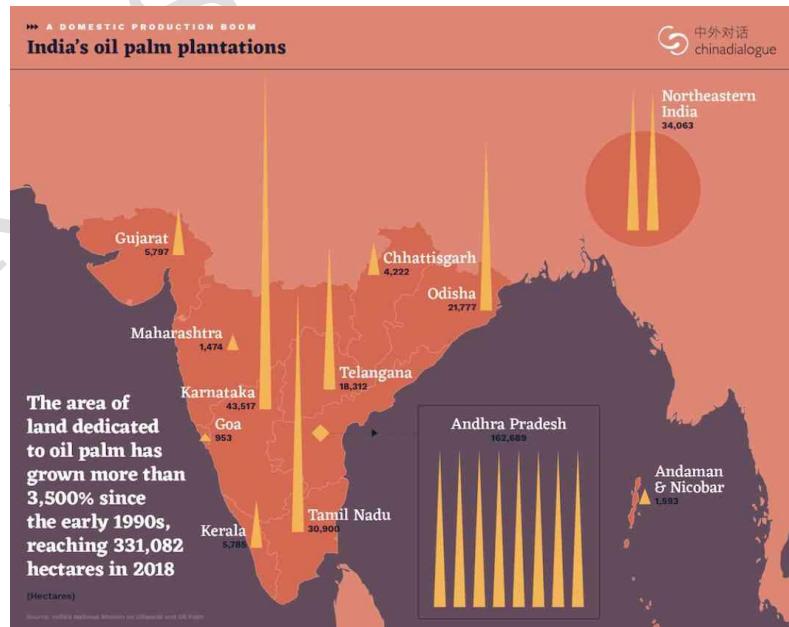
The timing of reduction of import duty by the government has affected the balance between the interests of farmers and consumers.

What is the reason for duty reduction?

- High price edible oil
- High food inflation
- Onset of festive season
- This urged the central government to reduce the import duty on crude and refined palm oil, soybean oil and sunflower oil between 16.5 % to 19.25% with effect from October 14 upto March 31, 2022.
- The rumours in the market in the last few days have already discounted the domestic price and this may further reduce the price of refined oil by Rs 6 to 8 per kg.

What is the trend of edible oil imports in India?

- Yellow Revolution started during early 1990s aimed at self-sufficiency in oilseeds but it could not be sustained beyond a short period.
- India is the **fourth largest producer** of oilseeds accounting for 10% of the global production.
- India is the **world's largest edible oil buyer**.
- Of the imported edible oils, share of palm oil is about 63% followed by soybean oil and sunflower oil.
- The production of oilseeds is concentrated in the Central and Southern parts of India, mainly in the states of Madhya Pradesh (27.89%), Rajasthan (21.49%), Maharashtra (14.84%), Gujarat, Andhra Pradesh and Karnataka.
- The groundnut, rapeseed-mustard and soyabean accounts for 87 per cent of production of oilseeds in the country during 2018- 19.
- According to SEA, import of vegetable oils during September 2021 is reported at 1,762,338 tons compared to 1,061,944 tons in September, 2020, i.e. up by 66%.
- Palm Oil imports in September 2021 are at 12.62 lakh tons which is the highest in any single month since India started importing Palm Oil in 1996.
- Soft Oils import decreased due to high prices of soybean and sunflower oils in international market.



What will be the impact of tax reduction?

- Indian households prefer indigenously extracted groundnut, sunflower, mustard, rapeseed and sesame oil and use palm oil as a low-cost supplement.
- Hence the palm oil may end up in the processed food and restaurant industries more than ordinary households.
- The recent measure will put oilseed farmers and the domestic solvent extraction industry in a difficult situation.
- This is because the farmers are now harvesting kharif soya and groundnut crop and reduction in import duty may affect the farmers' realisation for their produce.

How can the situation be eased?

- The government needs reliable data on evolving production and demand trends, and imported inventory for a more proactive decision-making.
- India's central procurement mechanism, buffer stock policies and public distribution system need to focus more on proteins, fats and processed foods that are taking up a higher share of the household budget.
- A more flexible PDS system has to be in place to balance the interests of farmers and consumers.
- Importing limited quantities of packaged cooking oils for PDS distribution may suppress the pre-festival spiral in cooking oils.
- India needs to become [Atmanirbhar in edible oils](#) to reduce the dependence on imports.

10. INFRASTRUCTURE

10.1 Gati Shakti National Master Plan

Why in news?

Prime Minister Narendra Modi has launched the ambitious Rs 100 lakh crore Gati Shakti Master Plan to provide multi-modal connectivity to more than 1,200 industrial clusters.

What is Gati Shakti?

- The plan aims to transfer India into a hub of world class infrastructure by providing integrated and seamless connectivity for movement of people, goods and services.
- A digital platform will be created to bring 16 ministries including rail and roadways together for integrated planning and coordinated implementation of infrastructure projects.
- **Comprehensiveness:** It will incorporate the existing infrastructure schemes of different departments and state governments like Bharatmala, Sagarmala, inland waterways, UDAN etc.
- **Analytical** -It will offer 200 layers of geospatial data, including on existing infrastructure as well as geographic information about forests, rivers and district boundaries.
- **Dynamic:** The portal will allow various government departments to track the progress of various projects in real time and at one centralised place.
- **Prioritization:** Different Departments will be able to prioritize their projects through cross-sectoral interactions.
- **Optimization-** For the transportation of goods from one place to another, the plan will help in selecting the most optimum route in terms of time and cost.
- **Synchronization:** PM GatiShakti will help in synchronizing the activities of each department in a holistic manner by ensuring coordination of work between them.
- The project will be spearheaded by the logistics division in the commerce ministry and the implementation will be monitored by a monitoring group under the Department for Promotion of Industry and Internal Trade (DPIIT).

What are the targets to be achieved under Gati Shakti?

- 11 industrial corridors and two new defence corridors in Tamil Nadu and Uttar Pradesh

- 4G connectivity in all villages
- Increasing renewable energy capacity to 225 GW from 87.7 GW
- Expanding the national highway network to 2 lakh km
- Increasing length of transmission network to 4,54,200 circuit km
- Creation of 220 new airports, heliports and water aerodromes
- Increasing cargo handling capacity of railways to 1,600 million tons from 1210 million tons
- Adding 17,000 km to gas pipeline network
- 202 fishing clusters/harbours/landing centres and more

What are the existing challenges in the infrastructure creation?

- Lack of coordination between different Departments
- Wasteful expenditure
- Time-taking approval process
- Multiplicity of regulatory clearances
- Hostile land acquisitions
- Difficulties in getting environmental clearance

What will be the benefits of the Gati Shakti plan?

- The plan aims to build Next Generation Infrastructure which will improve Ease of Living as well as Ease of Doing Business.
- It will facilitate the last mile connectivity of infrastructure and also reduce travel time for people.
- It will provide the public and business community information regarding the upcoming connectivity projects, other business hubs, industrial areas and surrounding environment
- The plan enables the investors to plan their businesses at suitable locations leading to enhanced synergies.
- It will create multiple employment opportunities and give a boost to the economy.
- It will improve the efficiency of port operations and cargo handling capacity and cut the vessel turnaround time.
- Studies estimate that logistics costs in India are about 13-14% of GDP as against about 7-8% of GDP in developed economies.
- The plan will improve the global competitiveness of local products by cutting down the logistics costs and improving the supply chains.

10.2 Coal Shortage in India

What is the issue?

India's thermal power plants are facing a severe coal shortage, with coal stocks having come down to an average of 4 days of fuel across an increasing number of thermal stations.

What is the current status of coal stocks?

- Coal fired plants makeup nearly 70% of India's power source mix.
- On October 4, 16 thermal power plants with a power generation capacity of 17,475 MW (mega watts) had zero days of coal stock.
- An additional 45 thermal power plants with a power generation capacity of 59,790 MW had coal stock only for up to two days.
- It is way below the government recommendations of

Mode	Taking stock			
	2020	2021	2020	2021
Number of plants	17	16	118	119
Capacity (MW)	34,300	35,200	1,28,226	1,29,866
Daily requirement ('000T)	452.3	464.2	1,327	1,359.9
Total stock ('000T)	5,733.5	2464	28,434.6	5,345.2
Total stock in days	13	5	21	4



holding 14 days worth of coal stock.

- The non-pithead plants or plants which are not located close to coal mines have critical levels of stock i.e under 8 days.

What is the reason behind India's coal shortage?

- **Increased power demand** - A sharp uptick in power demand as the economy recovers from Covid-19 pandemic coupled with supply issues have led to coal shortage.
- India consumed 124 billion units of power in August 2021 compared to 106 billion units of power in August 2019.
- **Supply crunches** - Lower than normal stock accumulation by thermal power plants in the April-June period is another reason.
- Continuous rainfall in coal bearing areas in August and September caused fewer despatches of coal from coal mines.
- **Fall in imports** – There has been sharp fall in imports due to high international prices.
- **Non-payments of coal dues** - The non-payments of coal dues by States such as Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh and Madhya Pradesh also resulted in inadequate supplies.

What will be the impact of coal shortage?

- The electricity shortages could delay India's economic reopening.
- It might lead to downscaling of business productions.
- India's population and under developed energy infrastructure will mean the power crisis could hit long and hard.

What measures is the government taking to address the situation?

- The Power Ministry has constituted a **Core Management Team** to monitor and manage the fuel on daily basis to improve supplies to power plants.
- Coal India, the state-owned miner claims that it has ramped up supplies to thermal power plants by nearly 12 per cent annually.
- The government is pressing thermal plants with captive coal mines to boost their coal output to meet their own demand.
- The Power Ministry is trying to expedite the start of production from a number of mines that already have all requisite clearances.
- The government has also boosted the number of rakes of coal being transported to thermal power plants daily.

What is the way forward?

- State run Coal India and NTPC Ltd. can work together to raise the output from mines.
- India has to ramp its imports despite the financial cost.
- Advance preparation and ensuring sufficient stocks ahead of monsoons is a well known strategy.

11. AGRICULTURE

11.1 Sowing Better to Eat Better

What is the issue?

The first round of Fifth National Family Health Survey suggested the worsening of nutrition-related indicators and Comprehensive National Nutrition Survey (2016-18) highlighted the role of micro-nutrient malnutrition.

What is the status of India's agri-food systems?

- India produces sufficient food, feed and fibre to sustain about 18% of the world's population (as of 2020).
- Agriculture contributes about 16.5% to India's GDP and employs 42.3% of the workforce (2019-20).

- The problem of malnutrition is a huge challenge in India.
- COVID-19 has exacerbated the nutrition issue, while climate change has challenged the agricultural production itself.
- Economic and ecological sustainability, nutrition and the adoption of new agricultural technologies poses huge challenge.
- Disasters and extreme events make India's biosecurity more vulnerable.

To know more about India's food security, click [here](#)

How can the agri-food system be improved?

- A shift in production can diversify the dietary pattern and can ensure nutrition security.
- Nutritional security can be ensured by kitchen gardens, reducing post-harvest losses, nutrition-sensitive safety net programmes, women's empowerment, enforcement of standards, improving Water, Sanitation and Hygiene, nutrition education, and effective use of digital technology.
- The direction of agri-food systems has to be reoriented not only to enhance farm incomes but also to ensure better access to safe and nutritious foods.
- The cost on the environment and the climate posed by the agri-food systems has to be minimised.
- The theme of **World Food Day 2021: "Our actions are our future; Better production, better nutrition, a better environment and a better life"** has to be focussed.
- FAO's support for the transformation of agri-food systems such as mainstreaming agrobiodiversity, greening agriculture, promoting nutrition-sensitive agriculture and strengthening national food security is the need of the hour.
- Integrated crop-livestock-forestry-fishery systems can help farmers produce a variety of products.
- A sustainable agri-food system has to be promoted in which a variety of sufficient, nutritious and safe foods are made available at an affordable price to everyone.
- Such systems can deliver food security and nutrition for all without compromising the economic, social and environmental bases.

11.2 GMO Rice from India Withdrawn in EU

What is the issue?

- 500 tonnes of genetically modified rice were discovered by European Commission Rapid Alert System for Food and Feed (RASFF) in a consignment that India exported to the EU countries.
- In June, France had issued a notification for unauthorised GM rice flour identifying India as the point of origin.

What are GM crops?

- Genetically modified crops are plants of which the **DNA has been modified** using genetic engineering techniques.
- The aim is to introduce a new trait to the plant which does not occur naturally in the species.
- In food crops, it include resistance to certain pests, diseases, or environmental conditions, and improving the nutrient profile of the crop.
- In non-food crops, it include production of pharmaceutical agents, biofuels, and other industrially useful goods, as well as for bioremediation.
- More than 10% of world's crop lands have been planted with GM crops.

What are the benefits of GM crops?

- Better pest and disease resistance.
- Greater tolerance of stress, such as drought, low temperature or salinity.
- High yield and faster growth.
- More nutritious and tastier.

- May be possible to produce medicines or even vaccines.
- Can be made resistant to specific herbicides.

What are the drawbacks of GM crops?

- Can cause unpredictable side effects.
- Can raise health related concerns.
- Can cause ecological damage.
- Not accessible to every farmers.
- Problem with Intellectual property rights.

What is the status of GM varieties in India?

- GEAC is the apex body for approval of activities involving large scale use of hazardous microorganisms and recombinants. It is established under **Ministry of Environment, Forests and Climate Change**
- Genetic engineering appraisal committee (GEAC) is responsible for approval of proposals relating to release of genetically engineered organisms and products including experimental field trials.
- **Bt cotton** – Bt cotton was first used in India in 2002.
- It is an insect-resistant transgenic crop designed to combat the **bollworm** and it accounts for 90% of the cotton acreage now.
- It was created by genetically altering the cotton genome to express a microbial protein from the bacterium **Bacillus thuringiensis**.
- Three genes are inserted via genetic engineering techniques:
 1. Cry1Ac gene
 2. NPTII gene
 3. AAD gene
- **Bt-Brinjal** - The GEAC in 2007, recommended the commercial release of Bt Brinjal that is resistant to **brinjal shoot fly**.
- It was developed by Mahyco in collaboration with University of Agricultural Sciences (Dharwad), Tamil Nadu Agricultural University and ICAR-Indian Institute of Vegetable Research.
- But it was overturned in 2010 by the then Environment Minister who assumed the role of regulator and ordered a suspension on the transgenic vegetable's cultivation.
- **GM hybrid mustard (DMH-11)** – DMH -11 crop has been made resistant to broad spectrum herbicide – **Glufosinate**.
- It was developed by Delhi University.
- It is pending for commercial release as GEAC has advised to generate complete safety assessment data on environmental bio-safety, especially effects on beneficial insect species.
- Others – In India, there has been previous incidents of illegal cultivation of HTBt cotton, Bt brinjal and GM soybean in commercial scale.
- *The only genetically modified crop under commercial cultivation in India is Bt cotton.*

What is India's status regarding rice export?

- **India is the second largest producer of rice next to China, producing one fifth of the world's rice.**
- India is the **largest exporter** of rice.
- GM-free rice that is tagged as 'organic rice' is among India's high-value exports worth Rs. 63,000 crore annually.

What is India's statement on this issue?

- **There are apprehensions that the testing varieties of GM rice in trial plots may have leaked into the exported product.**

- The Indian government has denied this possibility alleging that the contamination may have happened in Europe to cut costs.
- India has indicated that it will commission an investigation involving its scientific bodies to enquire into this matter.
- Because of the close connections between farmers and State agriculture universities which are testing new varieties of crops, there is a possibility that seeds may transfer within plots.
- Because many Indian farmers are dependent on European imports, the Centre must ensure importers that India's produce is compliant with trade demands.
- *India's first herbicide-tolerant & non-GM rice varieties - Pusa Basmati 1979 and Pusa Basmati 1985 was developed by Indian Agricultural Research Institute (IARI).*
- *It contains a mutated acetolactate synthase (ALS) gene that makes the plant resistant to Imazethapyr, a broad-spectrum herbicide.*

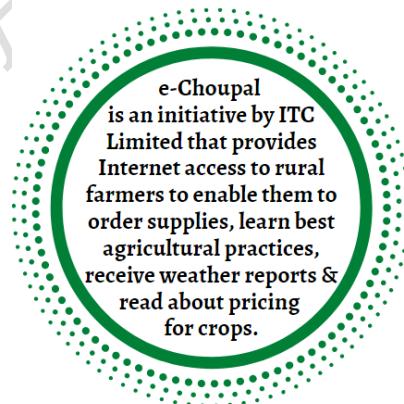
11.3 Agritech & Traditional Farmers' Knowledge

What is the issue?

With the emergence of agri-tech unicorns in the digital revolution in agriculture, farmers' traditional knowledge are often neglected or exploited.

What is the role of the Agri-tech start-ups in the digital revolution?

- The internet penetration of about 32 % provides the basis for the growth of digital platform-based enterprises.
- Agri-tech start-ups aim to address the knowledge gaps among the farmers.
- They provide goods and services to farmers, such as access to quality inputs, and reasonably priced credit.
- Several start-ups are providing various value chain services. ITC's e-Choupal and related one-stop retail formats were considered as precursors to the digital revolution in agriculture.
- On the output side, start-ups are working to reduce the farm-to-fork gap, enhance market access and bargaining power of smallholder farmers.



What efforts have been made by the Government in this respect?

- **Use of technology** - The government has taken steps to create a farmers' and land ownership database.
- The Digital India Land Records Modernization Programme, Unique Land Parcel Identification Number (ULPIN),etc. were the efforts taken in this direction in this direction.
- **India Digital Ecosystem of Agriculture (IDEA)** - The government has released a consultation paper on the IDEA that would place the farmer in the centre of the agriculture ecosystem leveraging open digital technologies.

What are the benefits of inculcating technology in agriculture?

- Provision of agri related information
- Increased productivity
- Reduces the risk of farmers
- Aids in precision farming
- Reduce the incidence of benami properties
- Reduce the incidence of protracted land disputes
- Enable farmers to use their assets to access institutional finance
- Reduce the challenges banks face in conducting due diligence before advancing agricultural loans.

What are the challenges in the emergence of agri-tech startups?

- Privacy and security concerns

- Issues of exploitation of farmers
- Unfair appropriation of traditional community knowledge – [PepsiCo India Holdings](#) had earlier sued 11 farmers for illegally growing and selling a potato variety registered in the company's name.
- Absence of checks and balances - The previous experience with attempts to patent Indian Basmati, Neem, and Turmeric by MNCs provides for little confidence.
- Data can be used as an instrument of coercion, manipulation, and control

How to balance the conservation of traditional knowledge and the growth of agri startups ?

- The awareness about the Protection of Plant Variety and Farmers Right Act (PPVFR Act) that aims to achieve a delicate balance between farmers' and breeders' rights has to be enhanced.
- The Traditional Knowledge Digital Library (TKDL) such as e-Kutir and Geographical Indications initiatives have to be strengthened.
- eKutir is a for-profit social enterprise group that provides economically sustainable solutions anchored with technology, micro-entrepreneurship, and community engagement.
- Farmer-owned cooperatives and producer companies have to be enabled to function as custodians of intellectual property and traditional knowledge of farming communities.
- There is a need for other complementary interventions and appropriate safeguards against inequitable appropriation of traditional knowledge.
- India needs to ensure that the digital push enables the transition towards decreased resource intensity or costs of agriculture, enhanced crop diversification, and nutritional security, and increased farmers' income.

11.4 Animal Husbandry needs Attention

What is the issue?

The pattern of global consumption is evolving towards higher share of animal products in diets focussing on the need for a proper and reliable dairy and poultry ecosystem.

What is the status of dairy and poultry sector?

- India is the world's largest producer of milk and third largest producer of egg.
- By 2022-23, milk production will expand to 235 million tonnes (from 198 mt in 2019-20) and egg production to 136 billion (from 114 billion in 2019-20).
- The protein meal demand is set to rise by 3 per cent per annum next 10 years.
- And by 2030, poultry meat will represent 41 per cent of all protein from meat sources.
- Consumers are attracted to poultry meat for lower price, product consistency and higher protein/lower fat content.
- In 2020, total milch cattle population was up by 10.5 per cent to 74.6 million in 2019.

What are the challenges in this sector?

- Disease outbreaks, sanitary restrictions and trade policies are the major challenges in the world meat market.
- Challenges in sourcing raw material for feed such as land constraint, water shortage, climate change, low crop yields, lack of tech infusion, policy constraint, etc adds to the issue.
- Maize and protein meal (oilseed extractions) will constitute 60 per cent of total feed use by 2030, according to OECD-FAO and the feed demand for maize is set to grow by 1.4 per cent per annum.
- Unreliability of feed supply, feed price volatility, demand fluctuation, policy environment, etc. are some of the issues.
- The biggest challenge to animal protein will come from the emerging plant protein segment.
- Livestock sector contributes around 54.6 % of total agricultural emissions in India adding to global warming.

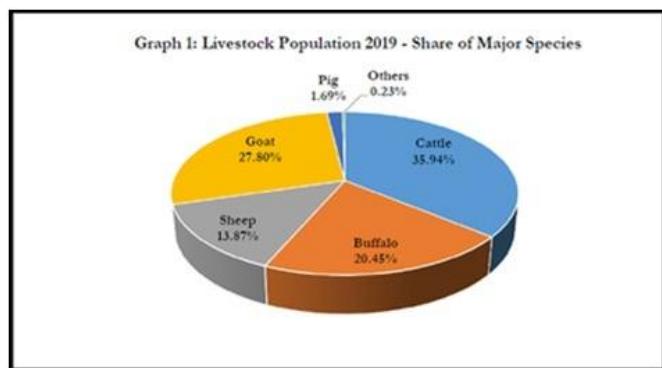
How to address these challenges?

- Feed intensification at the rate of 2.4 per cent is needed to meet the feed demand growth of the next 10 years.

- Animal feed market will have to be part of '**Sustainable Animal Agriculture Ecosystem**'.
- Contract farming can be promoted for assured availability and access to raw materials for feed market.
- Price stability can be provided by establishing backward linkages especially with FPOs (Farmer Producer Organizations).
- Hedging in commodity exchanges through the derivatives route and delivery based forward contracts can be explored for price risk management.
- Hedging against investment risk means strategically using financial instruments or market strategies to offset the risk of any adverse price movements.
- Research is a priority to study the market and demand projection strategies can ensure higher yields per milch animal, promote animal health and nutrition, etc.
- Upgrading skills, setting up of adequate processing capacity and investment can attract foreign direct investment.

20th Livestock Census

- The Livestock census is conducted across the country periodically since 1919.
- It was released by Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying.
- The 20th Livestock Census was launched in 2018 to capture breed-wise number of animals and poultry birds.
- The total Livestock population is 535.78 million in the country showing an increase of 4.6% over Livestock Census 2012.



Livestock	Major State
Cattle	West Bengal
Poultry	Tamil Nadu
Buffalo	Uttar Pradesh
Sheep	Telangana
Goat	Rajasthan
Overall livestock	Uttar Pradesh

12. SCIENCE & TECHNOLOGY

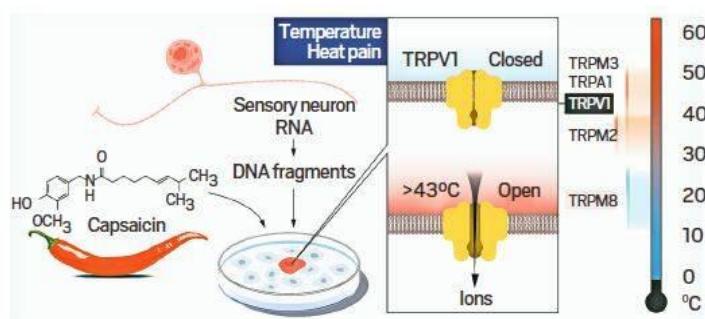
12.1 Nobel in Physiology 2021

Why in news?

Julius and Patapoutian have been awarded the **Nobel Prize in Physiology 2021** for their discoveries of receptors for temperature and touch.

What is their discovery about?

- In the human body, only very specific proteins sense heat and relay this signal to the nervous system which then triggers an appropriate response.
- Scientists knew that such sensors must exist, but were not able to identify them until Julius discovered the first heat receptor in capsaicin, the chemical compound in chilli peppers.
- That first discovery led to identification of several other receptors that can sense coldness, pressure, etc.



The discovery of the receptor TRPV1 paved the way to the unravelling of additional receptors, which together code for temperature sensation.
nobelprize.org



UP NEXT

- Tuesday, October 5: Physics
- Wednesday, October 6: Chemistry
- Thursday, Oct 7: Literature
- Friday, October 8: Peace
- Monday, October 11: Economics

What is the mechanism of the receptors?

