



INSIGHTSIAS
SIMPLIFYING IAS EXAM PREPARATION

INSTA PT 2020 EXCLUSIVE

ENVIRONMENT

May 2019 – February 2020

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NOTES

Government Programmes / Initiatives

1. Green Credit scheme

- **Forest Advisory Committee** has approved the implementation of **Green Credit scheme**.
- **Key features of the scheme:**
 - It allows **“forests” to be traded as a commodity**.
 - It allows the Forest Department **to outsource one of its responsibilities of reforestation to non-government agencies**.
- **Implementation:**
 1. The scheme allows agencies — they could be private companies, village forest communities — to identify land and begin growing plantations.
 2. After three years, they would be eligible to be considered as compensatory forest land if they met the Forest Department’s criteria.
 3. An industry needing forest land could then approach the agency and pay it for parcels of such forested land, and this would then be transferred to the Forest Department and be recorded as forest land.
 4. The participating agency will be free to trade its asset, that is plantation, in parcels, with project proponents who need forest land.
- **Present scenario:**
 1. In the current system, industry needs to make good the loss of forest by finding appropriate non-forest land — equal to that which would be razed.
 2. It also must pay the State Forest Department the current economic equivalent — called **Net Present Value** — of the forest land.
 3. It’s then the Forest Department’s responsibility to grow appropriate vegetation that, over time, would grow into forests.
- **Background:**
 - This is not the first time that such a scheme has been mooted. **In 2015, a ‘Green Credit Scheme’ for degraded forest land with public-private participation was recommended**, but it was not approved by the Union Environment Minister, the final authority.
- **Benefits of the scheme:**
 - Such a scheme will encourage **plantation by individuals outside the traditional forest area** and will help in meeting international commitments such as sustainable development goals and nationally determined contributions.

2. Namami Gange Programme

- It is **an umbrella programme** which integrates previous and currently ongoing initiatives with more comprehensive & better coordinated interventions.
- **Implemented by** the **National Mission for Clean Ganga (NMCG)**, and its state counterparts—State Programme Management Groups.
- **National Ganga Council (NGC):**
 - Created in October 2016 under **the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016**, dissolving the National Ganga River Basin Authority.
 - Headed by **the Prime Minister**.
 - NGC would have **on board the chief ministers of five Ganga basin states—Uttarakhand, Uttar Pradesh (UP), Bihar, Jharkhand and West Bengal—besides several Union ministers and it was supposed to meet once every year**.
- **Main Pillars of the Namami Gange Programme are:**
 1. Sewerage Treatment Infrastructure
 2. River-Surface Cleaning
 3. Afforestation
 4. Industrial Effluent Monitoring

5. River-Front Development
6. Bio-Diversity
7. Public Awareness
8. Ganga Gram

3. Sustainable Development Cell for Environmental Mitigation Measures

- The Ministry of Coal has decided to establish a '**Sustainable Development Cell**'.
- **Objective:** To promote environmentally sustainable coal mining in the country and address environmental concerns during the decommissioning or closure of mines.
- **Roles and functions:**
 - Advise, mentor, plan and monitor the mitigation measures taken by the coal companies for maximising the utilisation of available resources in a sustainable way.
 - Act as nodal point at Ministry of Coal level in this matter. Formulate the future policy framework for the environmental mitigation measures including **the Mine closure Fund**.

4. Jal Jeevan Mission

- Rajasthan government has sought changes in the norms for Central assistance for **the Jal Jeevan Mission (JJM)** in order to reduce the financial burden on the States.
- At present, the fund sharing pattern between Centre and State is 90:10 for Himalayan (Uttarakhand, Himachal Pradesh) and North-Eastern States, 100:0 for UTs and 50:50 for rest of the States.
- **About Jal Jeevan Mission:**
 - The Mission was **announced in August 2019**.
 - The chief objective of the Mission is **to provide piped water supply (Har Ghar Jal) to all rural households by 2024**.
- **Key features:**
 - It aims to create local infrastructure for **rainwater harvesting, groundwater recharge** and management of household waste water for reuse in agriculture.
 - The Jal Jeevan Mission is set to be based on various water conservation efforts like point recharge, desilting of minor irrigation tanks, use of greywater for agriculture and source sustainability.
 - The Jal Jeevan Mission will converge with other Central and State Government Schemes to achieve its objectives of sustainable water supply management across the country.