- When something hot or cold touches the body, the heat receptors enable the passage of some specific chemicals like calcium ions through the membrane of nerve cells.
- The entry of the chemical inside the cell causes a small change in electrical voltage, which is picked up by the nervous system.
- There is a whole spectrum of receptors that are sensitive to different ranges of temperature.
- Things are similar for sensing coldness.
- These receptors were sensitive not just to external touch, but could detect temperature or pressure changes inside the body as well.

What is the significance of this discovery?

- Decoding the neuroscience of pain can help develop new targets for pain therapy.
- The identification of these receptors opens up the possibility of regulating their functioning.
 - For example, if the receptors that feel pain are suppressed or made less effective, a person can feel less pain.
- There were several other therapeutic implications that might be useful in treatment of diseases like cancer or diabetes.

12.2 Nobel Prize for Chemistry 2021

Why in news?

Chemistry Nobel 2021 was awarded to German scientist Benjamin List and Scotland-born scientist David W.C. MacMillan who independently developed a new way of catalysis – **asymmetric organocatalysis** in 2000.

What are catalysts?

- When two or more compounds react to form new compounds, the process is often aided by other chemicals that do not change themselves, but help speed up the reaction. Such chemicals are called catalysts.
- Till around 2000, only two kinds of chemicals were known to act as effective catalysts - heavier metals and enzymes.
- Heavier metals** - Heavier metals are expensive, difficult to mine, and toxic to humans and the environment.
- Also traces remain in the end product affecting the purity of compound like medicines.
- Metals required an environment free of water and oxygen, which was difficult to ensure on an industrial scale.
- Enzymes**- Enzymes work best when water is used as a medium for the chemical reaction but that is not suitable for all kinds of chemical reactions.

What is asymmetric organocatalysis?

- Substances having same chemical composition and molecular formula but different properties are known as **isomers**.
- Two molecules could be exactly the same, except that they are mirror images of each other which are often referred as left-handed or right-handed molecules.
- List and MacMillan discovered that by using a natural compound like an **amino acid as a catalyst**, only **one specific mirror image** of the end-product could be obtained. This was named as asymmetric catalysis.

Why is the discovery so significant?

- New organocatalysts developed have helped drive a variety of chemical reactions in turn accelerating pharmaceutical drug research.
- The organic catalysts are cheap, environment friendly and are more efficient.
- The asymmetric organocatalysts have allowed researchers to efficiently produce new molecules with complete certainty of the 3-D orientation.

- Asymmetric organocatalysts allow several steps in molecule production to continue without interruption, minimising waste.
- Asymmetric organocatalysts were used to rectify the birth defects caused by thalidomide (used to treat nausea in pregnant women) by producing molecules of the desired mirror image form.
- This year's Prize underlines the message that great discoveries can come even from simple ideas which are often overlooked.

13. ENVIRONMENT

13.1 Protecting India's Natural Labs

What is the issue?

India is long known as the world's natural laboratory for geo-scientific learning but we are inching towards the disappearance of most of our geological heritage sites.

What is the significance of India's geodiversity?

- Indian landmass broke loose from the Gondwana land 150 million years ago and drifted northwards and got entwined with the world's youngest plate boundary.
- The geological features evolved over billions of years through numerous cycles of tectonic and climate upheavals.
- The Kutch region in Gujarat has dinosaur fossils and Tiruchirappalli of Tamil Nadu is originally a Mesozoic Ocean acting as a store house of Cretaceous (60 million years ago) marine fossils.

What is the status of recognition of geoheritage sites?

- The geological heritage of our planet was first recognised in 1991 at **First International Symposium on the Conservation of our Geological Heritage (Digne resolution)**.
- UNESCO facilitated efforts to create a formal programme to promote a global network of geoheritage sites complementing the World Heritage Convention and the UNESCO's MAB.
- Countries like Vietnam and Thailand have implemented laws to conserve their geological and natural heritage.
- The **Global Geoparks Network** was founded in 2004 as an international partnership developed under the umbrella of UNESCO.
- Today, there are 169 Global Geoparks across 44 countries.

What is the status of geoheritage sites in India?

- India is a signatory to the establishment of UNESCO Global Geoparks.
- But, it does not have any legislation and policy for conservation of geoheritages.
- Geological Survey of India (GSI) has identified 32 sites as **National Geological Monuments**.
- Yet **no** geopark in India is recognised by the UNESCO.

What is the reason for disappearance of most of our geological heritage sites?

- **Lack of geological literacy** - Indian classrooms view disciplines like environmental science and geology inferior to other pure subjects like physics, biology, and chemistry.
- The lack of awareness in geo-heritage parks makes decision-making on climate change difficult.
- **Developmental activities** - The **Anjar site** in Kutch district which has high concentration of iridium providing evidence for a massive meteoritic impact that caused the extinction of dinosaurs about 65 million years ago was destroyed by laying of a new rail track.
- A national geological monument exhibiting a unique rock called **Nepheline Syenite** in Ajmer district of Rajasthan was destroyed in a road-widening project.
- The **Lonar impact crater** in Buldhana district of Maharashtra is under the threat of destruction.
- Unplanned and booming real estate business has destroyed many geoheritage sites.

- Unregulated stone mining activities have also contributed to this destruction.

What does this situation call for?

- The situation calls for immediate implementation of sustainable conservation measures such as those formulated for protecting biodiversity.
- A progressive legal framework is needed to conserve geoheritage sites.
- There is a need for a national conservation policy under the direct supervision of a national body committed to the protection of geo-heritage sites.

13.2 Plastic Waste Management (Second Amendment) Rules, 2021

What is the issue?

The Union government notified the Plastic Waste Management (Second Amendment) Rules, 2021 allowing recycled plastic in food packaging.

What was the earlier case of recycled plastic?

- The 2016 rule mentions that carry bags or products made of recycled plastic shall not be used for storing, carrying, dispensing or packaging ready to eat or drink foodstuff.
- In 2018, the FSSAI banned the use of recycled plastic or newspaper for packaging of food items from July 1, 2019.

What is the new amendment about?

- The new rules provide a moratorium of 10 years to big companies to keep polluting since more single-use plastic products will be added to the phase-out list only after a decade.
- It has also allowed the use of recycled plastics for packing food products.

What are the concerns of using recycled plastic?

- India recycles 60 per cent of its plastic waste and most of this is done by the informal workforce in the country.
- Industrial packaging happens to be the highest user of plastic.
- The unscientific methods used by the informal workforce to produce plastic pellets raise concerns, especially around the contamination and purity of the recycled plastic.
- Plastic is used in a variety of sectors ranging from medicines, electronic equipment to chemical fertilizers and using such plastics in food contact applications is a concern.
- No standards were prescribed for recycling of plastic making it difficult to understand the chemical conformity of the recycled plastic.
- A growing body of research proves there is migration of chemicals (additives) from plastics to the food.

What are the global practices regarding the use of recycled plastics?

- In the U.S., manufacturers are responsible for ensuring that the recycled product is of suitable purity.
- The European Union has come up with a 'plastic strategy' in 2018 to transform the way plastic products are designed, produced, used and recycled in the EU.
- Korea's Ministry of Food and Drug Safety revised its legislation allowing only chemically recycled resins in parts that do not come into direct contact with food.
- The Chinese agency is now conducting an industry survey and initiating a risk assessment method for recycled food contact materials.

What are the recommendations for India?

- Our plastic has to be recycled in authorised recycling facilities.
- The use of recycled plastic should have been mandated for non-food applications initially to understand the issues.
- An inventory of the types of processes for recycling is needed and the safe method has to be identified and used for food contact applications.

- Guidelines on the source of the post-consumer plastic waste, type of polymer that can be used, the average time of plastic-food contact, temperature of the food, etc. are required.
- A working mechanism needs to be developed with all the stakeholders including MoEFCC, FSSAI, CPCB, SPCB, Urban Local Bodies, representatives of the plastic industry as well as consumers.

13.3 Mitigating a Crisis: COP 26 Glasgow

What is the issue?

The Heads of state from at least 120 countries are expected to convene in Glasgow for the 26th meeting of the United Nations Conference of the Parties (COP).

What is the COP 26 about?

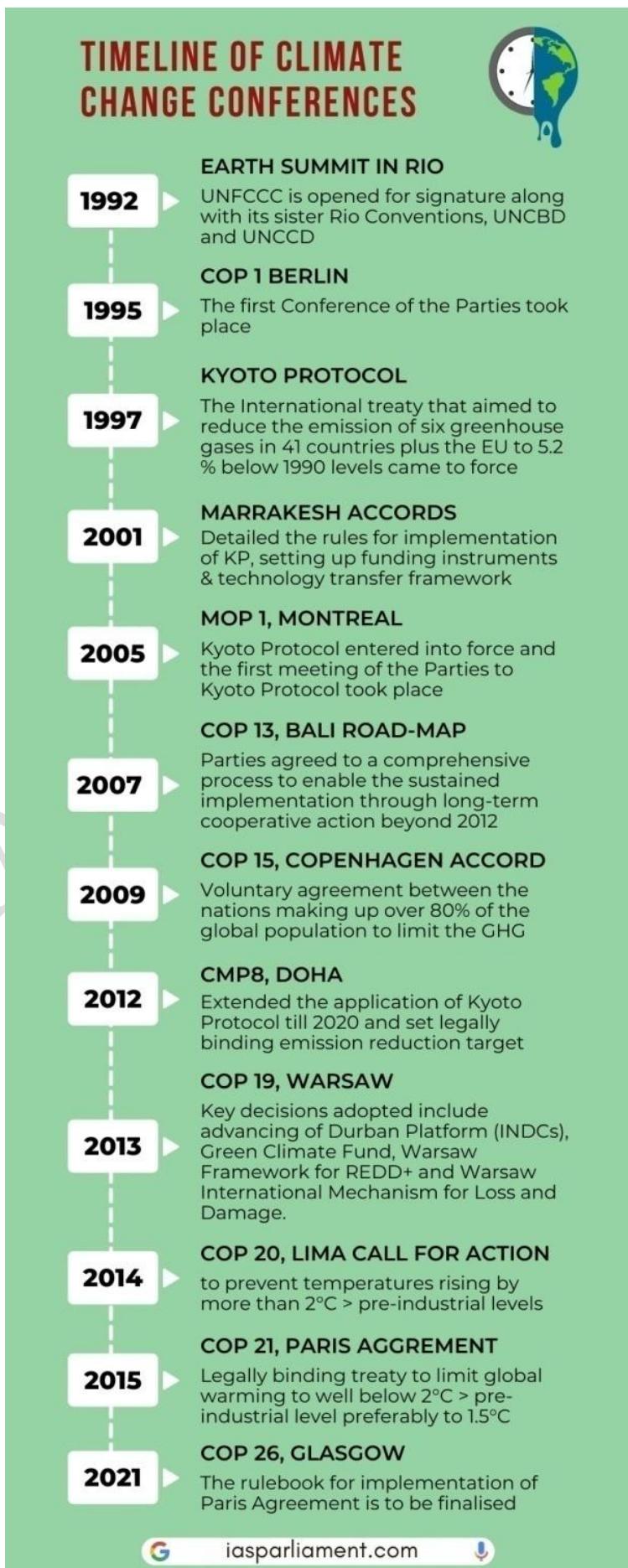
- COP26 is the 26th iteration of the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC).
- This year, the meeting will be held in Glasgow, UK.
- The UK will share the presidency with Italy.

Why is COP26 important?

- This year's COP is the most significant climate meeting since 2015, when the Paris Agreement was launched.
- A first version of the guidelines known as the 'rulebook' was worked out in past meetings, but so far countries have been unable to agree on important points.
- At the meeting, countries will also be expected to raise their climate ambitions, updating the Nationally Determined Contributions (NDCs).

What points of the rulebook are still under debate?

- **Carbon Markets** - Developing countries, particularly India, China and Brazil, gained significantly from the carbon market under CDM of Kyoto Protocol.
- India registered 1,703 projects under CDM which is the second highest in the world.
- The ratification of the Paris Agreement would change the scenario of carbon markets.
 1. Targets for developing countries
 2. CDM transition
 3. Accounting rules
 4. Share of Proceeds (SOP) to the Adaptation Fund



- **Emission cut pledges-** In 2015, countries have agreed to cut GHG emissions to 2 degrees Celsius and ideally 1.5 degree Celsius.
- The deadline for countries to make steeper emission cut pledges is this year and major emitters like China and India have not yet come forward with strengthened NDCs.
- **Fossil Fuels** - The UN has called upon the OECD countries to phase out coal by 2030 but environment ministers from G20 economies have not agreed on a timeline.
- **Finance-** Developed countries pledged to raise \$100 billion per year till 2020 to assist developing countries in dealing with the effects of climate change but it has not yet been achieved.
- **Net zero –** The issue of net-zero or carbon neutrality was not mentioned in the Paris Agreement.
- More than 50 countries have pledged to carbon-neutrality by middle of the century. China has said it would achieve this status by 2060
- Several other developing countries including India have also been resisting such targets as developed countries are responsible for over 75% of accumulated atmospheric GHGs.
- IPCC AR6 emphasised that to keep temperature rise within 1.5°C, global emissions should be reduced by 45% from 2010 levels by 2030, on the way to net zero 2050.
- **2030 targets-** The IPCC has called for 2030 emissions to be 45% less from 2010 levels for the 1.5°C goal.
- Several countries have not yet updated their NDC targets and the report calls for a significant increase in the level of ambition of NDCs” till 2030.

What has to be the focus for India at COP 26?

- India is ranked as the world's third largest emitter. It emits 7% of global emissions but the per-capita emissions are far below the global average.
- COP26 must focus sharply on reducing emissions till 2030, rather than on net zero 2050 which is too distant.
- India can raise its NDC pledge of reducing Emissions Intensity by 33-35% from 2005 levels by 2030 to 38-40%.
- India could also offer to achieve the carbon neutrality by 2070-75 by invoking Common but Differentiated Responsibility.

13.4 Why India shouldn't sign on to Net Zero

What is the issue?

The net zero campaign has been gaining momentum as a number of countries and non-state actors are pushing for the world's carbon dioxide emissions to reach net zero.

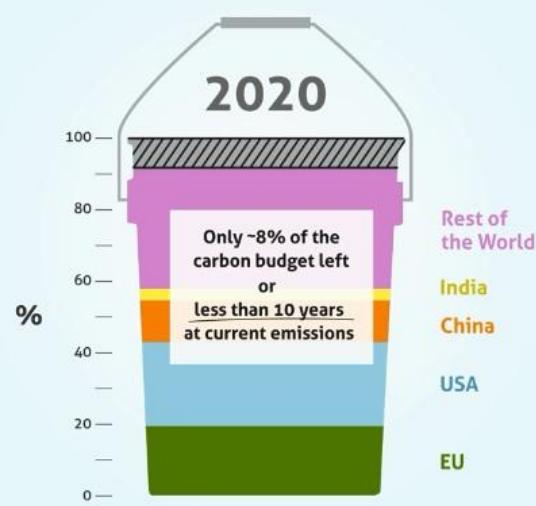
What targets have been set by the countries towards net zero emissions?

- IPCC AR6 emphasised that to keep temperature rise within 1.5°C, global emissions should be reduced by 45% from 2010 levels by 2030, on the way to net zero 2050.
- **Developed countries** – Countries such as the U.S., UK and Australia have committed to achieve the goal of net zero GHG emissions by 2050.
- **Developing countries** – Countries such as China have pledged to achieve net zero emissions by 2060.
- India hasn't set any net zero target so far.
- Non state actors - **Race To Zero** is a UN-led campaign is asking cities, businesses, universities, and more to hit net zero emissions.

Can net zero contain the temperature rise within 1.5°C?

- The stringent limits on future cumulative emissions post 2020, amounts to less than a fifth of the total

The carbon budget for 1.5 degrees



global carbon budget.

- The top three emitters of the world — China, the U.S. and the European Union — even after taking account of their net zero commitments will emit more than 500 billion tonnes of CO₂ before net zero.
- These committed emissions will undermine the basic purpose of net zero.
- The failure of the developed world to meet its pre-2020 obligations provides little confidence.
- Neither the Paris Agreement nor climate science requires that net zero be reached individually by countries by 2050.
- Less than a fifth of the world has been responsible for three-fifths of all past cumulative emissions.
- But the current net zero campaign pushes the developing countries for emission reduction despite their already low emissions.

What India must do?

- India's per capita emissions are less than half the world average and less than one-eighth of the U.S.'s.
- India's contribution to global emissions, in both stock and flow, is so disproportionately low.
- India's commitment to net zero would endanger the future of its own population allowing the developed countries to continue the exploitation.
- India should enable the responsible use of coal, oil and gas to come out of lower middle-income economy status and for its socio-economic development.
- India's small industries sector which provides employment and livelihood to the majority of the population outside agriculture, needs expansion and modernisation.
- The agriculture sector, the second largest source of GHG emissions for India after energy, needs to double its productivity and farmers' incomes and build resilience.
- Infrastructure for climate resilience in general is critical to future adaptation to climate change.
- India cannot sign on to net zero, without the big emitters taking their fair share of the global carbon budget.
- *Carbon Budget is the estimated amount of carbon dioxide the world can emit still having a likely chance of limiting global temperature rise to 2°C above pre-industrial levels.*
- *The budget is estimated to be around 1 trillion tonnes of carbon. The Global Carbon Budget is produced under the umbrella of Global Carbon Project (GCP).*

14. INTERNAL SECURITY

14.1 Pegasus Case

What is the issue?

Supreme Court has set up a panel to investigate allegations of potential surveillance of mobile phones using the Pegasus spyware.

What is Pegasus?

- A spyware is any malicious software designed to enter your computer device, gather your data, and forward it to a third-party without your consent.
- [Pegasus](#) is a spyware developed by an Israeli firm, NSO Group, to infiltrate smartphones — Android and iOS — and turn them into surveillance devices.
- It is used as a tool to track criminals and terrorists for targeted spying and not mass surveillance.
- NSO Group has affirmed that it sells the software only to governments.

How does it work?

- Pegasus exploits undiscovered vulnerabilities or bugs, which means a phone could be infected even if it has the latest security patch installed.

- In 2016 smartphones were infected using a technique called “**spear-fishing**”: text messages or emails containing a malicious link were sent to the target and it depended on the target clicking the link.
- By 2019, Pegasus employed **zero-click installation** without requiring any interaction by the target”
- It could infiltrate a device with a missed call on WhatsApp and could even delete the record of this missed call, making it impossible for the user to know they had been targeted.
- Pegasus also exploits bugs in iMessage, giving it backdoor access to millions of iPhones.
- The spyware can also be installed over a wireless transceiver (radio transmitter and receiver) located near a target.

What happened with Pegasus spyware?

- The Pegasus Project, an international investigative journalism effort, revealed that various governments used the software to spy on government officials, opposition politicians, journalists, activists and many others.
- It said the Indian government used it to spy on around 300 people between 2017 and 2019.
- A case was filed in the Supreme Court accusing the government for indiscriminate spying.

What was the government's stand?

- The government refused to file a detailed response to the allegations made by the petitioners citing national security as a reason.
- The government also pled to set up its own probe which was rejected by the court.
- The court said that such a course of action would violate the settled judicial principle against bias, i.e., “justice must not only be done, but also be seen to be done”.

What was the court's view?

- The Supreme court has underlined three key imperatives
 1. The right to privacy of citizens
 2. Freedom of the press including the right of journalists to ensure protection of their sources
 3. Limits on the usage of national security as a shield by the government to block disclosure of facts related to citizen's rights.
- The court cited the **Ram Jethmalani v. Union of India 2011** to say that the Government should not take an adversarial position when the fundamental rights of citizens are at threat.
- The court said that the Union of India may decline to provide information citing security of the State or other specific immunity under a specific statute but they must prove and justify the same.
- It has set seven terms of reference for the committee such as who procured Pegasus and whether the petitioners in the case were indeed targeted by use of the software, etc.
- The court has also asked the committee to make recommendations on a legal and policy framework on cyber security to ensure the right to privacy of citizens is protected.

What were the earlier views regarding privacy?

- *The right to privacy is protected as an intrinsic part of the right to life and personal liberty under Article 21*

What Pegasus spyware can do



Source: Pegasus Project

BBC

- The expression “freedom of press” has not been issues in Article 19 but it is comprehended within Article 19(1)(a)
- The **2017 K.S. Puttaswamy judgment** clarified that any invasion of privacy could only be justified if it satisfied three tests:
 1. The restriction must be by law
 2. It must be necessary (only if other means are not available) and proportionate (only as much as needed)
 3. It must promote a legitimate state interest (e.g., national security)]
- In 2018, the **Srikrishna Committee** on data protection noted that post the K.S. Puttaswamy judgment, most of India’s intelligence agencies are “potentially unconstitutional” because they are not constituted under a statute passed by Parliament.

PRELIM BITS

15. HISTORY, ART & CULTURE

Dr S Muthulakshmi Reddi

- Dr Reddi was India’s
 1. First Indian girl student at Madras Medical College,
 2. First woman house surgeon in the Government Maternity Hospital, Madras. And
 3. First woman lawmaker.
- In 1926, the government nominated Dr Reddi to the Madras Legislative Council, where she was the only woman member of the council.
- Later, her colleagues elected her as the deputy president to chair the council’s proceedings in the absence of the president.
- **Law on prostitution** - In 1930, the Madras Legislative Council was discussing a law on prostitution.
- But Dr Reddi defined prostitute as a person of either sex, instead of the council’s definition to include only women. So, the legislative council dropped the reference to women in the definition of prostitution.
- **For women** - She worked extensively to abolish the Devadasi system.
- Her efforts led to the strengthening of the Madras Immoral Traffic Act.
- She was also able to increase the age at which girls could be rescued from brothels.
- She championed the cause of reservation for women in elected bodies.
- She co-founded the Women’s Indian Association in 1918.
- She opened Avvai Home, Chennai (1930) to shelter, protect and educate the orphan girls, deserted women.
- Also, she opened Cancer Institute, Chennai (1954).

Kushinagar

PM inaugurated the Kushinagar international airport, Uttar Pradesh, which will mainly service the Buddhist tourism circuit.

- In Kushinagar, the Buddha attained Mahaparinirvana (ultimate salvation) in 483 BC and was cremated at Rambhar Stupa.
- Kushinagar is identified with Kushinara, **capital of the ancient Malla republic**.
- [Malla republic is one of the 16 Mahajanapadas of the 6th-4th centuries BC.]

- The area went on to be part of the kingdoms of the Mauryas, Shungas, Kushanas, Guptas, Harshavardhana, and the Palas.
- Kushinara is believed to have been inhabited until the 12th century.
- The first excavations in Kushinagar were carried out by **Alexander Cunningham and ACL Carlleyle**.
- He unearthed the main stupa & the 6-metre-long statue of the Reclining Buddha in 1876.

Buddhist Tourism Sites

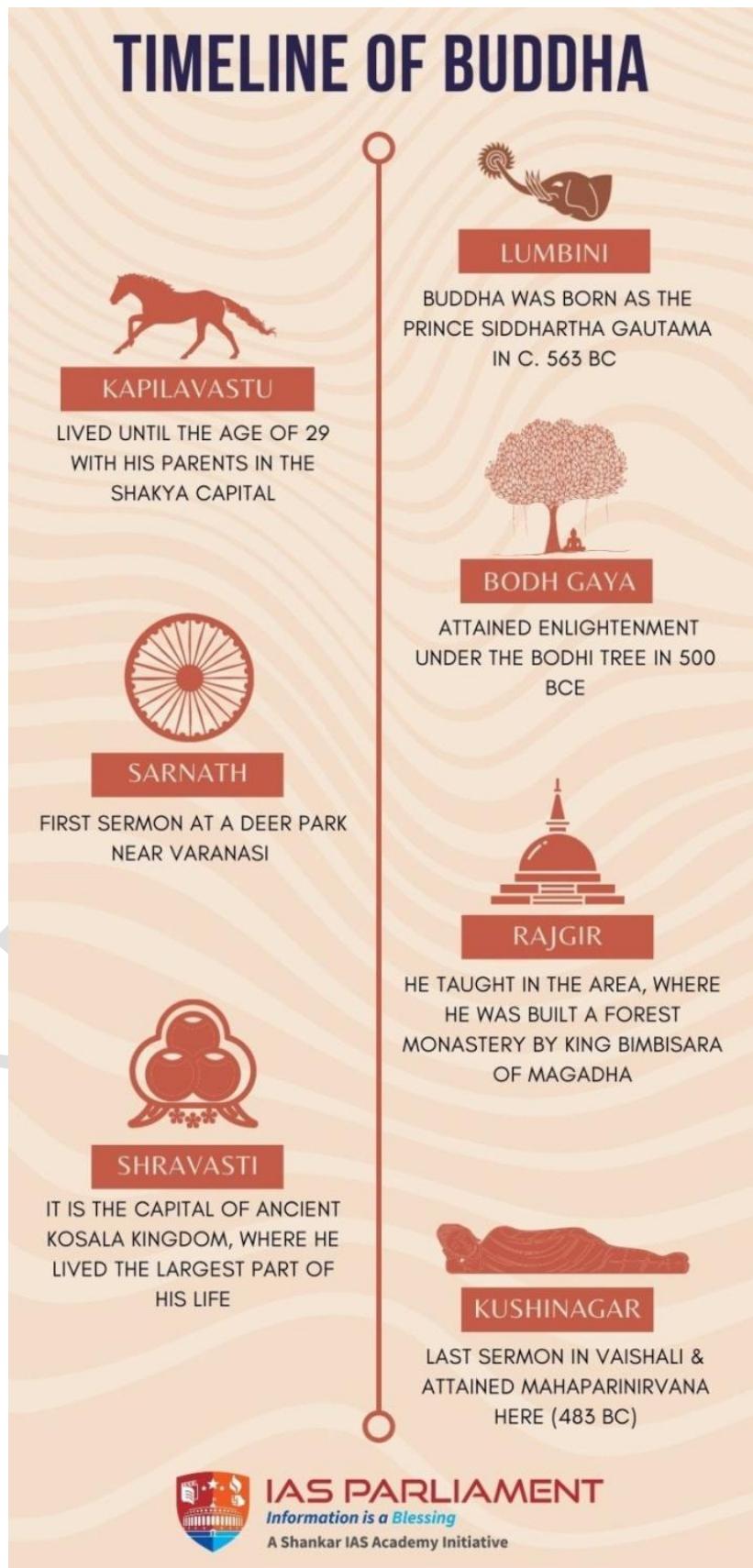
Buddhism originated in India and 7 of the 8 main Buddhist pilgrimage sites are in India, but it gets not even 1% of Buddhist pilgrims in the world.

- In 2016, the Ministry of Tourism announced the Buddhist Circuit as **India's first transnational tourism circuit** (India, Nepal and Sri Lanka).
- Buddhist Circuit includes Bodh Gaya, Vaishali, & Rajgir (Bihar), Kushinagar, Sarnath, and Shravasti (UP), and Lumbini (Nepal).
- A Buddhist Circuit tourist train covers all destinations in 14 days, and helicopter services and more airports are in the pipeline.
- The push is intended to assert India's position as the original centre of Buddhism, against the claims from China.

Maharajah Collection

The Tata group has reclaimed Air India, but the priceless Air India art collection is not part of the deal and is likely to stay with the government.

- 'Maharajah collection', as it is called, has over 4,000 works, including by Jatin Das, Anjolie Ela Menon, M F Husain and V S Gaitonde.
- There are posters by cartoonist Mario Miranda and ads designed by The New Yorker cartoonist Peter Arno, besides paintings, textiles, sculptures, and traditional wooden and bronze artwork.
- The collection served that purpose - **to present India as an ancient civilisation, but with a modern outlook**. No official estimate exists of the worth of the entire collection.



16. GEOGRAPHY

Weddell Sea as Marine Protected Area

Ministry of Earth Sciences said that India is co-sponsoring a proposal of the European Union for designating East Antarctica & Weddell Sea as Marine Protected Areas (MPAs).

- Weddell Sea is an embayment of the Antarctic coastline that forms a southward extension of the Southern Ocean. It has the Weddell Gyre.
- It is bounded,
 1. On the west by the Antarctic Peninsula of West Antarctica,
 2. On the east by Coats Land of East Antarctica, and
 3. On the extreme south by ice frontal barriers of the Filchner and Ronne ice shelves.

Marine Protected Area

- A marine protected area provides protection for all or part of its natural resources.
- Certain activities within an MPA are limited or prohibited to meet specific conservation, habitat protection, ecosystem monitoring, or fisheries management objectives.

Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)

- It is an international treaty to manage Antarctic fisheries to preserve species diversity and stability of the entire Antarctic marine ecosystem.
- It came into force in April 1982.
- It is responsible for the formulation, adaptation and implementation mechanisms of the MPAs.
- Since 2009, CCAMLR members have developed proposals for MPAs for various regions of the Southern Ocean.
- CCAMLR's scientific committee examines these proposals.
- After CCAMLR members agree upon them, elaborate conservation measures are set out by the commission.
- **India** has been a permanent member of CCAMLR since 1986.
- Work pertaining to CCAMLR is coordinated in India by the Ministry of Earth Sciences through its attached office, the Centre for Marine Living Resources and Ecology (CMLRE) in Kochi, Kerala.

Decadal prediction for Indian Ocean Dipole

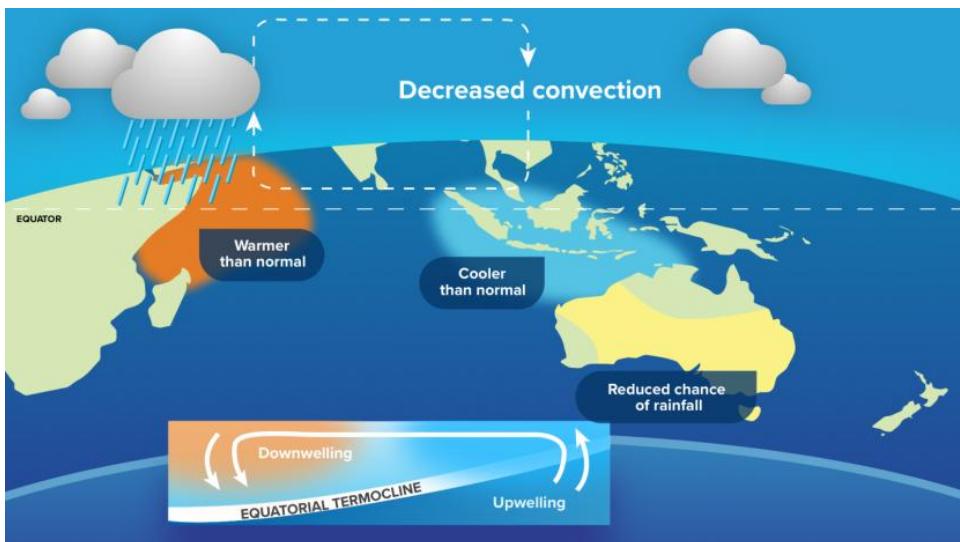
A new study claims to have found out decadal prediction skills for the Indian Ocean Dipole (IOD) to enable monsoon forecast for the next 5-10 years in advance.

- Retrospective decadal forecasts, with initial conditions from 1960 to 2011 from existing four models were analysed.
- It was found that the two models - **MIROC5 from Japan and CanCM4 from Canada** - show significant prediction skills for up to 10 years, with strongest leads up to 2 years.
- **Influencing factors** - The predictability of IOD comes from the subsurface ocean signals in the Southern Ocean.
- The El Nino-Southern Oscillation events, which occur in the tropical Pacific, are also well known as a major climate driver.



Indian Ocean Dipole

- The IOD, also known as the Indian Niño, is an irregular oscillation of sea-surface temperatures.
- It involves an aperiodic oscillation of sea-surface temperatures (SST), between "positive", "neutral" and "negative" phases.
- As part of it, the western Indian Ocean becomes alternately warmer (positive phase) and then colder (negative phase) than the eastern part of the ocean.



- **A positive phase** sees above normal sea-surface temperatures and greater precipitation in the western Indian Ocean region with a corresponding cooling of waters in the eastern Indian Ocean.
- This tends to cause droughts in adjacent land areas of Indonesia and Australia.
- The **negative phase** involves warmer water and greater precipitation in the eastern Indian Ocean, and cooler and drier conditions in the west.
- **A neutral phase** would mean sea temperatures were close to average across the Indian Ocean.
- The IOD thus affects the strength of monsoons over the Indian subcontinent.
- The IOD is one aspect of the general cycle of global climate, interacting with similar phenomena like the El Niño-Southern Oscillation (ENSO) in the Pacific Ocean.
- An IOD can either aggravate or weaken El Niño's impact on the Indian monsoon.
- If there is a positive IOD, despite an El Niño year, it can bring good rains to India.

Reasons for Extreme Weather in India

- Even as the southwest monsoon began to retreat from the subcontinent, Kerala and Uttarakhand received record rainfall in October, 2021.
- The rain-bearing '**low pressure system**' that is active in the Arabian Sea contributed to the heavy rain in Kerala.
- **Western disturbances** are what caused the rain in northern India.
 - Western disturbances are periodic influxes of moisture-laden clouds from the Mediterranean that are common during winter.
- As the Bay of Bengal is still warm, strong winds from there are reaching as far as Uttarakhand and will cause rainfall in north-eastern India.
- **Global Warming** - Both low pressures, and the western disturbances, are tangentially connected to the larger pattern of global warming.
 - The Bay of Bengal is historically the warmer ocean that seeds low pressures and cyclones that bring rain to India.
 - In recent years, however, the Arabian Sea, too, has been warmer than normal, leading to significant cyclonic activity.
- Overall elevated temperatures are contributing to warmer waters in the Arctic Ocean & drawing colder air from the poles with greater intensity.
- This has added to the increased moisture, thereby seeding more intense western disturbance activity over north India.

Mount Manipur

The Union government rechristened Mount Harriet, a historical tourist spot in the Andaman and Nicobar islands, as 'Mount Manipur'.

- Mount Harriet is the third highest peak in the Andaman and Nicobar Islands.
- It served as the summer headquarters of the Chief Commissioner during British Raj.
- Close by the Mount Harriet is the Mount Harriet National Park known for its wide variety of birds.
- **Manipur's connection to Mt. Harriet** - Anglo-Manipur War of 1891 was fought between the kingdom of Manipur and the British.
- Manipuris who had fought the British in the War, including Maharaja Kulachandra Dhwaja Singh, were exiled to a hillock in the Andaman Islands.
- The battle was triggered by a coup in the palace of Manipur, which had been marked by internal factionalism in the years leading up 1891.
- The British government took advantage of the "internal dissension" among the princes of the royal family.
- The war led to Manipur becoming a princely state under the indirect rule of the British crown.
- **Original name** - Mount Harriet is believed to be named after British artist, Harriet Christina Tytler, who was the wife of Robert Christopher Tytler, a soldier who served in the British Indian Army.

17. POLITY

Right to Healthcare

The demand for the enactment of legislation on the right to healthcare has been revived in Rajasthan, as such a law would streamline medical services and guarantee the availability of essential facilities to citizens.

- **Constitutional Provisions** - Article 21 (Fundamental Right) says that a right to health is inherent to a life with dignity.
- Articles 38, 39, 42, 43 and 47 (DPSP) are related to the right to health.
- India is a party to the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights.
- The Supreme Court (SC) of India held that Article 21 of the Indian Constitution in relation to human rights has to be interpreted in conformity with the international law.
- While upholding the right to health by a worker, the SC cited,
 - a. Article 25 [2] of the Universal Declaration of Human Rights and
 - b. Article 7 of the International Covenant on Economic, Social and Cultural Rights.
- **Statutory Provisions** - These covenants find statutory acceptance in the Protection of Human Rights Act, 1993.

Right to Protest

The Supreme Court said that the public roads could not be blocked to hamper free movement even as farmers and the Government verbally clashed during the hearing, over who is responsible for the 2-year blockade in New Delhi.

- The court noted that it had laid down the law in the **Shaheen Bagh protests case** that, *Right to protest should not hamper the right to movement of the public.*
- In the end, the court concluded that the roads cannot be blocked.
- To know more about Shaheen Bagh protests case, [click here](#).

ECI's Power on Party Symbol

Election Commission of India (ECI) has frozen an election symbol of a party from Bihar, so that neither of the two factions of the party will be able to use it in the coming Assembly by-elections.

- Para 15 of the Symbols Order, 1968 talks about the powers of the ECI on the question of a split in a political party outside the legislature.
- The ECI can decide whether the rival groups or none of such groups of a recognised political party is eligible to get the party symbol.
- This decision shall be binding on all such rival sections or groups. This applies to disputes in recognised national and state parties.
- For splits in registered but unrecognised parties, the ECI usually advises the warring factions to resolve their differences internally or to approach the court.
- The first case decided under Para 15 of the 1968 Order was the first split in the Indian National Congress in 1969.
- Before 1968, the EC issued notifications and executive orders under the Conduct of Election Rules, 1961.
- Testing** - In almost all disputes decided by the EC so far, a clear majority of party delegates/office bearers, MPs and MLAs have supported one of the factions.
- Whenever the EC could not test the strength of rival groups based on support within the party, it fell back on testing the majority only among elected MPs and MLAs.

Splinter Group

- Splinter group of a party is the group other than the one that got the party symbol.
- Until 1997, the Splinter groups were not recognised either state or national parties by the ECI.
- This is because the ECI has felt that merely having MPs and MLAs isn't enough, as the elected representatives had fought and won polls on tickets of their parent (undivided) parties.
- The EC introduced a new rule under which,
 - The splinter group of the party had to register itself as a separate party, and
 - The splinter group could lay claim to national or state party status only on the basis of its performance in state or central elections after registration.

Model Code of Conduct during Bye-election

The Election Commission (EC) noticed that certain political parties/ candidates are organizing electioneering activities in the areas adjoining the district/ constituency where the bye-election is being conducted.

- The applicability of the Model Code of Conduct (MCC) during bye-election would be only to the concerned district(s) comprising the Parliamentary/ Assembly Constituency going to such bye-election.
- This was mentioned in the existing instructions of the EC regarding enforcement of the MCC during elections.
- The only relaxation in these instructions has been given in case the constituency is comprised in State Capital/ Metropolitan Cities/ Municipal Corporations.
- In such cases, MCC instructions would be applicable in the area of concerned Constituency only.
- In all other cases, aforesaid instructions would be enforced in the entire district(s) covering the Constituency going for bye-election(s).
- The above relaxation has been given with an objective that the operation of MCC doesn't hamper normal developmental and administrative functioning in the State and districts.
- District Election Officers concerned will ensure that the MCC instructions & COVID guidelines are followed in the districts adjoining to the poll going district/ constituency.

Model Code of Conduct is a set of guidelines issued by the ECI for conduct of political parties and candidates during elections.

18. GOVERNMENT INITIATIVES

Geographical Indication Tag

Recently, certain products from Tamil Nadu have received the Geographical Indication (GI) Tags.

GI Product	Geographical Location
Kalamkari Paintings	Karuppur, Tamil Nadu
Wood Carvings	Kallakurichi, Tamil Nadu
Clove	Kanniyakumari, Tamil Nadu

- Documentary evidence shows that Karuppur Kalamkari paintings evolved under the patronage of Nayaka rulers in the early 17th century.
- Wood carving skill evolved as an indigenous art when Madurai was an important town in the ancient times.
- In the course of time, woodcarving craftsmen migrated to other towns, and each of them evolved their own style like Kallakurichi woodcarving.
- To know more about Geographical Indication Tag, click [here](#) and [here](#).

Kanniyakumari Clove

- This clove is being grown in the densely wooded areas of hilly regions of the district and it is known for its rich aromatic oil content.
- Of the total production of 1,100 tonnes of cloves in India, TN accounts for 1,000 tonnes, of which over 65% is grown in Kanniyakumari district.
- The district represents about 73% of the area under clove in Tamil Nadu.
- **Geographical suitability** - The hilly regions of Kanniyakumari district is ideal for clove cultivation, as it benefits from **both the monsoons**.
- ‘Sea mist’ comes in and works up the moisture needed for the crop.
- **Black soil** here, rich in organic nutrients, is suitable for clove cultivation. This makes the cloves grown in the region unique.
- **Oil** - With the highest percentage of volatile oil content present in the clove buds, the crop being grown in the district is much sought-after.
- Furthermore, drying happens naturally at the plantations located at an altitude of 800 metres and having moderate temperature. This means a limited loss of essential oils and an increase in their concentration.
- Flower buds, stalks and fallen leaves are used to prepare essential oils.
- The clove bud and its oils are also used in the medical, pharmaceutical and perfumery industries.
- ‘Sea mist’ also helps with **eugenol**. The eugenol acetate content in the oil is higher, lending better aroma and flavour to the clove buds.



Eugenol

- One of the major components of clove oil is phenylpropanoids, and eugenol is the reduced version of it.
- Eugenol, also called **clove oil**, is the major constituent [70% to 90%] in the aromatic oil extract from cloves. It is also found in lower concentrations in cinnamon and other aromatic spices.
- Eugenol is a **weak acid** that is used as
 - Aromatic oil that is used widely as a flavoring for foods & teas and

- b. Herbal oil used topically to treat toothache and more rarely to be taken orally to treat gastrointestinal and respiratory complaints.
- But, ingestions of Eugenol in high doses can cause severe liver injury.

National Formulary of India

Indian Pharmacopoeia Commission (IPC), Ministry for Health and Family Welfare launched the 6th Edition of National Formulary of India (NFI).

- NFI 2021 has been published to **promote rational use of medicines** in India.
- NFI, 2021 would act a guidance document for all the Clinicians and healthcare professionals while prescribing the medicines to the patients.
- NFI 2021 has been drafted by adopting the **principle ‘do not miss critical and do not overload’** the information by revising the appendices, chapters and drug monographs.
- There are 34 therapeutic categories chapters including 591 drug monographs and 23 appendices are included in this edition.
- Only indications approved by the Indian drug regulator (CDSCO), clinically relevant and as per standard care are included
- The NFI is aligned with National Health Programmes and National List of Essential Medicines (NLEM).

FORMULARY

- It is a manual containing clinically oriented summaries of pharmacological information about selected drugs.
- It may also include administrative and regulatory information pertaining to the prescribing and dispensing of drugs.

National Traffic Management Policy Framework for Drones

Ministry of Civil Aviation has notified a National Unmanned Aircraft System (UAS or drones) Traffic Management (UTM) Policy Framework that will manage drone movement in the UTM airspace.

- **UTM Airspace** is the airspace up to 1000 feet above ground level.
- This framework will allow both public and private third-party service providers to manage the drones in lower airspace.
- To handle the traffic from unmanned aircraft, UTM Service Providers (UTMSPs) will extend automated software services instead of voice communication as in traditional Air Traffic Management (ATM) systems.
- They will primarily be responsible for segregating and separating a drone from other drones and manned aircraft in the lower airspace.
- All drones (except Nano drones operating in the green zone) shall mandatorily share their real-time location through the network to the Centre either directly or through third-party UTM service providers.
- **SSP** - UTM service providers will be assisted by Supplementary Service Providers (SSPs).
- SSPs will maintain data about terrain, weather, and location of manned aircraft and provide services such as insurance, data analytics and drone fleet management.
- **Integration** - The policy requires UTM to be integrated with ATM so that flight plans & real-time location of manned aircraft can be recorded to continuously separate manned & unmanned aircraft from each other.
- Law enforcement and security agencies will also have access to some information in the UTM ecosystem on a need-to-know basis.
- **Service fee** - The policy also allows UTMSPs to levy a service fee on users, a small portion of which will also be shared with the Airports Authority of India.

19. ECONOMY

Rise in GST Revenue Collection

Gross Goods and Services Tax (GST) revenue collections in September (for sales in August) rose 22.5% year-on-year to Rs 1,17,010 crore.

- **Components** - The latest data indicates a slowdown in collections from domestic transactions with central GST and state GST mop up rising under 1% in September, compared to the previous month.
- It was largely IGST, which saw a 10% rise compared to August, that drove up overall collections. Cess on imported goods saw a decline.
- **Reasons** - The GST collections have picked up pace in the 2nd quarter as the economy is recovering at a fast pace.
- Anti-evasion activities, especially action against fake billers have also contributed to the enhanced GST collections.
- It is expected that the positive trend in the revenues will continue and the second half of the year will post higher revenues.
- **Concern** - Though GST revenues are picking up pace after the impact of the Covid-19, revenue buoyancy under GST is being seen as a concern.

GST Collection

- The GST has five key tax slabs: zero, 5%, 12%, 18% and 28%.
- A compensation cess, ranging between 1% and 290%, is levied on demerit and luxury goods over and above the topmost rate of 28%.
- A merger of 5% and 12% slabs or 12% and 18% slabs has been deliberated upon earlier as well but has not been taken up formally for a decision.

Negative Real Interest Rates

In its latest monetary policy review, RBI has projected retail inflation to be at 5.3% for 2021-22, which leads investors to worry about earning negative real rates.

$$\text{Real Rate of Return on Investment} = \text{Actual Rate of Return} - \text{Prevailing Inflation Rate}$$

- The real interest rate can be obtained by simply subtracting the rate of inflation during the period of investment, from the return earned.
- Unless the return on investments beat inflation, it will result in negative real interest rates, which will adversely affect the purchasing power.
- For example, if we are planning to buy a refrigerator for Rs. 20,000 but instead invested the amount in a fixed income instrument that pays 5% interest.
- In the next year, adding the return, investment will be worth Rs. 21,000.
- If the inflation in the prices of the refrigerators turns out to be 6%, its price will become Rs. 21,200.
- Thus, the investment amount won't be sufficient to buy the older refrigerator model and affect the purchasing power of the investor.
- To overcome this negative real interest rates, central banks would increase interest rates when inflation begins to exceed their desired threshold.
- But economic growth needs lower interest rate regime to kick-off investments, central banks may decide to keep the rates lower or hike at lower pace going ahead.

Secured Overnight Financing Rate

Rural Electrification Corporation Limited (REC Ltd.) raised a US\$75 million 5-year Secured Overnight Financing Rate (SOFR) linked Syndicated Term Loan with Sumitomo Mitsui Banking Corporation (SMBC).

- The Secured Overnight Financing Rate (SOFR) is a benchmark interest rate for dollar-denominated derivatives and loans that is replacing the London interbank offered rate (LIBOR).

- Interest rate swaps on more than \$80 trillion in notional debt switched to the SOFR in 2020.
- This transition is expected to increase long-term liquidity but also result in substantial short-term trading volatility in derivatives.
- The daily SOFR is **based on transactions in the Treasury repurchase market**, where investors offer banks overnight loans backed by their bond assets.
- SOFR is seen as preferable to LIBOR since it is based on data from observable transactions rather than on estimated borrowing rates.
- Benchmark rates such as the SOFR are essential in the trading of derivatives, particularly interest-rate swaps.
- [Corporations & other parties used interest-rate swaps to manage interest-rate risk and to speculate on changes in borrowing costs.]
- *While SOFR is becoming the benchmark rate for dollar-denominated derivatives and loans, other countries have sought their own alternative rates, such as SONIA and EONIA.*

REC Limited

- REC Limited is a Navratna NBFC focusing on Power Sector Financing and Development across India.
- Established in 1969, REC Limited has completed over fifty years in the area of its operations.
- It provides financial assistance to state electricity boards, state governments, central/state power utilities, independent power producers, rural electric cooperatives and private sector utilities.
- Its business activities involve financing projects in the complete power sector value chain; different type of projects includes Generation, Transmission, Distribution Projects, and Renewable Energy projects.

Green Term Loan

NTPC Renewable Energy ltd (REL) has signed its first Green Term Loan agreement of Rs. 500 crores with a tenor of 15 years with Bank of India for its 470 MW Solar Projects in Rajasthan & 200 MW Solar Project in Gujarat.

- Green loans are any type of loan instrument made available exclusively to finance or re-finance new and/or existing eligible Green Projects.
- Other similar instruments include [ESG ratings](#) and [Green bonds](#).

Green Financing

- Green finance is any structured financial activity that's been created to ensure a sustainable environmental outcome.
- Green finance includes climate finance but is not limited to it.
- It includes the **financing of public and private green investments** (including preparatory and capital costs) in the following areas
 1. Environmental goods and services* (such as water management or protection of biodiversity and landscapes)
 2. Prevention, minimization and compensation of damages to the environment and to the climate (such as energy efficiency or dams)
- It includes the **financing of public policies** (including operational costs) that encourage the implementation of environmental and environmental-damage mitigation or adaptation projects and initiatives.

Hybrid Funds Option

With markets hitting new highs and are likely to stay strong with some correction, weighing the hybrid funds option is needed.

- A hybrid fund is a type of a **mutual fund or ETF** that invests in different types of assets or asset classes to produce a diversified portfolio.
- Often, they are a combination of Equity and Debt assets, and sometimes they also include Gold or even Real estate.