5. National Water Policy (NWP)

- The government has finalised a committee to draft **a new National Water Policy (NWP)**.
- **National Water Policy 2012:**
 - The NWP currently in force was drafted in 2012 and is the third such policy since 1987.

- Among the major policy innovations in the 2012 policy was **the concept of an Integrated Water Resources Management approach that took the “river basin/ sub-basin” as a unit for planning, development and management of water resources.**
- **Minimum levels:** It also proposed that a portion of river flows ought to be kept aside to meet ecological needs. Such an approach led to the government, in 2018, requiring minimum water levels to be maintained in the Ganga all through the year and hydropower projects, therefore, to refrain from hoarding water beyond a point.
- The policy also stressed for **a minimum quantity of potable water for essential health and hygiene to all its citizens to be made available within easy reach of households.**
- The policy also noted that **inter-basin transfers** of water should be considered on the basis of merits of each case after evaluating the environmental, economic and social impacts of such transfers.

6. ‘Green wall’ of India

- The Centre is mulling an ambitious plan to create a **green wall** on North-Western part of India.
- **About the proposed wall:**
 - It will be **a 1,400km long and 5km wide green belt from Gujarat to the Delhi-Haryana border**, on the lines of the “**Great Green Wall**” running through the width of Africa, from Dakar



(Senegal) to Djibouti, to combat climate change and desertification.

If approved, this may turn out to be **a legacy programme in India’s efforts to deal with land degradation and the eastward march of the Thar desert.**

- India seeks replicate the idea as a national priority under its goal **to restore 26 million hectares of degraded land by 2030.**
- The green belt may not be contiguous, but would roughly cover the entire degraded Aravali range through a massive afforestation exercise.

7. Green India Mission (GIM)

- GIM is **one of the eight missions launched under the National Action Plan on Climate Change (NAPCC).**
 - GIM, launched in February 2014, is aimed at **protecting, restoring and enhancing India’s diminishing forest cover** and responding to climate change by a combination of adaptation and mitigation measures.
- **Objectives of the Mission:**
 1. To protect, restore and enhance India's falling forest cover.
 2. To respond to climate change through a combination of adaptation as well as mitigation measures.
 3. To increase forest-based livelihood incomes.
 4. To enhance annual Carbon sequestration by 50 to 60 million tonnes in the year 2020.
- **Goals:**

1. Improvement in quality of forest cover and ecosystem services of forests /non-forests, including moderately dense, open forests, degraded grassland and wetlands (5 m ha).
2. Eco-restoration/afforestation of scrub, shifting cultivation areas, cold deserts, mangroves, ravines and abandoned mining areas (1.8 m ha).
3. Improvement in forest and tree cover in urban/peri-urban lands (0.20 m ha)
4. Improvement in forest and tree cover on marginal agricultural lands/fallows and other non-forest lands under agroforestry /social forestry (3 m ha)
5. Management of public forest/ non-forests areas (taken up under the Mission) by the community institutions
6. Adoption of improved fuelwood-use efficiency and alternative energy devices by project-area households.
7. Diversification of forest-based livelihoods of about 3 million households living in and around forests.

8. Kerala's ban on CFL and filament bulbs from November 2020

- Kerala will impose **a ban on the sale of compact fluorescent lamps (CFL) and incandescent (filament) bulbs starting November this year** as part of sustainable energy policy.
- This is in line with the government project of '**Filament-free Kerala**' envisaged in 2018 as part of the state's **Urja Kerala mission**.
- **Key differences between LED and CFL:**
 - The major difference between the CFL and LED is that in **CFL the emission of light is because of the ionisation of mercury vapour**. The mercury vapour when ionise produces ultraviolet rays. These rays when collides with phosphorous coating tube generates visible light.
 - Whereas **in the LED** it is because of **the PN junction diode**. When the forward current applies across the diode, the recombination of the charge carrier takes place. This charge carrier gives energy in the form of the heat and light.
- **Rationale behind the ban:**
 1. The **CFL uses mercury vapour which is dangerous for the environment** and living beings.
 2. Also, it requires additional components like ballast, tungsten tube coated with barium, etc., which increases their cost.
 3. The **destruction of the LED is easier than the CFL** because LED does not have any harmful metal which pollutes the environment.
 4. The brightness of LED is more as compared to CFL because LED emits light only in one direction.
- **Why LED?**
 - The LED is better than the CFL in every aspect. The LED saves up to 80 percent of the electricity bill even though their cost is very less. It is recyclable, and their brightness remains same even after using it for a long time.