- They may also be known as **asset allocation funds**. The allocation to each asset class is decided by the fund manager basis the investment objective of the fund and the market condition.
- **Advantages** - Portfolio risk can be reduced by combining assets that have a low correlation.
- Helps in achieving maximum returns at minimum possible risk.
- While hybrid funds are conservative and limit exposure to equities, they allow investors to participate in any upside that the markets may offer.

Types of Hybrid Funds

- **Balanced funds** are hybrid funds that hold 60% stocks & 40% bonds.
- **Target date funds or lifecycle funds** invest in multiple asset classes for diversification.
- They vary from standard hybrid funds in that their portfolio portions begin with a more aggressive allocation and progressively rebalance to a more conservative allocation for use by a specified utilization date.
- **Blend fund** (or blended fund) is a type of equity mutual fund that includes a mix of both value and growth stocks.

Blue Dot Network

- In 2019, the Blue Dot Network (BDN) was announced as a joint initiative of the US, Japan and Australia to certify infrastructure projects that meet international quality standards.
- It brings together governments, the private sector and civil society to promote principles of global sustainable infrastructure development.
 - It will help attract private capital to infrastructure projects in developing and emerging economies.
- It is seen as a direct counter to China's Belt and Road Initiative (BRI).
- BDN certification will serve as a globally recognized symbol of market-driven, Paris Agreement-aligned, and financially, socially, and environmentally sustainable infrastructure projects.
- But, unlike the BRI, the BDN would not offer public funds or loans for the project.

Credit Score

- It is a number (from 300 to 850) that depicts a consumer's creditworthiness .
- It is **based on credit history** - number of open accounts, total levels of debt, and repayment history, and other factors.
- A strong credit score is a key to your financial health as it can provide you with access to the best offers on loans and credit cards.
- *The higher the score, the better a borrower looks to potential lenders.*

Credit Enquiry

- **Hard Enquiry** - When you apply for any kind of loan or a credit card, the lender fetches your credit report from a credit bureau to gauge your creditworthiness. This is commonly known as a 'hard enquiry.'
- Too many hard enquiries from lenders within a short span can reduce your score as it indicates credit hungriness.
- **Soft Enquiry** - When you check your credit score on your own, it is known as a 'soft enquiry.'
- Soft enquiries have no impact on your score. In fact, checking your credit score regularly can help detect errors that may emerge in your credit report.

Factors Impacting Credit Score

- **Credit Behaviour** - A person's credit score is determined by their **behaviour with credit** and is **not related to income**.
- Missing EMI repayments, high credit-utilisation ratio, frequent and multiple applications for loans and cards can severely damage a person's credit score, irrespective of their income.

- However, higher income impacts the overall loan eligibility, as it reflects higher repayment capacity.
- Despite a strong credit score, those with lower income may not be eligible for select credit cards or high-ticket loans.
- **Credit History** - If a person has fared well with their credit obligations, their risk of defaulting in future is relatively less and they can get credit approval with better offers and at preferential rates.
- On the other hand, indiscipline in handling credit in the past makes you a risky customer and bureaus give you a low credit score making it difficult to avail loans and cards.
- But, if you have never taken any loan or credit card in your life, you do not have any credit history.
- Having no credit history leaves providers with no data to analyse the credit risk provided to new credit applicants, leading to possible rejection.

Settling and Closing of Credit Account

- Settling of a loan or credit card account is different from closing them.
- **Closure** of an account means deactivating a loan or credit card after full repayment of outstanding dues as per schedule, with no outstanding amount remaining.
- **Settling** - When a person may be unable to pay the outstanding amount for some time, the lender may choose to extend the option to settle the account through a one-time payment option, where a certain amount of the debt may be written off.
- When you decide to settle your credit account, the credit bureaus are informed; this starts reflecting in your credit report as a 'settled' account.
- You need to know
- This 'settled' account remains in the credit report for a long time, and all the future loan or credit card applications may be adversely impacted.

20. AGRICULTURE

Reduction in Stubble Burning

The Centre-constituted [Commission for Air Quality Management](#) said that there could be reduced stubble burning in the coming seasons due to two main factors.

- **Reduction in the area under paddy cultivation** - The total paddy area in Haryana, Punjab and the eight NCR (National Capital Region) districts of Uttar Pradesh has reduced by 7.72% during 2021 as compared to the previous year.
- **A shift away from paddy varieties that take long to mature** - PUSA-44 variety has the longest duration (145-150 days) of maturity and leaves a shorter window for wheat sowing after its harvest.
- Also, it's the non-basmati variety of rice, whose stalk remains, that is usually burnt off by farmers ahead of sowing wheat.
- So, crop diversification and moving away from PUSA-44 variety with short duration High Yielding Varieties are thus part of the action plan for control of stubble burning.
- With this, total paddy straw generation from the non-basmati variety of rice is likely to be reduced by 12.42%.

Polyhouse Technology

- A polyhouse is a specially constructed structure like a building where specialised polythene sheet is used as a covering material under which crops can be grown in partially or fully controlled climatic conditions.
- It is covered with a transparent material as to permit the entry of natural light.
- Polyhouses are also helpful in reducing threats such as extreme heat and pest attacks in crops.
- Conventional polyhouses have a stationary roof which sometimes leads to excessive heat, insufficient light and prone to insufficient levels of carbon dioxide, transpiration and water stress.

- Retractable Roof Polyhouse Technology will be operated based on weather conditions and crop requirements to overcome the disadvantages in conventional polyhouses.
- **Monsoon and Arabica Coffee Harvest** - Coffee-growing regions in Karnataka and Kerala are receiving continuous rains which affects the harvest of ripened beans.
- It also led to the outbreak of fungal disease wherein the ripened beans rot on the branches.
- Thus, Growers are raising demands to the Government to extend the subsidy provided for setting up polyhouses to coffee growers also, who can utilise the infrastructure for drying the beans.

Hydroponics

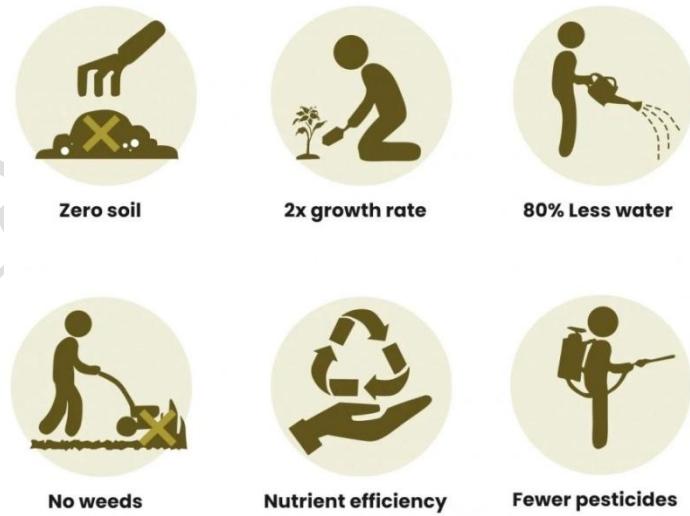
As part of Green Action Week (GAW), observed annually in the first week of October as part of a global campaign to promote sustainable consumption, the Madurai chapter focused on hydroponics.

- Hydroponics is a type of horticulture, a subset of hydroculture and the art of gardening in water without soil.
- [Geponics is the method of growing plants in normal soil.]
- Hydroponics (Latin word meaning ‘working water’) involves growing plants without soil, by using nutrient-rich solutions, oxygen, and water.
- **Advantages** (See Image)
- **Disadvantages** - Expensive, Vulnerable to power outages & water-borne diseases, Requires constant monitoring & maintenance, Problems affect plants quicker.

Method	Definition
Hydroponics	Art of gardening without soil, in nutrient-rich water
Aquaponics	Integration of fish farming (Aquaculture) and hydroponics
Aeroponics	Art of gardening without soil, where the roots are exposed to the air

WHY HYDROPOONICS?

Hydroponics is the method of growing plants in a nutrient-rich water-based environment. It comes with many incredible benefits over traditional gardening:



Green Action Week Campaign

- It is an initiative of Swedish Society for Nature Conservation.
- It is run by 60 organisations across 40 countries.
- India co-ordinator, CUTS International, is partnering with organisations across 12 States to collectively work to change consumption patterns among people for a sustainable living in the future.

Bio-enzymes from Kinnow

Punjab farmers, especially in kinnow belt, have started making bio-enzymes (BEs) from falling kinnow fruits, which, if not would become a total waste.

- Farmers can collect these dropped fruits from their kinnow fields and prepare bio-enzymes (BEs) at a low cost.
- Horticulture department experts say nearly 15-20% of the total kinnow production falls from the tree before and during the harvesting period.



- The fallen fruit is a major challenge for kinnow farmers in the state as one needs to dig up small pits to bury them, otherwise the fallen fruit rot and invite a fly attack on the healthy fruit still on the plants.
- But now, some farmers are using this fallen fruit to improve the pH level and soil fertility of their land by making BEs from this waste fruit.
- This waste kinnow can prove a boon to improve soil, water, air, depleting ground water, water contamination and overall ecology.
- Not only can plant health be improved, it also helps prevent indiscriminate usage of chemical sprays of fungicides and bacterial diseases on crops, especially vegetables, tuber crops and cereals.
- BEs can be used for a whole year in the form of spray on vegetables and mixing it with field irrigation.

Kinnow

- Often pronounced as Kinoo or Kinu, this fruit is a **high yield mandarin** and is a hybrid of 2 citrus cultivators 'King' & 'Willow Leaf'.
 - While an orange is a hybrid of citrus reticulate and citrus maxima, kinnow is a hybrid of citrus deliciosa and citrus nobilis.
- Developed by HB Frost in 1935, Kinnow is a year-long duration crop and it's juicier than oranges.
- It is majorly grown in Punjab, Himachal Pradesh, Jammu & Kashmir, Rajasthan and even Haryana.
- The main harvesting period is from November-end to March, but some varieties of citrus fruit start coming into the markets in October.

21. ENVIRONMENT

Algae to Biodegrade Plastic

Researchers have isolated an alga species that shows promise as an agent of biodegradation of plastic sheets.

- The usual means of disposal of plastic waste involves incineration, land-filling and recycling. These methods are hazardous to the environment.
- But, the new biodegradation method based on alga species is safe and environment friendly.
- In the recent study, the biodegradation of low-density polyethylene (polymer) sheet into monomers was done by the microalga Uronema africanum Borge.
- This microalga degrades the polymers by producing enzymes, hormones, toxins such as cyanotoxins, and some polysaccharides.
- This green photosynthetic microalgae is commonly found in Africa, Asia and Europe. It is an epiphyte, which attaches itself to other algae and plants.

Annual report of the Central Pollution Control Board (2011-12)

- The plastic waste generated in a year amounted to 5.6 million metric tonnes.
- Only 60% of the plastic used in India was collected and recycled.
- The metros alone contributed some 21.2% of the total waste, led by Delhi, followed by Chennai, Kolkata and Mumbai.

Dust Mitigation Measures at C&D Sites

Commission for Air Quality Management in NCR and Adjoining Areas (CAQM) has been taking up for strict compliance of dust mitigation measures at Construction & Demolition (C&D) sites.

- Dust emanating from C&D sites is a major consistent source of air pollution.

- The statutory directions were issued by CAQM to the authorities of the NCR states and Delhi to reduce dust from C&D sites includes imposing and collecting Environmental Compensation (EC) from the
 - 1. Violators of dust mitigation norms at the C&D sites, and
 - 2. Vehicles found violating the prescribed dust abatement norms during transportation of materials relating to C&D waste.
- C&D activities generate enormous amounts of dust and contribute significantly to PM_{2.5} and PM₁₀ adversely affecting the quality of air.
- To tackle the problem of dust resulting from construction, remodeling, repair and demolition, such activities need to be strictly monitored and inspected regularly for compliance of various dust control measures.

Ethanol 20 Programme

The government has launched the Ethanol 20 (E20) programme under which it aims to achieve 20% ethanol blending in petrol by 2025.

- Earlier, the central government had released an expert committee report on the 'Roadmap for Ethanol Blending in India by 2025' that proposes,
 - 1. A gradual rollout of ethanol-blended fuel to achieve E10 fuel supply by April 2022 and
 - 2. A phased rollout of E20 from April 2023 to April 2025.
- The committee also recommends roll out of E20 material-compliant and E10 engine-tuned vehicles from April 2023 and production of E20-tuned engine vehicles from April 2025.
- **Significance** - E20 programme is aimed at reducing the country's oil import bill, and it will also decrease the emissions of carbon monoxide, hydrocarbons and nitrogen oxides by 40%.
- This new initiative is also part of measures to improve energy security and self-sufficiency measures.
- With 100% use of 20% blend of bio ethanol, India will be able to save Rs. 30,000 crore on import of fossil fuel.

Other Initiatives

- The government is planning to introduce [Flex Fuel Vehicles](#) soon, which would be able to operate on 100% bio ethanol or 100% petrol.
- The government has allowed the production of ethanol from surplus and damaged food grains in addition to sugar cane.

Impacts of Shrinking Summer Sea Ice

A new study has found that if carbon emissions continue at current levels, summer ice in the Arctic will disappear by 2100, along with it, creatures such as seals and polar bears.

General Happening

- In winter, most of the Arctic Ocean surface freezes and scientists expect this to continue for the foreseeable future, even as climate warms.
- In summer, when some of the ice melts, winds and currents carry it for great distances - some into the North Atlantic, most into the Arctic's farthest-north coasts, along Greenland and the Canadian islands.
- It results in a **rich marine ecosystem**. On the Arctic ice, algae bloom.
- These feed tiny animals, which in turn feed fish, which in turn feed seals, which feed polar bears at the top of the chain.
- The irregular topography also helps create lairs for seals, and ice caves for polar bears

Pyramid of Marine Ecosystem



during the winter.

- But with a warming climate, summer sea ice has been shrinking fast, and now consistently spans less than half the area it did in the early 1980s.

Findings

- The study covered the region north of Greenland and the coasts of the Canadian Archipelago, where sea ice has traditionally been thickest round the year, and thus likely to be most resilient.
- **Two Scenarios** - The study looked into two scenarios
 1. Under the optimistic scenario (if carbon emissions are brought in check), some summer ice could persist indefinitely.
 2. Under the pessimistic scenario (if emissions continue as they are), summer ice would disappear by the end of the century.
- **Low & High Emission Scenarios** - Under the low-emissions scenario, summer ice from even the central Arctic will wane by 2050.
- This ice will no longer endure through the year. Locally formed summer ice will persist in the [Last Ice Area](#), but will now be only a metre thick.
- The study forecasts that under the low-emissions scenario, at least some seals, bears and other creatures may survive. They currently exist under similar summer conditions along western Alaska and Hudson Bay.
- However, under the higher-emissions scenario, by 2100, even the locally formed ice will disappear in summer.
- **Implications** - With no summer ice anywhere, there will be no ice-dependent ecosystems. This may not mean the end of all life.
- New things will emerge from other areas, but it may take some time for new creatures to invade.
- Earth may be getting warmer, but the planet's rotation around the sun will not change, and any new occupants including photosynthetic organisms would have to deal with the long, sunless Arctic winter.

Increasing Population of Peafowls

An unusual incident in Kerala - a person died after he was hit by a peafowl (*pavocristatus*) while driving a bike - has turned the spotlight on the increasing population of peafowls in the state.

- Studies have shown that the peafowl population has been on the rise in the state since the 1980s.
- Peafowls are a threat to paddy farmers in Kerala; they destroy its seeds and cause man-animal conflict.
- The species are currently habituated more in central Kerala, followed by southeast and northwest parts of the state.
- At least 19% of the states' area is suitable habitat for this species; this may increase by 40-50% by 2050.
- **The growing population of peafowls signals climate change:**
 - They are known to grow and thrive in dry conditions.
 - They are well adapted to living in forest edges and cultivated areas.
- As humans have encroached the foothills of the Western Ghats in Kerala to cultivate crops and construct buildings, it has resulted in the loss of vegetation and has altered the Western Ghats.
- **Agriculture expansion and deforestation** have caused other species to 'invade the human territory'.
- In the end, it is important to establish strategies and controlling methods to manage the peafowl population.

REPORTS

Air Quality

The Global Burden of Disease estimates that India lost 1.67 million lives in 2019 directly as a result of breathing polluted air.

- India's economic growth is built on fossil fuels. Coal, oil, and natural gas account for roughly 75% of our power generation come at the cost of heavy CO₂, SO₂, NO₂, ozone, and particulate matter emissions.
- The air quality in India is measured by Central pollution control board using National Air Quality Index.
- The mandate provided to the Central pollution control board under the Air (Prevention and Control of Pollution) Act 1981 empowers it to set standards for the quality of air.
- Poor air quality was found to counter 67% of the cost advantage of using solar panels over grid power, as ground-level smog and the particulate matter chokes their power output.
- Essential step is to expand the country's air quality monitoring network with low-cost monitors that capture readings for PM_{2.5} and 10 & gases like NO₂, SO₂, methane, and secondary volatile organic compounds.

Ecological Threat Report 2021

The 'Ecological Threat Report (ETR) 2021: Understanding ecological threats, resilience and peace' was released by the Institute of Economics and Peace.

- It assessed the data from sub-national administrative units in 178 countries for threats relating to **food risk, water risk, rapid population growth, temperature anomalies & natural disasters**.
- **Findings** - Of the 178 countries in the ETR,
 - a. 30 were identified as hotspots for having low levels of resilience and a medium to extremely high catastrophic threat score.
 - b. 13 faced extremely high ecological threats and
 - c. 34 others faced high ecological threats.
- The 30 hotspot countries are least likely to be able to mitigate and adapt to new ecological threats, leading to mass displacement.
- The most vulnerable countries are clustered in the Middle East and North Africa, sub-Saharan Africa and South Asia.
- Of the 15 countries most threatened, 3 are in south Asia. As a region, south Asia is the worst-placed, with water and food risks driving the average ETR score in the region.
- Global food insecurity has increased by 44% since 2014, affecting 30.4% of the world's population in 2020, and is likely to rise further.
- From 1990 to 2020, a total of 10,320 natural disasters occurred globally.
 - Flooding has been the most common natural disasters, accounting for 42% of the total disaster count.
- In 2020, 177 countries and territories recorded a warmer average temperature compared to their historical average temperatures.
- The report recommended a policy to combine health, food, water, refugee relief, finance, agricultural and business development into one integrated agency in high-risk areas and empowering local communities.

Ecological degradation and conflict work in a vicious circle, whereby one degradation of resources leads to conflict and vice versa.

Climate change will have an amplifying effect, causing further ecological degradation and pushing some countries through violent tipping points.

State of Climate Services 2021

The report 'State of Climate Services' 2021 was released by the World Meteorological Organization (WMO).

- According to the report, TWS dropped at a rate of 1 cm per year in 20 years (2002-2021).
- The biggest losses have occurred in Antarctica and Greenland. But many highly populated, lower latitude locations have experienced TWS losses.
- This includes India, where the TWS has been lost at a rate of at least 3 cm per year. In some regions, the loss has been over 4 cm per year too.
- India has recorded the highest loss in TWS if the loss of

Terrestrial Water Storage

- **Terrestrial Water Storage** (TWS) is the sum of all water on the land surface and in the subsurface, ie surface water, soil moisture, snow and ice and ground water.
- Only 0.5% of water on Earth is usable and available as freshwater.

water storage in Antarctica and Greenland is excluded.

- So, India is the ‘topmost hotspot of TWS loss’. The northern part of India has experienced the maximum loss within the country.
- **Factors** - Water resources across the world are under tremendous pressure due to human and naturally-induced stressors,
 1. Extreme weather events,
 2. Population growth,
 3. Urbanisation and
 4. Decreasing availability of freshwater

Indian Scenario

- In India, per capita water availability is reducing due to an increase in population.
- Average annual per capita water availability has been **consistently decreasing** - from 1,816 cubic metres (2001) to 1,545 cu.m. (2011).
- It is projected to further decrease to 1,367 cubic metres in 2031.
- Falkenmark Water Stress Indicator of 21 river basins in India are,

Number of River Basins	Water Stress
5	‘Absolute water scarce’ (per capita water availability below 500 cu. m.)
5	‘Water scarce’ (per capita water availability below 1,000 cu. m.)
3	‘Water stressed’ (per capita water availability below 1,700 cu. m.)

- The State of India’s Environment in figures, 2020 says that by 2050, 6 will become absolute water scarce, 6 will become water scarce and 4 will become water stressed.

Climate Vulnerability Index

Delhi-based Environmental think tank Council on Energy, Environment and Water (CEEW) has carried a first-of-its-kind district-level Climate Vulnerability Index (CVI).

- This district-level Climate Vulnerability Index has analysed 640 districts in India to **assess their vulnerability to extreme weather events** such as cyclones, floods, heatwaves, droughts, etc.
- The Climate Vulnerability Index maps,
 1. Exposure (i.e., whether the district is prone to extreme weather events),
 2. Sensitivity (the likelihood of an impact on the district by the weather event), and
 3. Adaptive capacity (what the response or coping mechanism of the district is).
- It helps map critical vulnerabilities and plan strategies to enhance resilience and adapt by climate-proofing communities, economies and infrastructure.
- Instead of looking at climate extremes in isolation, the study looks at the combined **risk of hydro-met disasters** (floods, cyclones and droughts), and their impact.
- The study does not take into consideration other natural disasters such as earthquakes.
- While assessing the preparedness of a state or district, the Index takes into account certain indicators like,
 1. Availability of critical infrastructure like cyclone and flood shelters,
 2. Government mechanisms in place including updating of disaster management plans, mitigation strategies, standard operating procedures before, during and after an extreme weather event.

Findings of Climate Vulnerability Index

- The CVI has ranked 20 states out of which Assam and Andhra Pradesh are the most vulnerable to extreme weather events, and Kerala, Tripura and West Bengal are the least vulnerable.
 - The study points out that the difference in the vulnerability of states ranked is marginal, making all states vulnerable.
- The reason why Kerala and West Bengal have performed better is because they have stepped up their climate action plans & preparedness to handle an extreme weather event.
- While 27 Indian states and UTs are vulnerable to extreme climate events, 463 districts out of 640 are vulnerable to extreme weather events.

India's Most Climate Vulnerable Districts	State
Dhemaji and Nagaon	Assam
Khammam	Telangana
Gajapati	Odisha
Vizianagaram	Andhra Pradesh
Sangli	Maharashtra
Chennai	Tamil Nadu

- 17 of 20 Indians (More than 80%) live in districts vulnerable to climate risks, out of which every 5 Indians live in extremely vulnerable areas.
- More than 45% of these districts have undergone unsustainable landscape and infrastructure changes.
- 183 hotspot districts are highly vulnerable to more than one extreme climate events.
- 60% of Indian districts have medium to low adaptive capacity in handing extreme weather events.

States	Vulnerability
North-eastern states	More vulnerable to floods
Southern and central states	Most vulnerable to extreme droughts
59% of the total districts in the eastern states	Highly vulnerable to extreme cyclones
41% of the total districts in the western states	

- Impacts** - Apart from the intensity and frequency of extreme weather events which have increased in the country, the report finds that “**land disruptions**” have increased the impact of these events.
- Land disruptions primarily point to anthropogenic activity resulting in the disappearance of forests, wetlands, mangroves and other habitats.
 - These ecosystems have traditionally acted as natural buffers against such extreme weather, reducing the impact.
 - With their disappearance, the impact of the weather events have increased and are being felt more across the country.

Recommendations

- Develop a high-resolution **Climate Risk Atlas** (CRA) to map critical vulnerabilities at the district level and better identify, assess, and project chronic and acute risks.
- Establish a centralised **climate-risk commission** to coordinate the environmental de-risking mission.

- Undertake **climate-sensitivity-led landscape restoration** focused on rehabilitating, restoring, and reintegrating natural ecosystems as part of the developmental process.
- Integrate climate risk profiling with infrastructure planning to increase adaptive capacity.
- Provide for **climate risk-interlinked adaptation financing** by creating innovative CVI-based financing instruments that integrate climate risks for an effective risk transfer mechanism.

PROTECTED AREAS

Corbett National Park

A proposal has been made to change the name of Corbett National Park to Ramganga National Park.

- **Name** - Set up in 1936 as India's - and Asia's - first national park, the national park was called Hailey National Park.
- It was renamed Ramganga National Park (after the river that flows through it) shortly after Independence.
- In 1956, it was rechristened yet again as Corbett National Park.
- **About** - Located in the Himalayan foothills of Uttarakhand, the park encompasses the Pathi Dun valley formed by the Ramganga River.
- It has sub-Himalayan belt ecological characteristics, as it falls in the Shivalik and Outer Himalaya geological provinces.
- It has dense moist deciduous forest.
- **Ideal Tiger Territory** - Corbett National Park was the place from where Project Tiger was launched in 1973.
- It is part of the Corbett Tiger Reserve. It has the single largest tiger population in a tiger reserve in the country.
- The national park along with the neighbouring Sonanadi Wildlife Sanctuary makes the critical tiger habitat of the Corbett Tiger Reserve.
- **Other Fauna** - Indian Leopards, Barking Deer, Spotted Deer, Sambar Deer, Jungle Cats, sloth, etc.

Guru Ghasidas & Tamor Pingla Tiger Reserve

National Tiger Conservation Authority (NTCA) approved the Chhattisgarh's proposal to declare the combined areas of the Guru Ghasidas National Park & Tamor Pingla Wildlife Sanctuary as a Tiger Reserve.

- **Approval** - The 11th Technical Committee of the NTCA approved the proposal under the Section 38V (1) of the Wildlife (Protection) Act, 1972.
- [Section 38V (1) of WPA, 1972 (Tiger Conservation Plan) - The State Government shall, on the recommendation of the NTCA, notify an area as a tiger reserve.]
- **About the New Reserve** - The new Reserve is located in the northern part of Chhattisgarh, bordering Madhya Pradesh and Jharkhand.
- Both Tamor Pingla Wildlife Sanctuary and Guru Ghasidas National Park were identified as **reserve forests**.
- Turning Guru Ghasidas into a Tiger Reserve is important as it provides a corridor for tigers to move between Bandhavgarh Tiger Reserve (Madhya Pradesh) and Palamau Tiger Reserve (Jharkhand).

Tamor Pingla Wildlife Sanctuary

- It is located in the Surajpur district of Chhattisgarh, and
 1. Moran River surrounds the northern boundary,
 2. BongaNalla guards the eastern boundary and
 3. Rihand River flows in the western boundary.
- The sanctuary experiences a warm and temperate type of climate.
- It is a part of the Sarguja Jashpur Elephant Reserve since 2011.

- **Fauna** - Asian elephants, Bengal tigers, Indian leopards, bears

Guru Ghasidas National Park

- It is located in the Narmada Valley dry deciduous forests eco-region of Chhattisgarh.
- It was the last known habitat of the Asiatic cheetah in the country.
- Originally a part of the Sanjay Dubri National Park in undivided Madhya Pradesh, it was created as a separate entity in Chhattisgarh's Sarguja region after the formation of the state in 2001.
- **Fauna** - Bengal tiger, Indian leopard, Spotted deer, Sambar deer, wild boar, Nilgai, Chinkara, Civet, Porcupine, Monitor lizard, etc

SPECIES IN NEWS

Allium Negianum

A plant discovered in Uttarakhand in 2019 has been newly confirmed as a new species of Allium.

- The plant, called Allium Negianum is a new species of onion.
- It was discovered in the Indo-Tibetan border area of Malari village, Niti valley of Chamoli district in Uttarakhand.
- It is restricted to the region of Western Himalayas in India and hasn't yet been reported from anywhere else in the world.
- It grows at 3000 to 4800 m above sea level.
- It can be found along open grassy meadows, sandy soils along rivers, and streams forming in snow pasture lands along alpine meadows.
- The alpine meadows are locally known as "Bugyal/Bugial", where the melting snow actually helps carry the seed to more favourable areas.
- It has long been known to local communities and the onion from Niti Valley deemed the best on the market.



Allium

- Allium is one of the largest genera in Amaryllidaceae, a family of herbaceous, mainly perennial and bulbous flowering plants.
- The genus has about 1,100 species distributed worldwide, including onion, garlic, scallion, shallot and chives.
- It naturally occurs in dry seasons in the northern hemisphere and South Africa.
- The primary center of evolution for the genus extends across the Irano-Turanian bio-geographical region.
- The Mediterranean basin and western North America are considered as the secondary centers of diversity.
- Indian Himalayan region has two distinct centers of Allium diversity
 1. The western Himalaya (over 85% of total diversity) and
 2. The eastern Himalaya (6%), covering the alpine-sub temperate region.

Mumba Eels

A new species of swamp eel belonging to the genus *Rakthamichthys* that is endemic to India was discovered in a well in Mumbai.

- This blind eel was named Rakthamichthys mumba.
- It is a new species of Hypogean eel (Teleostei: Synbranchidae). It is a completely blind subterranean freshwater fish species.
- Unlike other species of its genus, the mumba lacks eyes, fins and scales, has jaws equal in forward extent, different gill aperture, crescentic-shaped cephalic.

- Its body is pinkish-red with numerous blood vessels all over.
- **Difference** - *Rakthamichthys mumba* differs from its congener from Western Ghats of India by the possession of jaws-projecting forward equally, absence of eyes and having more vertebrae.

Family Synbranchidae

- Members of this family are very peculiar, relict lineages of percomorphs, consisting of freshwater eel-like fishes of the tropics and subtropics.
- They are distributed across all countries except Antarctica.
- Presently, this family consists of 26 valid species and is unique among teleosts by lacking paired, median and caudal fins.

Arctic Terns

The annual migration of birds including the Arctic Terns from the Arctic to the Gulf of Mannar Marine Biosphere Reserve has begun.

The seasonal migration occurs every year over the Central Asian Flyway (CAF).

- Arctic Terns (*Sterna paradisaea*) are small water-loving birds with angular wings.
- They are well known for its **long yearly migration**. It migrates from pole to pole (Arctic to Antarctica); travelling 70,000 km each year.
 1. The arctic tern hatches during summer in the Arctic Circle.
 2. During the unbearably cold arctic winter, the arctic tern flies south, following the summer season all the way to the Antarctic Circle.
- Arctic Terns are **social birds**, foraging in groups and **nesting on the ground** in colonies. They often rest on ice and fly on buoyant wings.
- Habitat - Shorelines
- Nesting - Ground (This bird has a circumpolar breeding distribution.)
- IUCN Conservation - Least Concern

Central Asian Flyway

- The Central Asian Flyway (CAF) is the shortest flyway out of the 9 flyways in the world.
- This flyway comprises 29 countries including Iraq, Kuwait, Qatar, Kyrgyzstan, Nepal, India, Bhutan, Myanmar and Maldives
- On this route, the migratory birds travelling on the east of CAF also halt at the adjoining sanctuary habitats in Dhanushkodi and other water bodies and inter-tidal shores.
- To know more about Migratory Flyways, [click here](#).

Journey in India

- The Arctic birds take the long non-stop haul from the Arctic and European regions to winter in South Asia.
- They usually stopover in the coastal swamps of the Gulf of Mannar between October and December.
- The birds begin their journey through India from the Bhitarkanika National Park, Odisha, and fly over to Kanniyakumari, the southern-most tip of coastal Tamil Nadu.
- The flocks again return in March on their way back.

Migration of Birds

- Migration of bird species **occurs annually** when the birds live in places that get too cold during the winter, and food supply becomes sparse.
- Birds migrate from the breeding area to a wintering area.
 - Breeding area is where they stay during the warmer seasons such as spring and summer.
 - Wintering area is where they will spend the winter months, and return after the season ends.

- Their route is set and generation after generation, follow the path.
- Birds use different techniques:
 1. **Visual cues** - Mountain ranges and rivers.
 2. **Aural cues** - Birds can hear low-frequency sounds, a skill that allows them to pick up sounds of waves or winds from the mountains and deserts from great distances away.
 3. **Earth's magnetic field** – Birds' eyes work like a magnetic compass, and direct them while detecting the angle and intensity of the magnetic field.

22. SCIENCE & TECHNOLOGY

SPACE

Lucy Mission - First Mission to Trojans

NASA will launch its first spacecraft Lucy on an Atlas V rocket to study Jupiter's Trojan asteroids to collect insights into the solar system's formation.

- The mission is named as 'Lucy' after an ancient fossil that provided insights into the evolution of human species.
- **Mission** - To investigate the group of rocky bodies circling the Sun in two swarms, one preceding Jupiter in its orbital path and the other trailing behind Jupiter.
- After receiving boosts from Earth's gravity, Lucy will embark on a 12-year journey to 8 different asteroids.
 - Among the 8 asteroids, one asteroid is in the Main Belt between Mars and Jupiter and then 7 Trojan Asteroids.
- Lucy will offer new insights into the history of the solar system, including how all of the planets came to be and why they are aligned in their current configuration.
- **Working** - Lucy will fly by its targets within 400 kms of their surfaces.
- It will use its onboard instruments and large antenna to investigate their geology, including composition, mass, density and volume.
- It will be the first solar-powered to venture this far from the Sun, and will observe more asteroids than any other spacecraft before it.

Trojan Asteroids

- Trojan asteroids or Jupiter Trojans are group of asteroids (more than 7,000 in number) that share the planet Jupiter's orbit around the Sun.
- They are leftovers of the primordial material from which Jupiter and the other outer planets were formed.
- Despite the fact that they really are in a very small region of space, they're very physically different from one another.
- Trojans are a type of co-orbital object, where a star and a planet orbit around a common barycentre.

DEFENCE

Agni-5

Agni-5 Missile was launched from the APJ Abdul Kalam Island, Odisha successfully.

- Agni-5 Missile is a nuclear-capable long-range Surface to Surface Intercontinental Ballistic Missile (ICBM).
- Agni-5 was developed by the Defence Research and Development Organisation (DRDO) as a part of the Integrated Guided Missile Development Program (IGMDP).

- It uses a 3-stage solid fuelled engine.
- It is capable of striking targets at ranges up to 5,000 kms with very high degree of accuracy.
- India began testing the Agni series of missile in 1989 with the 1st test for Agni 1, an Intermediate Range Ballistic Missile, with the 1000-km range.
- **Significance** - This Missile is capable of reaching most parts of China.
- Successful test of Agni-5 is in line with India's policy to have 'credible minimum deterrence' that underpins the commitment to 'No First Use' of its nuclear doctrine.
- Thus, second strike capability - the capability to strike back after being hit by nuclear weapons first becomes important.

Intercontinental Ballistic Missile

- Intercontinental Ballistic Missile (ICBM) is a land-based, nuclear-armed ballistic missile with a range of more than 5,600 km.
- ICBM-capable nations include the US, erstwhile Soviet Union, China, France, Israel, North Korea and the UK.
- The first ICBMs were deployed by the Soviet Union in 1958; the US followed the next year.

Nuclear Triad

- It refers to the delivery of nuclear weapons via land, sea and air i.e.
 1. Land-based intercontinental ballistic missiles (ICBMs),
 2. Submarine-launched ballistic missiles (SLBMs), and
 3. Strategic bombers.
- The purpose of having this 3-branched nuclear capability is to reduce the possibility that an enemy could destroy all of a nation's nuclear forces in a first-strike attack.
- This, in turn, ensures a credible threat of a second strike, and thus increases a nation's nuclear deterrence.

Status of Power	Countries
Triad powers	China, India, Russia and US
Former triad powers	France
Suspected triad powers	Israel

- Other methods of delivery could include orbital weapons, nuclear torpedo and hypersonic glide vehicles.

HEALTH

Xenotransplantation to Humans

New York surgeons have successfully transplanted a kidney from a genetically engineered pig into a brain-dead human.

- During the observation, the kidney began functioning and producing large amounts of urine within minutes of being connected to the person's blood vessels.
- Creatinine which is cleared from the blood by the kidney dropped from 1.9 to 0.8 demonstrating that the kidney was functioning optimally.
- If found compatible in the long run, this process of Xenotransplantation could help provide an alternative and additional supply of organs for people facing life-threatening diseases.

Xenotransplantation

- It is the process of transplanting living cells, tissues or organs between (xenografts or xenotransplants) different species.
- It is also known as heterologous transplantation.

GalSafe Pigs

- The transplant used a kidney that was obtained from a pig that had undergone editing to knock out a gene that codes for a sugar molecule called Alpha-gal.

- Alpha-gal is not normally found in humans and this molecule can elicit a devastating immune response in humans.
- The pigs with this gene alteration are called GalSafe pigs.
- GalSafe pigs have been FDA approved for human use for those who have pork allergies and also for use in pharmacology.
- Generally, pigs are preferred, as they are,
 1. Easier to genetically modify,
 2. Breed better with large litter,
 3. Grow faster,
 4. They are less likely to transmit infections, and
 5. The size of their organs is also similar to humans.

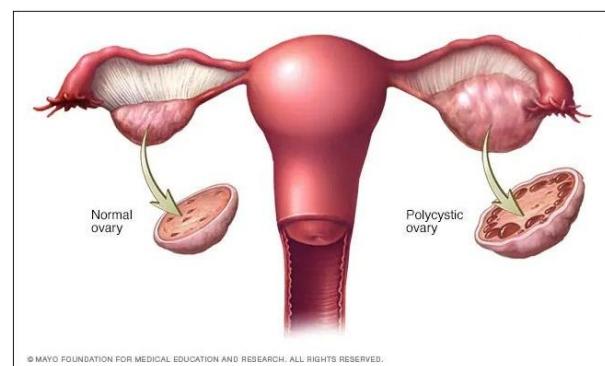
Mosquirix

Mosquirix or RTS,S/AS01 (RTS,S), which was endorsed by the World Health Organisation (WHO) is the first and only vaccine shown to have the capability of significantly reducing malaria.

- This is the first malaria vaccine that has completed the clinical development process and acts against Plasmodium falciparum.
- Mosquirix provides short-term protection that could potentially save lives in the age group most at risk from malaria.
- Mosquirix also helps protect against infection of the liver with the hepatitis B virus but should not be used only for this purpose.
- The active substance in Mosquirix is made up of proteins found on the surface of the P. falciparum parasites and the Hepatitis B Virus.
- The vaccine thus limits the ability of the parasites to mature in the liver.
- Malaria is a life-threatening disease caused by parasites transmitted to people through the bites of infected female Anopheles mosquitoes and disease is preventable and curable.
- WHO has recommended that the RTS,S/AS01 malaria vaccine be used for the prevention of P. falciparum.

Polycystic Ovary Syndrome

- Polycystic Ovary Syndrome (PCOS) or Polycystic Ovary Disorder (PCOD) is a health problem caused by an imbalance of reproductive hormones.
- It creates problems in the ovaries. The ovaries may develop numerous small collections of fluid (follicles) and fail to regularly release eggs.
- PCOS can happen at any age after puberty.
- Mostly, women between the age of 15 and 44, or during the years they can have children, have PCOS.
- **Causes** - PCOS may be caused due to
 1. Genetics,
 2. High levels of androgens (male hormones) and
 3. High levels of insulin.
- **Symptoms** - PCOS can cause missed or irregular menstrual periods, which can lead to,
 1. Infertility - Inability to get pregnant
 2. Development of cysts (small fluid-filled sacs) in the ovaries
- Other symptoms such as hirsutism (excess facial and body hair), weight gain, insulin resistance, and hair loss.



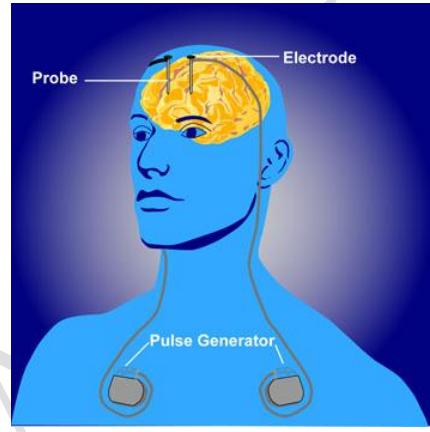
- In India, PCOS is a tabooed disorder; the discourse around it being more reductive in the past decades due to its link with infertility.

Deep Brain Stimulation

In the US, a patient with severe depression was treated successfully using ‘customised’ deep brain stimulation (DBS) technique for this patient’s case.

“DBS is the equivalent of using a pacemaker for the heart.”

- The doctors tried to reset the depressive brain patterns by recognising and tapping the brain circuits linked with these patterns.
- DBS is a surgical procedure in which electrodes or leads are implanted into certain brain areas.
- These electrodes generate **electrical impulses that control abnormal brain activity**. The electrical impulses can adjust for the chemical imbalances within the brain that cause various conditions.
- Traditional DBS system has 3 components,
 1. **Electrode** is an insulated wire inserted through a small opening in the skull and implanted into a specific brain area.
 2. **Extension wire** is insulated wire that is passed under the skin of the head, neck and shoulder, connecting the electrode to the IPG of the system.
 3. **Internal pulse generator (IPG)** is usually implanted under the skin in the upper chest.
- **Conditions** that are traditionally treated using DBS include dystonia, epilepsy, essential tremor, obsessive-compulsive disorder and Parkinson’s disease.
- In treating depression, however, DBS has shown limited success because most devices are only able to deliver constant electrical stimulation to one area of the brain.



High-fat Diet and Cancer

A new study shows that a high-fat diet increases the incidence of colorectal cancer, which starts in the colon or the rectum and grows to other parts of the body.

- It found that the fat disrupts the relationship between intestinal cells and the immune cells that watch them for emerging tumors.
- When a cell is infected, immune cells detect the foreign particle by watching over the MHC-II molecules.
 - MHC-II tags are the molecules that distinguish between normal and abnormal cells.
 - They encode a protein that presents foreign substances to the immune system.
- MHC cells activate the immune system to destroy bad cells - in case they are wearing out or about to become cancerous.
- But the study found that a **high-fat diet suppressed MHC-II levels** in intestinal cells. Hence, cells with reduced levels of these tags could not be identified as abnormal and hence, could grow into tumors.
- The crosstalk between stem cells, microbes and immune cells is critical for eliminating tumor-initiating cells. But this **cross-talk can fail** in response to a high-fat diet.
- **Application** - If the level of the immune recognition molecules is altered positively, tumor will more likely be recognized by the immune cell. This can be coupled with the existing strategies to eradicate tumors.

Linear No-Threshold Model for Radiation Safety

The U.S. Nuclear Regulatory Commission (NRC) upheld the Linear No-Threshold (LNT) dose-effect model to prescribe radiation safety standards.

- LNT model states that biological effects such as cancer and hereditary effects due to exposure to ionising radiation increase as a linear function of dose, without threshold.

- The petitioners supporting the request to discontinue use of the LNT model has supported the concept of “radiation hormesis”
- [Radiation Hormesis is a concept that posits that low doses of ionising radiation protect against the deleterious effects of high doses of radiation and result in beneficial effects to humans.]
- Petitioners proposed the following to be done saying that “it makes no sense to decrease radiation doses that are harmless and hormetic”.
 1. To increase the dose limits to workers;
 2. To raise the public dose limits to be the same as the worker doses;
 3. To end differential doses to pregnant women, embryos and fetuses, and children less than 18 years of age;
 4. To remove the As Low As Is Reasonably Achievable (ALARA) principle entirely from the regulations.
- NRC has determined that the LNT model continues to provide a sound regulatory basis to minimize the risk of unnecessary radiation exposure to both members of the public and radiation workers.
- Therefore, the NRC will maintain the current dose limit requirements.

Perfluoroalkyl and Polyfluoroalkyl Substances

- Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) are a complex, ever-expanding group of manufactured chemicals.
- PFAS molecules are made up of a chain of linked carbon and fluorine atoms.
- As the carbon-fluorine bond is one of the strongest, these chemicals do not degrade in the environment.
- **Uses** - PFAS are used to make various types of **everyday products**.
 - E.g.: They keep food from sticking to cookware, make clothes and carpets resistant to stains, and create effective firefighting foam.
- They are used in **industries** like aerospace, automotive, construction, electronics, and military.
- There are two kinds of PFAS, Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS).
- PFOA and PFOS were manufactured for the longest time, and are the most widespread in the environment. Recently, they are being replaced by alternatives, such as GenX.
- **Concerns** about the public health impact of PFAS have arisen for the following reasons:
 1. **Widespread occurrence** of PFAS in blood and urine of people.
 2. **Numerous exposures** - PFAS are used in hundreds of products globally, with many opportunities for human exposure.
 3. **Persistent** - PFAS remain in the environment for an unknown amount of time and may take years to leave the body.
 4. **Bioaccumulation** - Different PFAS chemicals may enter the food chain in various ways, gradually accumulating and remaining in a body over time. This occurs due to more intake than excretion of the chemicals.
- **Impacts** - People are most likely exposed to these chemicals by consuming PFAS-contaminated water or food, using products made with PFAS, or breathing air containing PFAS.
- Health effects on humans include
 1. Altered metabolism,
 2. Fertility and reduced fetal growth,
 3. Increased risk of being overweight or obese, and
 4. Reduced ability of the immune system to fight infections.

OTHERS

RoIP in Syama Prasad Mookerjee Port

A Radio over Internet Protocol (ROIP) System is being introduced as a marine communication mode at Syama Prasad Mookerjee Port (SMP), Kolkata, for the first time in any Major Indian Port.

- This system may provide an effective long range Marine communication.
- It shall cover the entire Hugli River Estuary from Kolkata to Sandheads, having base stations at 4 Locations.
- With this facility, vessels at Sandheads can be directly communicated via Radio, from Kolkata, especially during storms and inclement weather.

Radio over Internet Protocol

- Radio over Internet Protocol (RoIP) is a technology for transmitting radio communication signals using the Internet Protocol (IP) standard.
- RoIP provides the same performance as well-enhanced radio communication but uses a digital IP network to enable communication and connection between 2 or more analog radio devices or networks.
- **RoIP is similar to a Voice over Internet Protocol (VoIP)**, but with radio communication features and abilities.
- VoIP is a technology that allowing you to make voice calls over a broadband Internet connection instead of an analog (regular) phone line.
- At its core, RoIP is the integration of VoIP technology in two-way radio. Rather than transmitting voice data through traditional means, RoIP uses internet to send data from one user to another.
- RoIP works in a **half-duplex mode** where only one radio device can communicate at a time.
- The user must push the push-to-talk (P2T) each time before communicating.
- Besides radio communication features, RoIP enables the connection of 2 or more radio sites together using digital-to-analog converting receivers at both ends, which are directly connected to an Internet backbone.
- Moreover, RoIP also enables interoperability between different radio networks with different and non-compatible architecture.

Syama Prasad Mookerjee Port

- Syama Prasad Mookerjee Port (Erstwhile Kolkata Port) is **India's first Major Port**, which was constructed by the British East India Company.
- It has two dock systems viz.
 1. Kolkata Dock System and
 2. Haldia Dock Complex (A deep water dock).
- Despite being India's **only riverine port**, SMP has been maintaining its pivotal position in Indian Major Ports for the past 152 years.
- SMP is administered under the Ministry of Shipping through Major Port Trusts Act, 1963.

Fabricated Guar gum-Chitosan Film

Indian scientists have developed an environmentally friendly, non-toxic, biodegradable polymer using guar gum and chitosan.

Both guar gum and chitosan are polysaccharides extracted from guar beans and shells of crab and shrimps.

- Due to the low mechanical properties, high water-solubility, and low barrier properties of the polysaccharides, these biopolymers are not preferred.
- The fabricated guar gum-chitosan composite film will help in overcoming these challenges of polysaccharide.
- This film is a **cross-linked polysaccharide** without using any plasticizer with the help of a method called the **solution casting method** (a simple technique to make polymer films).
- The fabricated film can potentially be used in **packaging applications**, due to its,
 1. **High water stability** - Fabricated film does not dissolve in water even after 240 hours,
 2. **Higher mechanical strength** compared to general biopolymer (Biopolymer are known to possess poor strength),
 3. **High water repellence** or hydrophobic nature due to its high contact angle of 92.8° . It had low water vapor permeability when compared with the film made only from chitosan.

4. Excellent resistance to harsh environmental conditions.

Lyocell Fibre

The Lenzing Group has partnered with Italy's Orange Fiber to create the lyocell fibre made from orange peels.

- **Lyocell Fibre** is a semi-synthetic fabric that is commonly used as a substitute for cotton or silk.
- This fabric is a form of rayon, and it is composed primarily of cellulose derived from wood.
- Originally developed by American Enka in 1972, lyocell burst into popularity in the latter decades of the 20th century.
- Since it is primarily made from organic ingredients, this fabric is seen as a more sustainable alternative to fully synthetic fibers.
- **Orange Fibre** is a lyocell fibre that is produced from '**Pastazzo**'.
- [Pastazzo is the by-product of the citrus processing industry.]
- Orange Fibre could help to put citrus waste to use. Also, the material contains essential oils and vitamin C, is lightweight and absorbs moisture. It can be used in combination with wood pulp.

Refibra

- Refibra technology involves **upcycling cotton scraps** from garment production. These cotton scraps are transformed into cotton pulp.
- Up to one third of the Refibra is added to wood pulp, and the combined raw material is transformed to produce new virgin Lyocell fibers to make fabrics and garments.