9. Protected Special Agricultural Zone' (PSAZ)

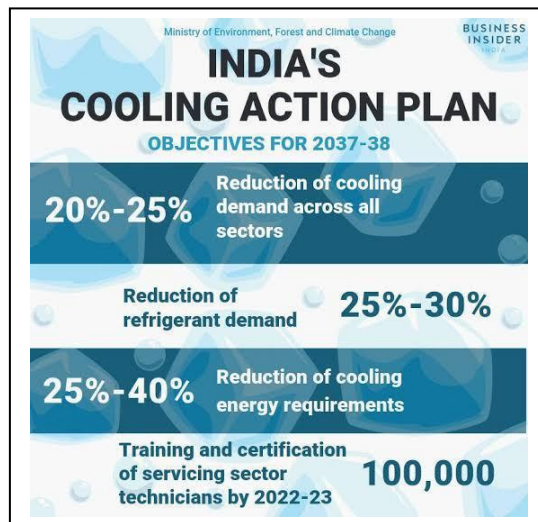
- Tamil Nadu CM declares **Cauvery Delta as Protected Special Agriculture Zone**. A law in this regard will be enacted soon.
- **The protected zone will include** Thanjavur, Tiruvarur, Nagapattinam districts and delta regions of Trichy, Ariyalur, Cuddalore and Pudukkottai.
- **Significance:**
 - PSAZ is aimed at protecting the Cauvery delta region for the future, fulfilling TN's food requirements and ensuring the welfare of delta farmers.
 - It has recognised farmer concerns about hydrocarbon exploration and accorded primacy to food security.

10. Jalyukta Shivar

- Maharashtra government has scrapped **the Jalyukta Shivar- the flagship water conservation project.**
- **What is Jalyukta Shivar?**
 - Launched in December 2014 after Maharashtra experienced consecutive droughts.
 - Aimed at rolling out measures that could potentially mitigate water scarcity in the most drought-prone villages in a systematic manner.
 - The project targeted strengthening and streamlining existing water resources like canals, bunds and ponds by arresting maximum run-off rainwater during monsoon.
- **What necessitated this?**
 - Nearly 52 per cent of the state's geographical area is prone to drought, either naturally or due to poor rainfall. This includes Marathwada and adjoining areas of Madhya Maharashtra and large parts of Vidarbha.

11. India's Cooling Action Plan (ICAP)

- **India's Cooling Action Plan (ICAP)** has received appreciation from the UN on World Ozone Day.
- **Significance of ICAP:**
 - India is the **first country in world to develop such a document.**
- **The goals stated in ICAP are:**
 - **Reduction of cooling demand** across sectors by 20% to 25 % by year 2037-38.
 - **Reduction of refrigerant demand** by 25% to 30% by year 2037-38.
 - **Reduction of cooling energy requirements** by 25% to 40% by year 2037-38.
 - **Training and certification of 100,000 servicing sector technicians** by the year 2022-23, in synergy with Skill India Mission.
 - **Recognize "cooling and related areas"** as a thrust area of research under the national S&T Programme.
- **The broad objectives of the India Cooling Action Plan include:**
 - **Assessment** of cooling requirements across sectors in next 20 years and the associated refrigerant demand and energy use.
 - **Map** the technologies available to cater the cooling requirement including passive interventions, refrigerant- based technologies and alternative technologies such as not-in-kind technologies.
 - **Suggest interventions** in each sector to provide for sustainable cooling and thermal comfort for all.
 - **Focus on skilling** of RAC service technicians.
 - **Develop an R&D innovation ecosystem** for indigenous development of alternative technologies.



12. Forest-PLUS 2.0

- US Agency for International Development (USAID) and India's Ministry of Environment, Forest and Climate Change (MoEF&CC) have launched Forest-PLUS 2.0.
- **What is it?**

- Forest-PLUS 2.0 is a **five-year programme** initiated in December 2018 that focuses on developing tools and techniques to **bolster ecosystem management and harnessing ecosystem services in forest landscape management**.
- Forest-PLUS 2.0 comprises pilot project in **three landscapes — Gaya in Bihar, Thiruvananthapuram in Kerala and Medak in Telangana**. The choice of these sites was driven by the contrast in their landscapes – Bihar is a forest deficit area, Telangana is a relatively drier area where there is ample scope for community livelihood enhancement and Kerala is rich in biodiversity.
- **The targets of this set are:**
 - 1,20,000 hectares of land under improved management.
 - New, inclusive economic activity worth \$12 million.
 - Measurable benefits accrued to 800,000 households.
 - Three incentive mechanisms demonstrated in managing landscapes for ecosystem services.

13.Climate vulnerability assessment map

- For preparing communities and people to meet the challenge arising out of climate changes, a pan India **climate vulnerability assessment map** is being developed. Such climate vulnerability atlas has already been developed for 12 states in the Indian Himalayan Region, using a common framework.
- The map is being developed under a joint project of the Department of Science and Technology (DST) under the Union Ministry of Science and Technology and Swiss Agency for Development and Cooperation (SDC).
- This research programme of DST is being implemented as part of the **National Mission for Sustaining the Himalayan Ecosystem (NMSHE) and National Mission on Strategic Knowledge for Climate Change (NMSKCC)**.

14.Reducing Emissions from Deforestation and Forest Degradation (REDD+) Himalayan programme

- **The Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme** being carried out in the himalayan states jointly by Indian Council of Forestry Research and Education (ICFRE) and International Centre for Integrated Mountain Development (ICIMOD) has been extended till July 2020.
- ICFRE-ICIMOD's REDD+ programme was launched in January 2016 to address the drivers of deforestation and forest degradation in India's Himalayan states.
- **Background:**
 - The REDD+ programme was initiated by the United Nations in 2005 to mitigate climate change through **enhanced forest management in developing countries**. It aimed to create incentives for communities so that they stop forest degrading practices.
 - More than 300 REDD+ initiatives have taken off since 2006. The mechanism has been enshrined in the **Paris Agreement of 2015**, and its implementation is

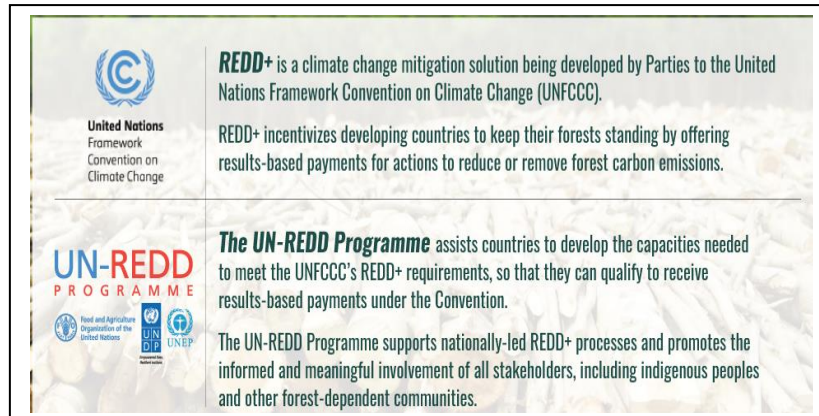
transitioning from smaller, isolated projects to larger, jurisdictional programmes with support from bilateral and multilateral agencies.

- **About REDD+:**

- REDD+ is a **mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC)**.
- It creates a **financial value for the carbon stored in forests** by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.
- **Developing countries would receive results-based payments for results-based actions.** REDD+ goes beyond simply deforestation and forest degradation and includes the role of **conservation, sustainable management of forests and enhancement of forest carbon stocks.**

India's REDD+ strategy:

- Complying with the UNFCCC decisions on REDD+, India has prepared its **National REDD+ Strategy**.
- The Strategy builds upon existing national circumstances which have been updated in line with India's National Action Plan on Climate Change, Green India Mission and India's Nationally Determined Contribution (NDC) to UNFCCC.
- The strategy report has been prepared by Indian Council of Forestry Research & Education (ICFRE), Dehradun.