Ecovero

- Ecovero is a **viscose natural fiber**, which are environmentally responsible and have a low environmental impact.
- They are derived from **sustainable wood and pulp**, coming from certified and controlled sources.

23. INDEX AND REPORT

Henley Passport Index 2021

Henley Passport Index 2021 was prepared and released by the Henley and Partners, a London-based global citizenship and residence advisory firm.

- The index ranks the passports of countries according to the number of destinations their holders can visit without a prior visa.
- Created in 2006, the index ranks passports based on their power and mobility based on the analysis of exclusive data from the International Air Transport Association (IATA).
- [IATA maintains the world's largest and most accurate database of travel information.]
- The index is updated in real time according to countries' visa policy changes and it covers 227 destinations and 199 passports.
- It assumes only the passport of citizen of country and it is not for diplomatic, emergency or temporary in nature.
- **Findings** - India's rank has slipped by 6 places from the year 2020 to 90th position on the Henley Passport Index.
- For the third consecutive year, Japan has secured the top position. The first position is shared by both Japan and Singapore.
- Meanwhile, Afghanistan, Iraq, Syria, Pakistan, and Yemen are among the least powerful.

Least Developed Countries Report 2021

This Report was released by the United Nations Conference on Trade and Development (UNCTAD).

- This **annual report** provides a comprehensive and authoritative source of **socio-economic analysis** and data on the world's most impoverished countries.
- It is intended for a broad readership of governments, policy makers, researchers and all those involved with LDCs' development policies.
- **Findings** - The 2021 report said that the growth performance of LDCs over the past 50 years has been characterized by an overall sluggish and uneven record.
- Real GDP for the LDC group increased 5-fold since the LDC category was created in 1971.
- The Gross Domestic Product (GDP) per capita for LDC group is less than 10% of the world average (2019).
- Major shortcomings of the development experience of the LDCs over the past 50 years have been laid bare by the outbreak of the COVID-19 crisis.

Least Developed Countries

- There are **46 countries** are designated by the United Nations as LDCs.
- The list of LDCs is reviewed **every 3 years** by the Committee for Development Policy (CDP), a group of independent experts that report to the United Nations Economic and Social Council (ECOSOC).
- After a triennial review of the list, the CDP recommends to ECOSOC, countries for addition to the list or graduation from LDC status.
- This report will be sent later to the UN General Assembly (UNGA).
- Criteria for inclusion into the LDC category and for graduation from the LDC category - Per capita income, Human Assets Index, and Economic and Environmental Vulnerability Index.
- **Income criterion** is based on a 3-year average estimate of the Gross National Income (GNI) per capita in US dollars, using conversion factors based on the World Bank Atlas methodology.
- The threshold for inclusion and graduation is based on the thresholds of the World Bank's low-income category.
- **Human assets index** (HAI), consisting of two sub-indices - Health sub-index and Education sub-index.
- **Economic and environmental vulnerability index** also has two sub-indices - Economic sub-index and Environmental sub-index.
- A country must achieve 2 of the 3 criteria at 2 consecutive triennial reviews to be considered for graduation.

State of the World's Children Report 2021

The UNICEF released its global flagship report titled, 'The State of the World's Children 2021'.

- This UNICEF report is the most comprehensive analysis of global trends affecting children.
- **Purpose** - The 2021 report details the impact of COVID-19 pandemic on the **mental health** of children, adolescents and caregivers.
- It examines how risk and protective factors in the home, school and community shape mental health outcomes.
- It urges global commitment, communication and action to promote good mental health for every child and young people.
- **Findings** - Globally, 1 in 5 young people of 15 to 24-years of age are feeling depressed or having little interest in doing things.
- In India, 1 in 7 young people (14% of 15 to 24-years of age) are reported often feeling depressed or having little interest in doing things.
- Children have not only been living an emotional tragedy, many are also at a higher risk of neglect and abuse.

Industrial Park Rating System Report 2.0

Industrial Park Rating System 2.0 (IPRS 2.0) Report was released by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry.

- IPRS Report aims to provide important information regarding all Special Economic Zones, Industrial Clusters and Parks.
- It will enhance India's industrial competitiveness and attract investment.
- It categorizes into 3 categories - Leaders, Challengers and Aspirers.

Categories of IPRS 2.0	Number of Industrial Parks
Leaders	41
Challengers	90
Aspirers	185

- These ratings are assigned on the basis of 4 pillars - internal infrastructure, external infrastructure, business support services, and environment and safety management.
- The Report is an extension of the India Industrial Land Bank which features more than 4,400 industrial parks in a GIS-enabled database to help investors identify their preferred location for investment.

India Industrial Land Bank

- India Industrial Land Bank (IILB) is a Geographic Information System (GIS)-based portal that was developed by the DPIIT.
- The system was developed by integrating the Industrial Information System (IIS) with state GIS.
- It serves as a **one-stop repository of all industrial infrastructure-related information** such as connectivity, infra, natural resources and terrain, plot-level information, etc.
- It has GIS-enabled database of industrial areas or clusters across the country, which will help investors to get free real-time information about the availability of industrial land and resources.

State of the Education Report for India 2021

The UNESCO released the 2021 State of the Education Report for India: No Teachers, No Class.

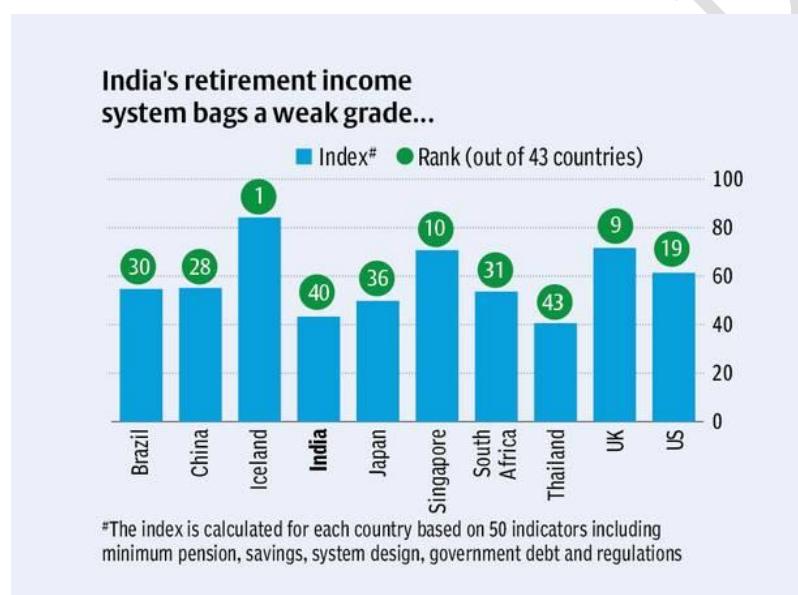
- **Findings** - The gross enrolment ratio (GER) for elementary schools has increased from 81.6 in 2001 to 102.1 in 2019-2020.
- But the overall retention is 74.6% for elementary education and 59.6% for secondary education in 2019-20.
- **Number of Teachers** - 89% of the total 1.2 lakh single-teacher schools in the country are in rural areas.
- India needs 11.16 lakh additional teachers to meet the current shortfall.
- Tripura has the least number of women teachers, while Chandigarh leads the chart.
- The proportion of teachers employed in the private sector grew from 21% (2013-14) to 35% (2018-19).
- **Lack of Digital Infrastructure** - Overall availability of computing devices in schools is 22% for all India, with rural areas seeing much lower provisioning (18%) than urban areas (43%).
- Access to the internet in schools is 19% all over India - only 14% in rural areas compared to 42% in urban areas.
- There are a range of issues - lack of devices and Internet bandwidth for students, lack of preparedness of teachers in the use of technology, and lack of resources in Indian languages.
- **Recommendations** - The focus of this decade should be on teachers and teaching as the Quality of education is the core challenge of the next decade.

- As schools in India have not been functioning physically from March 2020, foundational learning is set to slide even further down from current low levels.

Global Pension Index 2021

The 13th Global Pension Index 2021 is published by Mercer, in collaboration with CFA Institute and the Monash Centre for Financial Studies.

- The report compared 43 retirement income systems from around the world, highlighting strengths and weaknesses.
- As the world continues to grapple with the economic implications of the pandemic, the study also reveals factors causing the **gender pension gap** around the world.
- Findings** - In 2021, new entrant Iceland is named as having the world's best pension system overall.
- India has ranked at 40th position out of 43 countries in the 2021 Index.
- [In 2020, India was ranked at 34th position out of 39 countries.]
- The report reveals that the financial well-being of Indian future retirees is left to chance. Also, it shows that the minimum pension of Indians (as a % of average wage) will be the lowest across the nations.



Highest home ownership is a silver lining for Indian retirees

Score for some of the countries on home ownership (out of ten)



India has the least minimum pension amount

which is represented by 'adequacy' sub-index

India's rank (out of 43 countries)



*This index measures the financial viability of pension system

**Integrity index considers role of governance and regulations that improves the credibility of the system



Report on Cryptocurrency Ownership

- According to data by comparison firm Finder, internet users in Nigeria have the world's highest rates of cryptocurrency ownership, followed by Malaysia and Australia.
- Japan ranked lowest in the list with only 4.6% of the population owning the virtual asset.
- India secured the 7th place with nearly 15.4% respondents saying they own at least one cryptocurrency.
 - In India, nearly 48% women have invested in at least one cryptocurrency, against 52% owned by men.
 - This indicates that both genders are at par in terms of ownership, which is in contrast to other countries like Japan and Norway where less than 30% women own the asset.
- Among all crypto assets, **Bitcoin emerged as most popular**, with the highest adoption seen in Japan with 76.7% people saying they own it.
- About 57% Indians who own cryptocurrency have invested in Bitcoin, according to the Cryptocurrency Adoption Index 2021.

Cryptocurrency Adoption Index 2021

The Global Crypto Adoption Index 2021 was released by the crypto analysis platform Chainalysis.

- The Index ranked 20 countries to measure the level of cryptocurrency adoption and usage by individuals between July 2020 and June 2021.
- Chainalysis ranks countries by their peer-to-peer (P2P) cryptocurrency trade volume and weights it to favour countries with lower purchasing power parity (PPP) per capita and fewer internet users.
 - This is done to highlight countries where more residents are putting a larger share of their overall wealth into P2P transactions.
- **Findings** - Global adoption of cryptocurrency grew over 800% in the past year, especially in emerging market economies.
- This indicates that people turn to virtual money to preserve their savings in the face of currency devaluation, to send and receive remittances and carry out business transactions.
 - Emerging markets took the top spots due to huge transaction volumes on P2P platforms when adjusted for purchasing power parity per capita and internet-using population.
- India ranked second in a list of 20 countries with the highest cryptocurrency adoption rate.
- Vietnam secured the first spot, and Pakistan came third.

24. NOBEL PRIZES 2021

History of Nobel Prize

- The Nobel Prize was set up when businessman Alfred Nobel died and left the majority of his fortune to the establishment of prizes in physics, chemistry, physiology or medicine, literature and peace.
- His will stated that the prizes should be awarded to those who shall have conferred the greatest benefit to humankind.
- Since the 1st Nobel Prizes were awarded in 1901, they have been awarded annually. It was not awarded, mostly during World War I and II.
- A Nobel Prize cannot be awarded posthumously.

Nobel Prize	Selection
Nobel Prize in Physics and Chemistry	Royal Swedish Academy of Sciences
Nobel Prize in Physiology or Medicine	The Nobel Assembly at Karolinska Institutet
Nobel Prize in Literature	The Swedish Academy
Nobel Peace Prize	Norwegian Nobel Committee

- [Norwegian Nobel Committee is a 5-member committee of the Norwegian Parliament (Storting).]
- Fund** - When Alfred Nobel died leaving the majority of his fortune to the establishment of the Nobel Prize he stated that the money should be converted into a fund and invested in "safe securities."
- Today the interest earned on that money is used to fund the Nobel Prizes.

Nobel Prize Laureate

- The word "laureate" refers to being signified by the laurel wreath.
- In ancient Greece, laurel wreaths were awarded to victors as a sign of honour.

Nobel Prize in Physics 2021

The Nobel Prize in Physics 2021 was awarded with one half jointly to Syukuro Manabe, Klaus Hasselmann and the other half to Giorgio Parisi for groundbreaking contributions to our understanding of complex systems.

- They have laid the foundation of our knowledge of the Earth's climate and how humanity influences it.
- They have revolutionized the theory of disordered materials and random processes.

PHYSICS

- Manabe showed how carbon dioxide and water vapour lead to global warming
- Hasselmann proved that human activities made global temperatures rise
- Parisi helped understand complex systems which have high randomness or disorder. Eg: weather and climate phenomena

Complex Systems

- Complex systems are systems composed of many components which may interact with each other.
- They are characterised by **randomness and disorder** and are difficult to understand.
- Examples are Earth's global climate, organisms, the human brain, etc.,
- One complex system of vital importance is **Earth's climate**.

Nobel Prize in Literature 2021

The Nobel Prize in Literature 2021 was awarded to Abdulrazak Gurnah, who was born in Zanzibar.

- It was awarded for his uncompromising and compassionate penetration of the effects of colonialism and the fate of the refugee in the gulf between cultures and continents.
- Born in Zanzibar, Gurnah was forced to flee to the United Kingdom at the end of the 1960s after a revolution occurred in Zanzibar.

Zanzibar

- Zanzibar Island is the main island in the Tanzanian archipelago of Zanzibar.
- It is also known as Unguja.
- In 1964, Zanzibar, Pemba Island and some other smaller islands, joined with Tanganyika on the mainland to form the United Republic of Tanzania.

Nobel Peace Prize 2021

The Nobel Peace Prize 2021 was awarded jointly to Maria Ressa and Dmitry Andreyevich Muratov for their efforts to safeguard freedom of expression, which is a precondition for democracy and lasting peace.

- Maria Ressa uses freedom of expression to expose abuse of power, use of violence and growing authoritarianism in her country, the **Philippines**.
- In 2012, she co-founded Rappler, a digital media company for investigative journalism, which she still heads.
- Dmitry Andreyevich Muratov has for decades defended freedom of speech in **Russia** under increasingly challenging conditions.
- In 1993, he was one of the founders of the Novaja Gazeta - the most independent newspaper in Russia - that has a fundamentally critical attitude towards power.

Country	Rank in World Press Freedom Index 2021
Norway	1
Philippines	138
Russia	150
India	142

Sveriges Riksbank Prize in Economic Sciences 2021

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2021 was awarded to three people.

- The one half of the award was given to **David Card** for his empirical contributions to labour economics.
 - Using natural experiments, David Card has analysed the labour market effects of minimum wages, immigration and education.
 - The results showed that increasing the minimum wage do not necessarily lead to fewer jobs, among other things.
 - So, we now know that the incomes of people who were born in a country can benefit from new immigration, while people who immigrated at an earlier time risk being negatively affected.
 - It also showed that resources in schools are far more important for students' future labour market success than was previously thought.
- The other half of the award was jointly given to **Joshua D. Angrist** and **Guido W. Imbens** for their methodological contributions to the analysis of causal relationships.
 - They demonstrated how precise conclusions about cause and effect can be drawn from natural experiments.

PRELIMS PRACTICE QUESTIONS

- 1) Which one of the following is the possible reason for Mars having no liquid water on its surface?
- Mars may be just too small to hold on to large amounts of water
 - Mars has a thick atmosphere which distort the stability of water on Mars
 - Mars has extreme temperatures which enables evaporation of water molecules
 - None of the above
- 2) C.K. Mishra Committee sometimes seen in the news recently, was constituted for?
- To recommend an approach towards development of a Sustainable Finance Hub
 - To inquire hardships faced by journalists and to improve their condition of services
 - To study the impact of journalism in daily lives and recommend a foundation for ethical journalism
 - None of the above
- 3) Which one of the following statements regarding DigiSaksham Initiative is incorrect?
- It aims to provide a variety of employment related services like career counselling, vocational guidance, information on skill development courses, apprenticeship, internships etc.
 - It is a joint initiative of Ministry of Labour & Employment and Microsoft India.
 - The initiative will be implemented in the field by Aga Khan Rural Support Programme India.
 - The initiative gives priority to the job-seekers of semi urban areas belonging to disadvantaged communities, including those who have lost their jobs due to Covid-19 pandemic.
- 4) When you travel to the sea, your cruise will take you through territorial areas that have been claimed by Britain, Argentina and Chile. Most of the sea is covered in dense sea ice all year around and only the north-western part can be visited by ships.
- Identify the sea which correctly matches with the above description:
- Bering Sea
 - Weddell Sea
 - Chukchi Sea
 - Sargasso Sea
- 5) Consider the following statements with respect to Battle of Saraighat
- It was fought between the Mughal Empire and the Ahom Kingdom in 1671.
 - It was regarded as the greatest naval battle ever fought in a river.
 - In the battle, Mughals defeated the Ahoms and extend their empire into Assam for the first time.
- Which of the statements given above are correct?
- 1 and 2 only
 - 1 and 3 only
 - 2 and 3 only
 - 1, 2 and 3
- 6) The Indian Astronomical Observatory (IAO) located in the Trans- Himalayan region near Ladakh is becoming one of the promising sites globally for the next generation of astronomical observatories. It is due to which of the following reasons?

1. More clear nights
2. Minimal light pollution
3. Uninterrupted by monsoon
4. Background aerosol concentration
5. Extremely dry atmospheric condition

Select the correct answer using the codes given below:

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

7) With respect to Petrichor Process, consider the following statements:

1. Petrichor is an earthy smell that permeates the air before a rain event.
2. Actinobacteria which decomposes dead or decaying organic matter into simple chemical compounds is the main contributor of this process.
3. Geosmin is a type of alcohol which contributes to the petrichor scent.

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

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

8) Which of the following deals with the specification, reservation, choice and allotment of symbols at elections in Parliamentary and Assembly Constituencies?

- a. Conduct of Elections Rules, 1961
- b. Article 324 of Indian Constitution
- c. Representation of the People Act, 1951
- d. Election Symbols (Reservation and Allotment) Order, 1968

9) This country recently commemorates the First ever National Day for Truth and Reconciliation to honour the lost children and survivors of the country's indigenous residential schools, their families and communities. All citizens were encouraged to wear the colour orange to highlight how indigenous children were robbed of their culture and freedoms.

The above paragraph refers to which of the following countries?

- a. Bolivia
- b. Canada
- c. Australia
- d. New Zealand

10) How is the Domain Name System (DNS) different from the Border-Gateway Protocol (BGP), which are responsible for the massive outage of Facebook recently?

1. DNS is the tool that converts a web domain into the actual Internet Protocol (IP) address whereas BGP enables the internet to exchange routing information between autonomous systems.
2. If BGP is the internet's phone book which tells you where you're going, DNS is its postal service that tells you how to get there.

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

11) India is facing a severe coal shortage recently. Which of the following is/are the reason for coal shortage?

- 1. Decreased buying from Coal India
- 2. Sharp rise in imports of high priced coal
- 3. Continuous rainfall in coal bearing areas

Select the correct answer using the codes given below:

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

12) Ecological Threat Report (ETR) will be published by?

- a. World Wide Fund for Nature
- b. UN Environment Programme
- c. Institute for Economics and Peace
- d. International Union for Conservation of Nature

13) Consider the following statements with respect to a Right to clean, healthy and sustainable environment

- 1. Right to clean, healthy and sustainable environment was recognised as a human right by UN Human Rights Council.
- 2. India abstains from voting on the resolution which favours right to a clean, healthy and sustainable environment as Human right.
- 3. The right to a clean environment was rooted in the 1972 Stockholm Declaration.

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

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

14) With respect to the Two Pillar Solution, sometimes seen in the news recently, consider the following statements:

- 1. It is an implemental plan of World Trade Organization to reform international taxation rules.
- 2. It aims to reallocate taxing rights over MNEs from their home countries to markets, regardless of whether firms have a physical presence there.
- 3. It seeks to put a floor on competition over corporate income tax, through a global minimum corporate tax rate.
- 4. India is one of the members of the OECD/G20 Inclusive Framework on BEPS.

Which of the statements given above are correct?

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

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

15) With respect to Bridgmanite, consider the following statements:

- 1. It is the dominant material in the lower mantle.
- 2. It is probably the most abundant mineral in the Earth.

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

16) Paddy straw consists of which of the following?

- 1. Urea
- 2. Silica
- 3. Lignin
- 4. Oxalates
- 5. Molasses
- 6. Selenium

Select the correct answer using the codes given below:

- a. 3, 4 and 5 only
- b. 2, 3, 4 and 6 only
- c. 1, 2, 3, 4 and 6 only
- d. All of the above

17) Which of the following are the consequences of Artificial Lights?

- 1. It alters the predator-prey relationships
- 2. It deters sea turtles from moving to the beach at night to lay eggs.
- 3. It repels newborn turtle hatchlings towards ocean, leading to their death.
- 4. It causes migratory birds to migrate too early or too late and miss ideal climate conditions for nesting, foraging and other behaviours.

Which of the statements given above are correct?

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

18) Consider the following statements with respect to BepiColombo mission

- 1. It is the first ever mission to orbit Mercury, the smallest and least explored terrestrial planet in our Solar System.
- 2. It is a joint mission by the European Space Agency and the Japan Aerospace Exploration Agency.

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

19) Which of the following conducts are commonly identified as an activity of Cartel?

- 1. Bid-Rigging
- 2. Output Restrictions
- 3. Harmony in Price-Fixing
- 4. Market sharing by territory

Select the correct answer using the codes given below:

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

20) Which of the following best describes the term Circular Economy?

- a. It is an alternative to a traditional linear type “take-make-waste” economy.
- b. It connects freelancers with customers to provide short term services using digital platforms
- c. It is a peer-to-peer based activity of acquiring, providing, or sharing access to goods and services
- d. None of the above

21) Match the following:

Types of Wastes – Classification

- 1. Glass bottles & Worn out shoes – Hazardous Household Waste
- 2. Paper & Old Clothes – Municipal Dry Waste
- 3. Used Sanitary napkins – Biomedical Waste
- 4. Kitchen & Uncooked waste – Biodegradable Municipal Waste

Which of the pairs given above are correct?

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

22) Consider the following statements:

- 1. She was an educator, a surgeon, a lawmaker and a social reformer.
- 2. She was the first woman legislator in British India.
- 3. She builds Avvai Home in Madras in 1930 to give free education, clothes and proper diet to orphans.
- 4. She wrote a book titled, My Experience as a Legislator.

Identify the personality who correctly matches with the above description:

- a. Sarojini Naidu
- b. ArunaAsaf Ali

- c. Matangini Hazra
- d. Muthulakshmi Reddy

23) In dengue, there is a drop in platelet count. Which of the following is/are the reasons for the drop in platelet count?

- 1. Platelet count in dengue decreases as it suppresses bone marrow, which is the platelet-producing area.
- 2. The dengue virus binds with platelets and replicates which tends to destroy normal platelets.
- 3. Antibodies that are produced during this period destroy the normal platelets thinking that they are foreign bodies.

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

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

24) Which of the following is/are the goals of COP-26 of UN Framework Convention on Climate Change (UNFCCC)?

- 1. To finalise the Paris Rulebook
- 2. Adapt to protect communities and natural habitats
- 3. To mobilise at least \$100bn in climate finance per year by 2020
- 4. Secure global net-zero by mid-century and keep 1.5 degrees within reach

Select the correct answer using the codes given below:

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

25) Which of the following is/are derived from sea weeds?

- 1. Alginate
- 2. Agar-agar
- 3. Carrageenan

Select the correct answer using the codes given below:

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

26) Consider the following statements:

- 1. India extracts more groundwater than China and the US.
- 2. Half of total clean water needed in our country is met from groundwater.
- 3. In India, around 90% of groundwater extracted is used for irrigation, making it the highest category of ground water user in the country.

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

27) Arrange the following in the sequence of ‘order of events’ with respect to the Crypto currency transaction process:

- 1. New Transaction entered.
- 2. Transaction is clustered into blocks.
- 3. Transaction transmitted to network of peer to peer computers.
- 4. Validation of the transaction.
- 5. Blocks are chained to form long history of transactions.
- 6. Transaction is complete.

Select the correct answer using the codes given below:

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

28) Which of the following rivers flows into the Arctic Ocean?

- 1. Alatna river
- 2. Mackenzie river
- 3. Ob river
- 4. Irtysh river
- 5. Lena river

Select the correct answer using the codes given below:

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

29) “Varshavaas” or “Vassa” in Budhism refers to?