15. Compensatory

Afforestation Fund and Compensatory Afforestation Fund Management and Planning Authority (CAMPA)

- Supreme Court of India ordered for establishment of Compensatory Afforestation Fund and Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in 2001.
- In 2006, adhoc CAMPA was established for the management of Compensatory afforestation fund.
- **CAMPA Act:**
 - To **compensate the loss of forest area** and to maintain the sustainability, the Government of India came up with a well-defined Act, known as CAMPA (Compensatory Afforestation Fund Management and Planning Authority).
 - The law establishes the **National Compensatory Afforestation Fund** under the Public Account of India, and a **State Compensatory Afforestation Fund** under the Public Account of each state.
 - These Funds will receive payments for: (i) compensatory afforestation, (ii) net present value of forest (NPV), and (iii) other project specific payments.
 - The National Fund will receive 10% of these funds, and the State Funds will receive the remaining 90%.
 - According to the Act's provision, a company diverting forest land must provide alternative land to take up compensatory afforestation.
 - For afforestation, the company should pay to plant new trees in the alternative land provided to the state.
 - The act also seeks to establish **National and State Compensatory Afforestation Fund Management and Planning Authorities** to manage the funds.

- **Important activities on which the fund can be utilised** will be for the Compensatory Afforestation, Catchment Area Treatment, Wildlife Management, Assisted Natural Regeneration, Forest Fire Prevention and Control Operations, Soil and Moisture Conservation Works in the forest, Improvement of Wildlife Habitat, Management of Biological Diversity and Biological Resources, Research in Forestry and Monitoring of CAMPA works etc”.
- CAMPA funds cannot be used for payment of salary, travelling allowances, medical expenses, etc.

16.Environment Impact Assessment

- Environment Impact Assessment (EIA) is a formal process used to predict the environmental consequences of any development project. Environment Impact Assessment in India is **statutory backed** by the **Environment Protection Act in 1986**, which contains various provisions on EIA methodology and process.
- **Rationale behind EIA:** EIA looks into various problems, conflicts and natural resource constraints which may not only affect the viability of a project but also predict if a project might harm to the people, their land, livelihoods and environment. Once these potential harmful impacts are predicted, the EIA process identifies the measures to minimize those impacts.
- **The objective of the EIA is to:** Identify the environmental, social and economic impacts of a project prior to taking a decision on its implementation. Mitigation of harmful impacts and maximizes the beneficial effects.
- **Once the assessment is complete, the EIA findings are communicated to all stakeholders** viz. developers, investors, regulators, planners, politicians, affected communities etc. On the basis of the conclusion of EIA process, the government can decide if a project should be given environment clearance or not. The developers and investors can also shape the project in such a way that its harms can be mitigated and benefits can be maximized.

17.National Policy on Biofuels-2018

- The National Policy on Biofuels-2018 approved by the Government envisages an indicative **target of 20% blending of ethanol in petrol and 5% blending of bio-diesel in diesel by 2030.**
- **National Policy on biofuels- salient features:**
 - **Categorization:** The Policy categorises biofuels as “**Basic Biofuels**” viz. First Generation (1G) bioethanol & biodiesel and “**Advanced Biofuels**” – Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop- in fuels, Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
 - **Scope of raw materials:** The Policy expands the scope of raw material for ethanol production by allowing use of Sugarcane Juice, Sugar containing materials like Sugar Beet, Sweet Sorghum, Starch containing materials like Corn, Cassava, Damaged food grains like wheat, broken rice, Rotten Potatoes, unfit for human consumption for ethanol production.
 - **Protection to farmers:** Farmers are at a risk of not getting appropriate price for their produce during the surplus production phase. Taking this into account, the Policy allows **use of surplus food grains for production of ethanol** for blending with petrol with the approval of National Biofuel Coordination Committee.
 - **Viability gap funding:** With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of Rs.5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.