- a. Three-month rainy retreat
- b. Endless cycle of repeated rebirth
- c. One who is on the path to buddhahood
- d. Undistracted and concentrated state of consciousness

30) Assertion (A): Venus is unlikely to have harboured any ocean anytime in the past.

Reason (R): The temperature in Venus never got low enough for the water in its atmosphere to form raindrops that could fall on its surface.

Select the correct answer using the codes given below:

- a. Both A and R are correct and R is the correct explanation of A
- b. Both A and R are correct and R is not the correct explanation of A
- c. A is correct but R is incorrect

d. A is incorrect but R is correct

31) Consider the following statements with respect to Martand Sun Temple

1. It is one of the earliest known sun temples much older than Konark and Modhera.
2. It is located in the State of Gujarat.
3. It was built during the 8th century by the King Lalitaditya.

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

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

32) PadyaNatakam is a theatre form of which of the following states?

- a. Kerala
- b. Odisha
- c. Karnataka
- d. Andhra Pradesh

33) With respect to 'Nebra Sky Disc' consider the following statements.

1. It is the world's oldest concrete depiction of stars.
2. It belongs to the Iron Age.

Identify the Correct Statements:

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

34) Consider the following statements with respect to Secured Overnight Financing Rate (SOFR)

1. It is a benchmark interest rate that financial institutions use to price U.S. dollar-denominated derivatives and loans.
2. It is one of the alternatives to London Interbank Offered Rate (Libor).
3. SOFOR is based on completed financial transactions whereas Libor is self-reported and may not accurately represent the true cost of borrowing.

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

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

35) Consider the following statements with respect to Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

1. They are human-made chemicals made up of carbon-fluorine bond.
2. They do not break down easily and therefore stay in the environment for a very long time.

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

36) Which of the following products contains Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)?

- 1. Cosmetics
- 2. Non-stick cookware
- 3. Water resistant clothing
- 4. Paints, varnishes and sealants
- 5. Stain-resistant carpets and fabrics

Select the correct answer using the codes given below:

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

37) Consider the following statements:

- 1. The Metaverse combines elements of the physical world and merges them with virtual spaces.
- 2. Decentraland is the virtual world where one can perform day to day activities.

Which of the above statements is correct?

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

38) Consider the following statements regarding African Elephants:

- 1. African elephants are smaller in size compared to the Asian elephants.
- 2. African elephants are patriarchal and are led by a male elephant.
- 3. African elephants acts as ecosystem engineers.

Identify the **incorrect** statements.

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

39) Consider the following statements with respect to Bio-Enzymes

- 1. They are organic solutions produced through fermentation of organic wastes by mixing in sugar, jaggery/molasses and water.
- 2. It takes 60-100 days to ferment organic waste and to fasten the fermentation, yeast can be used.

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

40) How is mRNA Vaccine different from DNA Vaccine?

- 1. Plasmid DNA has to enter the nucleus of a cell whereas the mRNA only needs to be present in the cytoplasm.
- 2. mRNA vaccines are fragile and require storage and transportation at cold temperatures whereas DNA vaccines have greater stability and are easier to store and transport.

Select the correct answer using the codes given below.

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

41) With respect to SadirAttam, consider the following statements:

- 1. It is a precursor to the classical dance form, Bharatanatyam.
- 2. It was performed by devadasis which refers to the girls who were dedicated to a temple at a very young age.

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

42) The Right to Protest involves the exercise of which of the following fundamental rights?

- 1. Equality before Law
- 2. Freedom of Resistance
- 3. Freedom to assemble peacefully
- 4. Freedom of speech and expression

Select the correct answer using the codes given below.

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

43) With respect to Dakshineswar Kali Temple, consider the following statements:

- 1. The temple is built on the basis of Ratna style architecture.
- 2. It consists of 'AthChala', a eight-sided pyramid roof structure.
- 3. This temple is situated at the western banks of river Ganges.

Identify the correct statements.

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

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

44) With respect to ‘Particulate Matter’, consider the following statements:

- 1. Particulate Matter is the combination only solid and gaseous particles in the atmosphere.
- 2. Particulate Matter includes both organic and inorganic substances such as smoke, pollens, etc.

Choose the correct option.

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

45) With respect to white dwarf, consider the following statements:

- 1. The faintest main sequence star is called the white dwarf.
- 2. This is the last stage in the life cycle of a star, like the Sun.
- 3. They are the remains of normal stars, whose nuclear energy supplies have been used up.
- 4. Proxima Centauri is the nearest white dwarf.

Choose the correct statement(s).

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

46) Which of the following School of Buddhism is being headed by Dalai Lama?

- a. Sakya
- b. Gelug
- c. Kagyu
- d. Nyingma

47) Hoisting National Flag is a fundamental right under which of the following?

- a. Equality before Law
- b. Prohibition of Discrimination
- c. Freedom of Speech and Expression
- d. Freedom of Conscience, Profession, Practice and Propagation

48) Consider the following statements with respect to QutbShahi Tombs Complex

- 1. It is a UNESCO World Heritage Site.
- 2. It is a ceremonial Gateway built to celebrate the foundation of Hyderabad, a new Millennial City, in 1591 A.D.
- 3. The tombs belong to the rulers of the QutbShahi Dynasty, their queens and children and the nobles who faithfully served them.

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

- a. 1 and 3 only

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

49) Silver Forget-Me-Not (FMN), sometimes seen in the news recently, refers to?

- a. A butterfly Species
- b. A form of Pesticide
- c. A shadow foreign policy followed in Japan
- d. A substance produced in the digestive system of sperm whales

50) Consider the following statements with respect to Green Day Ahead Market (GDAM)

- 1. It is a new market segment for trading in renewable energy following the Central Electricity Regulatory Commission (CERC) approval.
- 2. India is the only large electricity market in the world to implement a GDAM exclusively for renewable energy.

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

Answers

1. a

Mars

- Water is essential for life, on Earth and other planets but Mars has no liquid water on its surface now.
- New research from Washington University in St. Louis suggests a fundamental reason that, Mars may be just too small to hold on to large amounts of water.
- Mars was always doomed and headed towards deterioration.

2. a

C.K. Mishra Committee

- International Financial Services Centres Authority (IFSCA) has been established as a unified regulator to develop and regulate financial products, financial services, and financial institutions in the International Financial Services Centres (IFSCs) in India.
- IFSCA, in its endeavour to develop the required eco-system has constituted an Expert Committee to recommend approach towards development of Sustainable Finance Hub and provide road map for the same.
- The expert committee is being chaired by Shri C.K. Mishra, Former Secretary to Government of India, Ministry of Environment, Forest & Climate Change.
- The committee consists of leaders across the sustainable finance spectrum, including international agencies, standard setting bodies, funds, academia, and consultancies.

3. a

- Minister for Labour and Employment has recently launched DigiSakshamInitiative.

DigiSaksham Initiative

- It is a digital skills programme to enhance the employability of youth by imparting digital skills that are required in an increasingly technology driven era.
- It is a joint initiative launched by the Minister for Labour and Employment with Microsoft India.

- Through DigiSaksham initiative, free of cost training in digital skills including basic skills as well as advance computing, will be provided to more than 3 lakh youths in the first year.
- The Jobseekers can access the training through National Career Service (NCS) Portal.
- The initiative gives priority to the job-seekers of semi urban areas belonging to disadvantaged communities, including those who have lost their jobs due to Covid-19 pandemic.
- Under the DigiSaksham initiative, there will be basically three types of training viz. Digital Skills
 1. Self paced learning
 2. VILT mode training (Virtual Instructor led) and
 3. ILT mode training (Instructor led).
- The ILT training which is in person training would be conducted at the Model Career Centres (MCCs) and National Career Service Centres (NCSC) for SCs/STs across the country.
- DigiSaksham will be implemented in the field by Aga Khan Rural Support Programme India (AKRSP-I).

4. b

- India has extended support for protecting the Antarctic environment and for co-sponsoring the proposal of the European Union for designating East Antarctica and the Weddell Sea as Marine Protected Areas (MPAs) at a high-level ministerial meeting conducted recently.

Marine Protected Area (MPA)

- An MPA is a marine protected area that provides protection for all or part of its natural resources.
- Certain activities within an MPA are limited or prohibited to meet specific conservation, habitat protection, ecosystem monitoring, or fisheries management objectives.
- Since 2009, CCAMLR members have developed proposals for MPAs for various regions of the Southern Ocean.
- The proposal to designate East Antarctica and the Weddell Sea as MPAs was first put forth to the CCAMLR in 2020 but could not reach a consensus at that time.
- This is the first time India is considering co-sponsoring an MPA proposal at the CCAMLR and getting aligned with countries such as Argentina, Brazil, Chile, Korea, New Zealand, South Africa and the USA, which are also proactively considering supporting the MPA proposals.
- CCAMLR is an international treaty to manage Antarctic fisheries to preserve species diversity and stability of the entire Antarctic marine ecosystem.

British Antarctic Territory

- It is a sector of Antarctica claimed by the United Kingdom as one of its 14 British Overseas Territories, of which it is by far the largest by area.
- It forms a wedge shape that extends to the South Pole, overlapping the Antarctic claims of Argentina (Argentine Antarctica) and Chile (Chilean Antarctic Territory).

5. a

- Indian Vice-President has recently inaugurated the Mahabahu Brahmaputra River Heritage Centre on Guwahati's BarphukanarTila, meaning Barphukan's Hillock.
- This British-era bungalow on a hillock used to be the 17th century military office of the Ahom rulers.
- Barpukhan was a post equivalent to Governor General created by Ahom king PratapSimha or Susengpha (1603-1641).
- The hillock by the Brahmaputra, mentioned in ancient scriptures as Mandrachal, was from where Ahom General LachitBorphukan launched the Battle of Saraighat in March 1671 to inflict the most crushing defeat on the Mughals.

Battle of Saraighat

- It is a naval battle fought in 1671 between the Mughal Empire (led by the Kachwaha king, Raja Ram Singh I), and the Ahom Kingdom (led by LachitBorphukan) on the Brahmaputra river at Saraighat.
- Saraighat is regarded as the greatest naval battle ever fought in a river.

- Although weaker, the Ahom Army defeated the Mughal Army.
- The Battle of Saraighat was the last battle in the last major attempt by the Mughals to extend their empire into Assam.

6. d

Indian Astronomical Observatory (IAO), Ladakh

- A recent study has said that the Indian Astronomical Observatory (IAO) located at Hanle near Leh in Ladakh is becoming one of the promising sites globally for the next generation of astronomical observatories.
- This is due to its advantages of more clear nights, minimal light pollution, background aerosol concentration, extremely dry atmospheric condition, and uninterrupted by monsoon.
- The study found that the Hanle site which is as dry as Atacama Desert in Chile and is also one of the emerging sites for infrared and sub-mm optical astronomy.
- This is because water vapour absorbs electromagnetic signals and reduces their strength.

7. d

Petrichor Process

- Rain has no scent but moments before a rain event, an “earthy” smell known as petrichor does permeate the air.
- This smell actually comes from the moistening of the ground.
- Petrichor is a combination of fragrant chemical compounds of which some are from oils made by plants.
- The main contributor to petrichor is **actinobacteria**, a tiny microorganism which can be found in rural and urban areas as well as in marine environments.
- They decompose dead or decaying organic matter into simple chemical compounds which can then become nutrients for developing plants and other organisms.
- A byproduct of their activity is an organic compound called **geosmin**, a type of alcohol, like rubbing alcohol, which contributes to the petrichor scent.

The Process

- During a prolonged period of dryness when it has not rained for several days, the decomposition activity rate of the actinobacteria slows down.
- Just before a rain event, the air becomes more humid and the ground begins to moisten.
- This process helps to speed up the activity of the actinobacteria and more geosmin is formed.
- When raindrops fall on the ground, especially porous surfaces such as loose soil or rough concrete, they will splatter and eject tiny particles called aerosols.
- The geosmin and other petrichor compounds are released in aerosol form and carried by the wind to surrounding areas.
- If the rainfall is heavy enough, the petrichor scent can travel rapidly downwind and alert people that rain is soon on the way.

8. d

Election Symbols (Reservation and Allotment) Order, 1968

- It is an order that provides for specification, reservation, choice and allotment of symbols at elections in Parliamentary and Assembly Constituencies, for the recognition of political parties in relation thereto and for matters connected therewith.

Allocation of Symbols after a party splits

- When the Commission is satisfied on information in its possession that there are rival sections or groups of a recognised political party each of whom claims to be that party, the Commission may, after taking into account all the available facts and hearing such representatives of the sections or groups, decide that one such rival section or group or none of such rival sections or groups is that recognised political party.
- The decision of the Commission shall be binding on all such rival sections or groups.

- This applies to disputes in recognised national and state parties.
- For splits in registered but unrecognised parties, the EC usually advises the warring factions to resolve their differences internally or to approach the court.

9. b

National Day for Truth and Reconciliation

- Canada marked its first ever National Day for Truth and Reconciliation on September 30, 2021.
- The day honours victims and survivors of Canada's residential schools, which sought to forcefully assimilate indigenous children.
- The aim of the holiday is to educate and remind the citizens of the history of indigenous children and remember their suffering.
- All citizens were encouraged to wear the colour orange to highlight how indigenous children were robbed of their culture and freedoms.
- Orange was the colour worn by First Nations residential school survivor Phyllis Webstad on her first day; later, her clothing would be taken from her and her hair cut off.

10. a

Facebook Outage

- Facebook Inc.'s services suffered a massive outage recently for as long as six hours.
- It kept several users from accessing the company's core platforms like WhatsApp, Instagram and Messenger apps.
- An update to the BGP removed the online properties from being available to world's computers.
- This means the social network's Domain Name System (DNS) was not accessible to other networks, and the Internet.

What is Domain Name System (DNS)?

- DNS is like a phone book for the internet.
- It's the tool that converts a web domain, like Facebook.com, into the actual internet protocol, or IP, address where the site resides.
- Think of Facebook.com as the person one might look up in the white pages, and the IP address as the physical address they'll find.

What is Border Gateway Protocol (BGP)?

- The problem at Facebook Inc. appeared to have its origins in the Border Gateway Protocol or BGP.
- BGP refers to a gateway protocol that enables the internet to exchange routing information between autonomous systems (AS).
- Internet is a network of networks. As networks interact with each other, they need a way to communicate. This is accomplished through peering. BGP makes peering possible.
- If DNS is the internet's phone book, BGP is its postal service.
- When a user enters data on the internet, BGP determines the best available paths that data could travel.
- Without it, networks would not be able to send and receive information with each other.

11. a

- A sharp uptick in power demand as the economy recovers from the Covid-19 pandemic coupled with supply issues have led to the current coal shortage.
- India consumed 124 billion units of power in August 2021 compared to 106 billion units of power in August 2019 which was not impacted by the pandemic.
- Coal fired thermal power plants have also supplied a higher proportion of the increase in demand leading the share of thermal power in India's power mix increasing to 66.4% from 61.9% in 2019.

The key reasons for the supply crunch include:

1. Lower than normal stock accumulation by thermal power plants in the April-June period
2. Continuous rainfall in coal bearing areas in August and September which led to lower production
3. Lower imports coupled with high international prices of coal

12. c

Ecological Threat Report (ETR)

- The Institute of Economics and Peace (IEP) has recently released the Ecological Threat Report (ETR).
- This is the second edition of the Ecological Threat Report (ETR), which covers 178 independent states and territories.
- The ETR is unique in that it combines measures of resilience with the most comprehensive ecological data available to shed light on the countries least likely to cope with extreme ecological shocks, now and into the future.
- It analyses risk from population growth, water stress, food insecurity, droughts, floods, cyclones, rising temperatures and sea levels.
- The Institute for Economics & Peace (IEP), a leading international think-tank, also produces indexes such as the Global Peace Index and Global Terrorism Index.

13. d

Right to clean, healthy and sustainable environment

- In a landmark decision, the UN Human Rights Council has recently recognised, for the first time, that having a clean, healthy and sustainable environment is a human right.
- The Council called on States to work together, and with other partners, to implement this newly recognized right.
- The resolution on the Human right to a safe, clean, healthy and sustainable environment was adopted by a vote of 43 in favour, none against and 4 abstentions.
- China, India, Japan and Russian Federation, abstained from voting on the resolution.
- The resolution was proposed by five members comprises Costa Rica, the Maldives, Morocco, Slovenia and Switzerland.
- The resolution emphasises the rights to life, liberty and security of human rights defenders working in environmental matters, referred to as environmental human rights defenders.
- The right to a clean environment was rooted in the 1972 Stockholm Declaration.

14. c

Two pillar solution

- The **OECD/G20** Inclusive Framework on Base Erosion and Profit Shifting (IF) has agreed a two-pillar solution to address the tax challenges arising from the digitalisation of the economy.
- 136 countries including **India have signed** this historic pact to enforce a minimum corporate tax.
- **Pillar One** aims to ensure a fairer distribution of profits and taxing rights among countries with respect to the largest MNEs, including digital companies.
- This would entail reallocation of some taxing rights over MNEs from their home countries to markets where they have business and earn profits, regardless of whether firms have a physical presence there.
- **Pillar Two** seeks to put a floor on competition over corporate income tax, through a global minimum corporate tax rate that countries can use to protect their tax bases.
- Pillar Two which was initially proposed to be brought into effect from 2023 has now been deferred to 2024.

Background

- The US loses nearly \$50 billion a year to tax cheats, according to the Tax Justice Network report, with Germany and France also among the top losers.
- India's annual loss due to corporate tax abuse is estimated at over \$10 billion.

15. c

- On May 22, 2012, a large meteor shower occurred near the town of Katol in Nagpur.
- The International team of scientists examined a section of the highly-shocked meteorite from Katol.
- The paper published this month in PNAS reports the first natural occurrence of a mineral called bridgmanite.
- The mineral was named in 2014 after Prof. Percy W. Bridgeman, recipient of the 1946 Nobel Prize in Physics.
- Prior to its naming in 2014, it was referred to as perovskite because according to rules set down by the International Mineralogical Association, a mineral cannot be given a formal name until a specimen has been found that can be examined first hand.
- Various computational and experimental studies have shown that about 80% of the Earth's lower mantle is made up of bridgmanite.

16. b

Paddy Straw

- Punjab Government has recently proposed to use the paddy crop residue as fodder for animals, especially cattle.

Background

- Producing over 20 million tonnes of paddy straw every year, most of which is burnt in fields by farmers, leading to widespread air pollution that even spreads to neighbouring states.

Challenges

- High silica and lignin content reduces its digestive properties.
- Higher selenium content in paddy straw also limits its use as fodder in animals as compared to wheat straw.
- However, if given in moderate quantities (up to 5 kg per animal per day), selenium poses no health hazard to the animal.
- Paddy straw also contains oxalates (2-2.5%) which leads to calcium deficiency so mineral mixture should always be fed along with the straw.

Treatment

There are two methods that have been recommended to overcome the challenges of using paddy straw as cattle fodder:

- Urea-only treatment
- Urea plus molasses treatment

17. b

Artificial Light & its effects

- Cities are no safe havens for avian life.
- Birds collide into buildings very often because windows reflect the surrounding environment or offer avenues that look open.
- Birds that have nocturnal migratory patterns (i.e. migrate by the night) are particularly adversely affected by night lights of the city.
- Artificial lights can cause them to migrate too early or too late and miss ideal climate conditions for nesting, foraging and other behaviours.



India and Light Pollution

- Light pollution and other 'by-products' of rapid urbanisation threaten birds and other animals in the Indian subcontinent as well.
- Some migratory birds that are particularly vulnerable are those whose migratory routes pass through India, include common crane, bar-headed goose, falcon, northern wheatear, Amur falcon etc.
- Adverse effects of artificial lights on nocturnal ecology are observed on other species like bats, loris and insects.
- Light also deters sea turtles from moving to the beach at night to lay eggs.
- **Hatchlings use light-cues from the horizon to move towards the ocean.**
- **Horizon is the line at which the earth's surface and the sky appear to meet.**
- **However, artificial sources draw them away from the ocean, leading to their death.**
- Like birds, species of migratory fish too bear the brunt of the untoward consequences of anthropogenic lights.
- Artificial lighting has also altered predator-prey relations.

18. b

BepiColombo Mission

- It is Europe's first mission to Mercury.
- Launched on 20 October 2018, it is on a seven year journey to the smallest and least explored terrestrial planet in our Solar System.
- BepiColombo is a joint mission between ESA and the Japan Aerospace Exploration Agency (JAXA), executed under ESA leadership.
- The mission comprises two spacecraft: the Mercury Planetary Orbiter (MPO) and the Mercury Magnetospheric Orbiter (Mio).
- ESA's Mercury Planetary Orbiter (MPO) will study the planet's surface and interior.
- JAXA's Mercury Magnetospheric Orbiter (MIO) will study the planet's magnetic field.
- When it arrives at Mercury in late 2025, it will endure temperatures in excess of 350 °C and gather data during its one-year nominal mission, with a possible one-year extension.
- Bepi Colombo is the first Mercury mission for the ESA and Japan.
- Only two other spacecraft have visited Mercury: NASA's Mariner 10 and MESSENGER.

19. d

According to ICN, four categories of conduct are commonly identified across jurisdictions.

1. Price-fixing
2. Output restrictions
3. Market allocation
4. Bid-rigging

20. a

Background

- Since the second industrial revolution, our economy has been linear, working on take-make-use-dispose principles.
- On the one hand, this has resulted in increased economic benefits and prosperity, but on the other hand, it has also led to the overuse of resources by promoting a 'use-and-throw' approach.
- According to the Circular Gap Report 2021, 100



Figure 14 Plastic segregation representation. Source: CPCB Guidelines on Plastic Waste Management

billion tonnes of different materials enter the Earth every year.

- This model not only leads to environment degradation and resource depletion, but it also increases the cost of products by disturbing the material supply system.
- This results from fluctuating raw material prices, low materials availability, geopolitical dependence on different materials and increasing demand.
- To address this issue, we need to focus on resource efficiency by adopting a circular economy.

Circular Economy

- The circular economy is defined as an alternative to the linear ‘take-make-waste’ approach.
- It seeks to design out waste, regenerate natural ecosystems and keep materials and products in use for as long as possible.
- To this end, resources are not consumed and discarded, destroying their value.
- Rather, their value is retained by reusing, repairing, remanufacturing or recycling.
- Adopting a circular economy results in extended life of products and assets by recycling/ upcycling end-of -life products and closing the loop.

21. a

22. d

Dr. Muthulakshmi Reddy

- She was an educator, a surgeon, a lawmaker and a social reformer.
- Muthulakshmi's life came under a great influence of Mahatma Gandhi and Dr Annie Besant who changed her viewpoint on life.
- In the year 1926, she attended the Paris International Congress of Women as a delegate.
- In the coming years, she gave up her practice in response to a request from the Women's Indian Association (WIA) to enter the Madras Legislative Council.
- With serving poor women and children, she developed an interest in orphan children, which led her to build Avvai Home in Madras in 1930, under which she used to give free education, clothes and proper diet to orphans.
- Her book, My Experience as a Legislator, has recorded all of her services in the Legislature.
- It was due to her persistent efforts that despite opposition, she brought in the Anti-Polygamy Bill.
- With this, the bill for the suppression of brothels and immoral trafficking of women and children was piloted by her and was passed in 1930.
- She set up a separate hostel for Muslim girls and provided scholarships for Harijan girl's institute.
- She also recommended the then government to make the minimum age of marriage to at least 21.
- Under the Women's Indian Association, Muthulakshmi started the Cancer Relief Fund.
- At the age of 68, Muthulakshmi became the first Chairperson of the State Social Welfare Board.
- She has brought about many improvements and additions to the Children's Aid Society for which she was honoured with the first active Honorary Secretary and Organiser.



Figure 4 Characterization of Municipal Solid Waste. Source: CPCB

Muthulakshmi had many firsts to her credits:

- She was the first woman to get into a total men's college, Maharajas College
- She was the first and the only woman candidate in the Medical College 1907.
- She was the first woman house surgeon in the Government Maternity and Ophthalmic Hospital.
- She was the first woman legislator in British India.
- She became the first Alderwoman of the Madras Corporation in 1937
- She was the first woman Chairperson of the State Social Welfare Advisory Board in 1954
- She was the first woman Deputy President of the Legislative Council.

23. d

Dengue & Platelet Count decrease

- When an infected mosquito bites a human, the dengue virus enters the bloodstream, it binds to platelets and replicates leading to multiplication of infectious virus.
- The infected platelet cells tend to destroy normal platelets, which is one of the major causes for the drop in the platelet count in dengue fever.
- Meanwhile, disease fighting cells is our body's natural defense system against dengue virus.
- Antibodies produced during this time destroy normal platelets thinking that they are foreign bodies.
- Also, bone marrow suppression by dengue virus results in reduced platelet count since bone marrow is the center for the production of all blood cells including platelets.