- **Boost to biodiesel production:** The Policy encourages setting up of supply chain mechanisms for biodiesel production from non-edible oilseeds, Used Cooking Oil, short gestation crops.
- **Expected benefits:**
 - **Import dependency:** The policy aims at reducing import dependency.
 - **Cleaner environment:** By reducing crop burning & conversion of agricultural residues/wastes to biofuels there will be further reduction in Green House Gas emissions.
 - **Health benefits:** Used Cooking Oil is a potential feedstock for biodiesel and its use for making biodiesel will prevent diversion of used cooking oil in the food industry.
 - **Employment Generation:** One 100klpd 2G bio refinery can contribute 1200 jobs in Plant Operations, Village Level Entrepreneurs and Supply Chain Management.
 - **Additional Income to Farmers:** By adopting 2G technologies, agricultural residues/waste can be converted to ethanol and can fetch a price for these waste.
- **Classification of Biofuels:**
 - **1st generation biofuels** are also called conventional biofuels. They are made from things like sugar, starch, or vegetable oil. Note that these are all food products. Any biofuel made from a feedstock that can also be consumed as a human food is considered a first-generation biofuel.
 - **2nd generation biofuels** are produced from sustainable feedstock. The sustainability of a feedstock is defined by its availability, its impact on greenhouse gas emissions, its impact on land use, and by its potential to threaten the food supply. No second generation biofuel is also a food crop, though certain food products can become second generation fuels when they are no longer useful for consumption. Second generation biofuels are often called “advanced biofuels.”
 - **3rd generation biofuels** are **biofuel derived from algae**.

18. Emission Trading Scheme (ETS)

- Gujarat has launched India's first trading programme to **combat particulate air pollution**- the emission trading scheme (ETS), on World Environment Day 2019, which has air pollution as its theme.
- **Key features of the programme:**
 - It is a market-based system where the government sets a cap on emissions and allows industries to buy and sell permits to stay below the cap.
 - Being initiated in Surat by the Gujarat Pollution Control Board (GPCB).
 - Gujarat programme is the first in the world to regulate particulate air pollution.

19. Forest Landscape Restoration (FLR) and Bonn Challenge

- The centre has launched a flagship project on enhancing capacity on **forest landscape restoration (FLR) and Bonn Challenge** in India, through a pilot phase of 3.5 years implemented in the States of Haryana, Madhya Pradesh, Maharashtra, Nagaland and Karnataka.
- **Background:**
 - At the UNFCCC Conference of the Parties (COP) 2015 in Paris, India also joined the voluntary Bonn Challenge pledge to bring into restoration 13 million hectares of degraded and deforested land by the year 2020, and additional 8 million hectares by 2030. India's pledge is one of the largest in Asia.
- **What is Bonn Challenge? What is FLR approach?**
 - The Bonn Challenge is a **global effort to bring 150 million hectares of deforested and degraded land into restoration by 2020 and 350 million hectares by 2030**.
 - The 2020 target was launched at a high level event in **Bonn** in 2011 organised by the Government of Germany and IUCN, and was later endorsed and extended to 2030 by the **New York Declaration on Forests** of the 2014 UN Climate Summit.

- The Bonn Challenge is an **implementation vehicle for national priorities** such as water and food security and rural development while simultaneously helping countries contribute to the achievement of international climate change, biodiversity and land degradation commitments.
- Underlying the Bonn Challenge is the **forest landscape restoration (FLR)** approach, which aims **to restore ecological integrity at the same time as improving human well-being through multifunctional landscapes**.
- **What is FLR?**
 - Forest landscape restoration (FLR) is the on-going process of **regaining ecological functionality** and enhancing human well-being across deforested or degraded forest landscapes.
 - FLR is more than just planting trees – it is **restoring a whole landscape to meet present and future needs**.
 - It is long-term because it requires a multi-year vision of the ecological functions.
 - The majority of restoration opportunities are found on or adjacent to agricultural or pastoral land. In these situations, restoration must complement and not displace existing land uses.
 - This result in a mosaic of different land uses including: agriculture, agroforestry systems and improved ecological corridors.