24. d

Goals of COP-26 of UNFCCC

1. Secure global net zero by mid-century and keep 1.5 degrees within reach

- Countries are being asked to come forward with ambitious 2030 emissions reductions targets that align with reaching net zero by the middle of the century.

To deliver on these stretching targets, countries will need to:

- accelerate the phase-out of coal
- curtail deforestation
- speed up the switch to electric vehicles
- encourage investment in renewables.

2. Adapt to protect communities and natural habitats

- The climate is already changing and it will continue to change even as we reduce emissions, with devastating effects.

At COP26 we need to work together to enable and encourage countries affected by climate change to:

- protect and restore ecosystems
- build defences, warning systems and resilient infrastructure and agriculture to avoid loss of homes, livelihoods and even lives

3. Mobilise finance

- To deliver on our first two goals, developed countries must make good on their promise to mobilise at least \$100bn in climate finance per year by 2020.
- International financial institutions must play their part and we need work towards unleashing the trillions in private and public sector finance required to secure global net zero.

4. Work together to deliver

- We can only rise to the challenges of the climate crisis by working together.

At COP26 we must:

- **finalise the Paris Rulebook** (the detailed rules that make the Paris Agreement operational)
- accelerate action to tackle the climate crisis through collaboration between governments, businesses and civil society.

25. d

Seaweeds

- They have long been sourced by the food industry for its stabilising properties.
- When processed, it loses its pungency, and seaweed products such as agar gel can withstand high temperatures.
- **Agar gel** can be used as a stabiliser and thickener in pie fillings, icings and meringues.
- As it is tasteless, it does not interfere with the flavour of the food, and in ice creams it is used to inhibit the crystallisation of ice.
- **Agar-agar**, the main ingredient in falooda and jigarthanda, is a seaweed-based product.
- **Kappaphycus alvarezii** is a species of seaweed that yields **carrageenan**.
- Carrageenan is an additive used to thicken, emulsify, and preserve food and drinks and it is a commercially viable venture.
- **Alginate**, another extract, is used in restructured and reformed food products such as chicken nuggets.
- As a binder and emulsifier, it helps meat retain its shape.

Fertilizer of Future

- **Sagarika** - Seeing the nutrient value of this sea vegetable and encouraged by the Indian Farmers Fertiliser Cooperative, AquAgri manufactures a product called Sagarika.
- It was derived from the sap of red and brown algae, which acts as a bioenhancer and stimulates the internal growth of plants.
- Researchers say that an extract from seaweed also helps in the faster germination of seeds, and this was successfully tested on cotton seeds.
- As organic farming becomes the buzzword, seaweed is becoming the fertiliser of the future.

26. d

Ground water in India

- India is the biggest user of groundwater.
- According to a report India extracts more groundwater than China and the US the next two biggest pullers of groundwater combined.
- Half of total clean water needed in our country is met from groundwater.
- About 89 percent of groundwater extracted in India is used for irrigation making it the highest category user in the country.
- Household use comes second with 9 percent share of the extracted groundwater followed by industry that uses only 2 percent of it.
- Similarly, the Central Ground Water Board (CGWB) has stated in LokSabha that 50 percent of urban water requirement and 85 percent of rural domestic water needs are fulfilled by groundwater.

27. b

Order of Transaction Process in Crypto Currency

1. New Transaction is entered.
2. Transaction is then transmitted to network of peer to peer computers scattered across the world.
3. Network of computers then solve the equation to confirm the validation of the transaction.

4. Once confirmed as legitimate transactions, they are clustered into blocks.
5. These blocks are then chained together creating a long history of all transactions that are permanent.
6. Transaction is complete.

28. c

Rivers that flow into Arctic Ocean:

- Yukon and Mackenzie in North America
- The rivers in Asia, the Ob, Yenisey and Lena Rivers.
- The Alatna and the Irtysh Rivers flow in Alaska, United States.

29. a

- Prime Minister Shri NarendraModi will participate in an event marking Abhidhamma Day at Mahaparinirvana Temple.

Abhidhamma Day at Mahaparinirvana Temple

- The day symbolises the end of three-month rainy retreat – Varshavaas or Vassa – for the Buddhist Monks.
- During which the Buddhist monks stay at one place in vihara& monastery and pray.
- The event will also be attended by eminent Monks from Sri Lanka, Thailand, Myanmar, South Korea, Nepal, Bhutan and Cambodia, as well as Ambassadors of various countries.

30. a

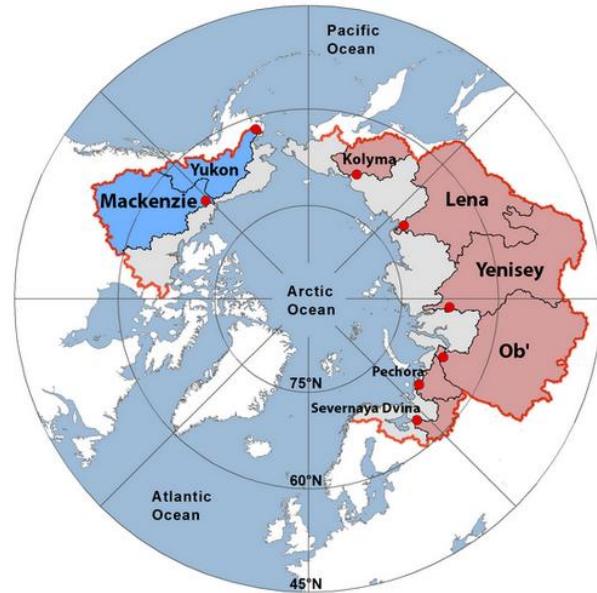
Venus & its Oceans

- While, earlier studies have suggested that Venus may have its own liquid water oceans, a new study suggested that this is not the case.
- The study was conducted by a team of astrophysicists led by the University of Geneva (UNIGE) and the National Centre of Competence in Research (NCCR) PlanetS, Switzerland.
- They investigated whether Earth's twin did indeed have milder periods.
- According to the study, the climatic conditions did not allow water vapour to condense in the atmosphere of Venus.
- This means that the temperature in Venus never got low enough for the water in its atmosphere to form raindrops that could fall on its surface.
- Instead, water remained as a gas in the atmosphere and oceans never formed.
- One of the main reasons for this is the clouds that form preferentially on the night side of the planet.
- These clouds cause a very powerful greenhouse effect that prevented Venus from cooling as quickly as previously thought.

31. b

Martand Sun Temple

- It is also known as PanduLaidanTemple.
- It is a Hindu temple dedicated to Sun God or Bhaskar.
- It was built during the 8th century CE.
- Martand is another Sanskrit synonym for Surya.
- The temple is located in the Indian union territory of Jammu and Kashmir.
- This temple has been built with strong and square limestones and exhibits pillars in Greek pattern.



- It is believed to be the only sun temple in the entire north India.
- The other sun temples are at Konark in Odisha and at Modhera in Gujarat.
- Of the three Sun temples in India, Martand is the oldest, whereas, Konark temple, a colossal structure stands majestic on the sea shore on a vast stretch of sandy soil built in 13th century by King Narasimhadeva and the third one is at Modhera, built in 1026 by King Bhimdev.
- Officially, Martand temple is regarded as one of the many sites of national importance in Jammu and Kashmir and is listed as a centrally protected monument.

32. d

PadyaNatakam

- It can be described as a poetic dramatisation of religious and mythological stories.
- This form of theatre is unique to **Andhra Pradesh**.
- It combines poetry and prose with music and theatre.
- Some of the most well-known PadyaNatakam plays are Kurukshetram, SatyaHarischandra and Gayopaakyam.

33. a

Nebra Sky Disc

- The British Museum in London will display an ancient object called the Nebra Sky Disc.
- It is thought to be the world's oldest concrete depiction of stars.
- It was loaned by the German State Museum to the British Museum.
- About 3,600 years ago, the disc was ritually buried along with two swords, axes, two spiral arm-rings and one bronze chisel near Nebra in Germany.
- The burial of these objects is thought to be made as a dedication to gods and the disc belongs to the Bronze Age.
- Hypotheses about its existence have imagined it as an astronomical clock.
- The disc has a value of about \$11 million and is thought by some to be one part of a pair, with the other part still out there, waiting to be discovered.
- The raw materials to make the disc were imported from as far as Cornwall in England.
- The knowledge required to create the object was "entirely local" and was drawn from observing the heavens from atop the Mittelberg Mountain, which is near the modern village of Nebra.
- The bronze disc, which depicts the world's oldest representation of "specific astronomical phenomenon", had five phases over its history.
- In the first phase, the disc illustrated the night sky with 32 gold stars, including the Pleiades, a
- gold orb representing the sun or a full moon and a crescent moon.
- This illustration served as a reminder of when it was necessary to synchronise the lunar and solar years by inserting a leap month.

34. d

- In a first for any NBFC in India, Rural Electrification Corporation Limited (REC) has successfully raised a USD 75 million, 5-year Secured Overnight Financing Rate (SOFR) linked Syndicated Term Loan with Sumitomo Mitsui Banking Corporation (SMBC), Singapore Branch appointed as the sole Mandated Lead Arranger and Bookrunner.
- Along with the loan, REC has also entered into interest rate swap referencing SOFR to hedge the interest rate risk on this facility, which is the first such deal by any Corporate in India.

Background

- Once upon a time, Libor—the London Interbank Offered Rate—was among the most important benchmarks in the world for setting interest rates on commercial and consumer loans.

- But multiple scandals, plus a starring role in the financial meltdown of the Great Recession, have inspired efforts to replace Libor worldwide.

Secured Overnight Financing Rate (SOFR)

- SOFR is a benchmark that financial institutions use to price loans for businesses and consumers.
- The overnight financing part of its name references how SOFR sets rates for lenders: It is based on the rates that large financial institutions pay each other for overnight loans.
- SOFR is an alternative risk-free rate that will serve as the successor to Libor in many U.S. dollar borrowing agreements.

Libor Vs SOFR

LIBOR

- Libor is simply based on the rates that financial institutions say they would offer each other for short-term loans.
- With fewer transactions, Libor began reflecting quoted rates, rather than actual rates from transactions.
- And this self-reported Libor rate may not accurately represent the true cost of borrowing.

SOFR

- By taking into account actual lending transactions between institutions, SOFR will be more reliable than Libor, which was subject to insider manipulation.
- It means there is much more real transaction data to rely on, rather than self-reported hypothetical rates.

Other differences

- Libor is forward-looking while SOFR is backward-looking.
- It means the bank knows what the borrowing rate is at the beginning of the period. Since SOFR is backward-looking, the borrower won't know exactly what they owe until the end of the loan.
- Libor is unsecured and doesn't use collateral, so it includes a credit risk premium.
- SOFR is a secured rate, based on transactions that involve collateral, in the form of Treasuries, so there's no credit risk premium baked into the rates.

Other Alternatives to Libor

1. Sterling Overnight Index Average (SONIA)
2. Federal Funds Overnight Index
3. Ameribor
4. U.S. prime rate

35. c

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

- PFAS are a large, complex, and ever-expanding group of manufactured chemicals that are widely used to make various types of everyday products.
- PFAS chemicals include PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonic acid).
- PFAS molecules are made up of a chain of linked carbon and fluorine atoms.
- Because the carbon-fluorine bond is one of the strongest, these chemicals do not degrade in the environment.
- In other words, these are long lasting chemicals which break down very slowly over time.
- In fact, scientists are unable to estimate an environmental half-life for PFAS, which is the amount of time it takes 50% of the chemical to disappear.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies for a long time.

36. d

Applications of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

- Food packaging materials
- Nonstick cookware
- Stain-resistant carpets and fabrics
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Cosmetics

37. c

Metaverse

- The term metaverse is used to describe the vision in which the internet evolves into a virtual world.
- This idea was for the first time conceptualised in 1992 by American novelist Neal Stephenson.
- It has been made by blending the words “meta,” that means beyond, and “universe”.
- The Metaverse combines elements of the physical world and merges them with virtual spaces.
- In Metaverse technology, internet is seen as a 3D space, where individuals can go in and out and interact with each other.
- This would mean you can talk to your co workers even without attending office in the real world, but would be present near them virtually.
- Face book is evolving into a metaverse company from a mere social media network.

Decentraland

- It is a virtual world where the visitors can perform various activities like watching concerts, visiting art galleries and gambling in casinos.
- The plots of lands are also being sold which are worth 100s of thousands of dollars in MANA (crypto currency).

Examples of Metaverse

- Crypto currency is an example of metaverse.
- Non Fungible tokens (NFT - A non-fungible token is a unique and non-interchangeable unit of data stored on a digital ledger) can also be considered an example of metaverse.

38. b

African Elephants

- African elephants are the largest land animals on Earth.
- They are slightly larger than Asian Elephants and can be identified by their larger ears (Asian elephants have smaller, rounded ears.)
- Elephants in general are matriarchal, suggesting they live in female-led groups.
- African elephants are keystone species meaning they play a critical role in their ecosystem. They are also known as “ecosystem engineers” as they shape their habitat in many ways.
- There are two subspecies of African elephants - African Savannah (or bush) elephant and African Forest Elephants.
- International Union for Conservation of Nature (IUCN) has enlisted the African forest elephants as ‘critically endangered’ and Savannah elephants as ‘endangered’.
- Previously IUCN listed both African elephants as “vulnerable”. But now it has opted to list them separately. It is after genetic evidence proved that both are different species.

39. c

- Punjab farmers, especially in kinnow belt, have started making bio-enzymes (BEs) from falling kinnow fruits, which, if not would become a total waste.
- Farmers can collect these dropped fruits from their kinnow fields and prepare bio-enzymes (BEs) at a low cost.
- Horticulture department experts say nearly 15-20% of the total kinnow production falls from the tree before and during the harvesting period.
- The fallen fruit is a major challenge for kinnow farmers in the state as one needs to dig up small pits to bury them, otherwise the fallen fruit rot and invite a fly attack on the healthy fruit still on the plants.
- But now, some farmers are using this fallen fruit to improve the pH level and soil fertility of their land by making BEs from this waste fruit.
- This waste kinnow can prove a boon to improve soil, water, air, depleting ground water, water contamination and overall ecology.
- Not only can plant health be improved, it also helps prevent indiscriminate usage of chemical sprays of fungicides and bacterial diseases on crops, especially vegetables, tuber crops and cereals.
- BEs can be used for a whole year in the form of spray on vegetables and mixing it with field irrigation.

Bio-enzymes

- They are organic solutions produced through fermentation of organic waste including various fruits, vegetable peels and flowers, by mixing in sugar, jaggery/molasses and water.
- It takes 60-100 days to ferment organic waste.
- To fasten the fermentation, yeast can be used as culture to prepare it in 45-50 days.

Kinnow

- Often pronounced as Kinoo or Kinu, this fruit is a high yield mandarin and is a hybrid of 2 citrus cultivators 'King' & 'Willow Leaf'.
- While an orange is a hybrid of citrus reticulate and citrus maxima, kinnow is a hybrid of citrus deliciosa and citrus nobilis.
- Developed by HB Frost in 1935, Kinnow is a year-long duration crop and it's juicier than oranges.
- It is majorly grown in Punjab, Himachal Pradesh, Jammu & Kashmir, Rajasthan and even Haryana.
- The main harvesting period is from November-end to March, but some varieties of citrus fruit start coming into the markets in October.

40. c

- India may see the roll-out of the world's first DNA vaccine, ZyCov-D.
- Produced by pharmaceutical company Zydus Cadila, the vaccine has received Emergency Use Authorisation and is also the first in the country to be approved for children above the age of 12.
- The vaccine is produced on a DNA platform, and introduces a specific antigen-coding DNA sequence into the cells of an organism to induce an immune response.

DNA Vaccines Vs mRNA Vaccines

- For DNA vaccines to be effective, the plasmid DNA must cross the cell membrane, enter the cytoplasm, and then reach the cell nucleus by crossing the nucleus membrane.
- In contrast, an RNA vaccine only needs to cross the cell membrane to enter the cytoplasm.
- Because DNA vaccines need to go through the extra step of entering the cell nucleus, they produce a much lower immune response than mRNA vaccines.
- mRNA vaccines are fragile and require storage and transportation at cold or ultra-cold temperatures.
- In contrast, DNA vaccines have greater stability and are easier to store and transport than mRNA vaccines.

41. c

SadirAttam

- Most classical dance forms of India which are strictly based on the NatyaShastra, originated from within the temple complexes.
- One such example is the SadirAttam of Tamil Nadu, today known as Bharatanatyam.
- It was performed by the devadasis.
- Devadasis meaning Deva (deity) and Dasis (devotee) were the temple dancers of South India.
- The devadasi system was such that girls at a very young age were dedicated to the temple and were often considered to be married to the deity.
- Once a girl became a devadasi, she started training in the dance form called SadirAttam also known as DasiAttam under the guidance of dance teachers called Nattuvanar or Koothiliar.
- Bharatanatyam traces its lineage to the ancient dance of SadirAttam.
- The transition from Sadir to Bharatanatyam is unknown but it is a classical dance form that was once on the verge of dying, and has managed to survive over the years.

42. b

The right to protest involves the exercise of two fundamental rights

1. Freedom of speech and expression under Article 19 (1) (a)
2. Freedom to assemble peacefully under Article 19 (1) (b)

43. a

Dakshineswar Kali Temple

- Situated at the eastern banks of river Hooghly in West Bengal.
- It is built on the basis of Ratna Style Architecture.
- Ratna style architecture is the amalgamation of the Bangla and the North Indian (Sikhara) styles.
- The construction period is from 1847-1855.
- Presiding Deity: Bhavatarini, a form of ParashatiAdya Kali, standing on the chest of a supine Shiva.
- A gabled roof with an eight-sided pyramid structured roof is called “athchala” or eight faced roof, which resembles a dome.
- Due to lack of suitable stones in this alluvial delta, architects resorted to engineering other materials, giving rise to the use of burnt bricks and terracotta for temple construction.
- Almost every square inch of the temple is covered in intricate details with terracotta.
- This ornamentation is composed of rows of burnt-brick panels, each with a figure or geometric patterns.
- Idols in garbhagriha are Kali and Shiva.
- Goddess kali appeared in the dream of Rani Rasmani and told her to construct the temple.
- Ramakrishna Paramhans, the guru of Swami Vivekananda, worked as the priest in this temple.

44. b

Particulate Matter

- Particulate matter is the sum of all solid and liquid particles suspended in air many of which are hazardous.
- This complex mixture includes both organic and inorganic particles, such as dust, pollen, soot, smoke, and liquid droplets.
- These particles vary greatly in size, composition, and origin.
 - It includes PM 10: Inhalable particles, with diameters that are generally 10 micrometres and smaller.
PM 2.5: fine inhalable particles, with diameters that are generally 2.5 micrometres and smaller.
- Sources of PM: Some are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires.

How are particles formed?

- Coarse particles are produced by the mechanical break-up of larger solid particles.
- The coarse fraction can include dust from roads, agricultural processes, uncovered soil or mining operations, as well as non-combustible materials released when burning fossil fuels.
- Pollen grains, mold spores, and plant and insect parts can also contribute to the coarse fraction.
- Evaporation of sea spray can produce large particles near coasts.
- Fine particles are largely formed from gases.

45. b

White Dwarf

- A white dwarf is very small, hot star, the last stage in the life cycle of a star like the Sun.
- White dwarfs are the remains of normal stars, whose nuclear energy supplies have been used up.
- White dwarf consists of degenerate matter with a very high density due to gravitational effects.
- A typical white dwarf is half the size of our Sun and has a surface gravity 100,000 times that of Earth.
- Using the Hubble Space telescope and Transiting Exoplanet Survey Satellite (TESS), astronomers have identified several white dwarfs over the years.
- An international team has reported a unique phenomenon in a white dwarf about 1,400 light years from Earth.
- They saw the white dwarf lose its brightness in 30 minutes. These gaps in brightness have been previously reported but the process usually takes place over a period of several days to months.

Red Dwarf

- The faintest (less than 1/1000th the brightness of the Sun) main sequence stars are called the red dwarfs.
- Because of their low luminosity, they are not visible to the naked eye.
- They are quite small compared to the sun and have a surface temperature of about 4000 degree Celsius.
- According to some estimates, red dwarfs make up three-quarters of the stars in the Milky Way.
- Proxima Centauri, the nearest star to the Sun, is a red dwarf.

46. b

Dalai Lama

- The Dalai is the head monk of the Gelug school of Tibetan Buddhism.
- Tibetan Buddhism has four major schools, namely Nyingma (c. 8th century), Kagyu (11th century), Sakya (1073), and Gelug (1409).
- He is considered to be the successor in a line of tulku who are believed to be incarnations of Avalokitesvara, the Bodhisattva of Compassion.
- Avalokiteshvara is the earthly manifestation of the self-born eternal Buddha Amitabha, whose figure is represented in his headdress, and he guards the world in the interval between the departure of the historical Buddha, Gautama, and the appearance of the future buddha, Maitreya.
- Until the 1950s, the Dalai Lamas headed the Tibetan government.
- As per the tradition, indications about the next Dalai Lama would be left behind by the present one.
- Panchen Lama, second only to The Dalai Lama is traditionally recognized by the Dalai Lama and the Panchen Lama is part of the process by which each new Dalai Lama is chosen.
- The Chinese have already installed their own Panchen Lama.

47. c

- **Article 19(1) (a)** of Indian Constitution which granted the fundamental right to Freedom of Speech & Expression granted every citizens the fundamental right to fly the national flag on their premises throughout the year, provided the premises do not undermine the dignity of the national flag.

48. b

- The QutbShahi tombs complex has been on the tentative list of World Heritage Sites since 2010

The QutbShahi Monuments of Hyderabad Golconda Fort, QutbShahi Tombs, Charminar

- Located in the city of Hyderabad, capital of the state of Andhra Pradesh, Golconda Fort, QutbShahi Tombs and Charminar are the landmarks that symbolize the QutbShahi Dynasty.
- The monuments of the QutbShahi period represent different building typologies; Golconda is a fortified citadel and an early capital city of the QutbShahi dynasty.
- It is an ensemble of military structures, ramparts, gates, bastions, armoury; religious structures such as mosques, temples; residential structures such as palaces; water systems such as canals, fountains and landscaped gardens.
- The tombs of QutbShahis are a mausoleum complex, a royal necropolis which comprises the tombs of the Royal family and the officials who faithfully served them and also mortuary bath and mosques.
- Charminar on the other hand, is a ceremonial Gateway built to celebrate the foundation of Hyderabad, a new Millennial City, in 1591 A.D.

49. a

- A rare butterfly species, called the Silver Forget-Me-Not (FMN), has been spotted twice inside the Srivilliputhur-Meghamalai Tiger Reserve in Tamil Nadu.

Silver Forget-Me-Not (FMN)

- The Silver FMN was earlier recorded in Chinnar, Kerala, in 2019; in Andaman & Nicobar Islands between 2015 and 2017 and in Sikkim, West Bengal and the Northeast States of Arunachal Pradesh, Assam, Meghalaya, Mizoram and Tripura between 2005 and 2020.
- The species is not known to be migratory in nature.
- Indigosa is its food plant and probably, the Silver FMN is overlooked due to its resemblance to the Common FMN.

Silver FMN Vs Common FMN

- Both are silver in colour with a spot on the forewing.
- The slight variation in the discal bands, colour of the Upper wing and position of the spot determines the species.
- The common FMN is bluish-silver with a spot in the middle of its two straight discal bands.
- The Silver FMN is pale silvery with slightly curved bands and the spot is near the upper band.

50. c

Green-Term Ahead Market (G-TAM)

- It is a new market segment for trading in renewable energy following the Central Electricity Regulatory Commission (CERC) approval on a day-ahead basis.
- The GDAM will enable electricity generation and distribution companies to buy or sell renewable energy through open access.
- The Green Day-ahead market will operate in an integrated way with the conventional day-ahead market.
- The Exchanges will offer the market participants to submit bids together for both conventional and renewable energy through the separate bidding windows.
- National Load Despatch Centre (NLDC), POSOCO, as the Nodal Agency, has set up the latest technologies and communication infrastructure for facilitating the Green Day Ahead Market.

Day-Ahead-Market (DAM)

- It is a physical electricity trading market for deliveries for any/some/all 15 minute time blocks in 24 hours of next day starting from midnight.
- The prices and quantum of electricity to be traded are determined through a double sided closed auction bidding process