Animal / Wildlife Protection

1. Cheetah reintroduction project

- The Supreme Court recently **allowed the Centre to introduce** the African cheetah to a suitable habitat in India.
- With India's own cheetahs vanishing, a plea for this had been filed by the National Tiger Conservation Authority (NTCA), seeking permission to introduce the African cheetah from Namibia.
- The matter came up before the Supreme Court during a hearing on shifting a few lions from Gujarat to Kuno-Palpur wildlife sanctuary, Madhya Pradesh, which was also one of the sites identified for releasing cheetahs.
- **What is reintroduction and why reintroduce Cheetah now?**
 - **'Reintroduction'** of a species means releasing it in an area where it is capable of surviving.
 - Reintroductions of large carnivores have increasingly been recognised as **a strategy to conserve threatened species and restore ecosystem functions**.
 - The cheetah is the only large carnivore that has been extirpated, mainly by over-hunting in India in historical times.
- **Facts:**
 - The cheetah, ***Acinonyx jubatus***, is one of the oldest of the big cat species, with ancestors that can be traced back more than five million years to **the Miocene era**.
 - The cheetah is also the world's fastest land mammal.
 - It is listed as **vulnerable** in IUCN red listed species.
 - The country's last spotted feline died in Chhattisgarh in 1947. Later, the cheetah — was declared extinct in India in 1952.
 - The Asiatic cheetah is classified as a "critically endangered" species by the IUCN Red List, and is believed to survive only in Iran.
- **Reasons for extinction:**
 1. Problems like human-wildlife conflict, loss of habitat and loss of prey, and illegal trafficking, have decimated their numbers.
 2. The advent of **climate change** and growing human populations have only made these problems worse.
 3. With less available land for wildlife, species that require vast home range like the cheetah are placed in competition with other animals and humans, all fighting over less space.
- **About NTCA:**
 - The National Tiger Conservation Authority is **a statutory body** under the Ministry of Environment, Forests and Climate Change.
 - It was **constituted under enabling provisions of the Wildlife (Protection) Act, 1972**, as amended in 2006, for strengthening tiger conservation.
 - The National Tiger Conservation Authority has been fulfilling its mandate within the ambit of the Wildlife (Protection) Act, 1972 for **strengthening tiger conservation** in the country by retaining an oversight through advisories/normative guidelines, based on **appraisal of tiger status, ongoing conservation initiatives and recommendations** of specially constituted Committees.
 - **Composition:** Set up **under the Chairmanship of the Minister for Environment and Forests**. The Authority will have eight experts or professionals having qualifications and experience in wildlife conservation and welfare of people including tribals, apart from three Members of Parliament of whom two will be elected by the House of the People and one by the Council of States.
 - **Functions of NTCA are as follows:**
 1. Ensuring normative standards in tiger reserve management.
 2. Preparation of reserve specific tiger conservation plan.

3. Laying down annual/ audit report before Parliament.
 4. Instituting State level Steering Committees under the Chairmanship of Chief Minister and establishment of Tiger Conservation Foundation.
 5. According approval for declaring new Tiger Reserves.
- **'Project Tiger'** is a Centrally Sponsored Scheme of the Ministry of Environment, Forests and Climate Change, providing **funding support to tiger range States**, for in-situ conservation of tigers in designated tiger reserves, and has put the endangered tiger on an assured path of recovery by saving it from extinction, as revealed by the recent findings of the All India tiger estimation. It was launched in April 1973 by the Government of India during Prime Minister Indira Gandhi's tenure.

2. First-of-its kind turtle rehab centre comes up in Bihar

- A first-of-its-kind rehabilitation centre for freshwater turtles was inaugurated in Bihar's **Bhagalpur forest division** in January 2020.
- The need to build such a centre was felt after several turtles were found severely wounded and sick when rescued from smuggles by rescue teams.

3. Bhitarkanika census on saltwater crocodiles

- **Bhitarkanika census** finds an increase of 15 **saltwater crocodiles** from last year.
 - There are now 1,757 crocodiles in the park, the census conducted on January 3, 2020, found. Last year, there were 1,742.
- There are **three species of crocodilians**—saltwater, Mugger and Gharial.
 1. **Mugger:**
 - The mugger crocodile, also called the Indian crocodile, or marsh crocodile, is found throughout the Indian subcontinent.
 - It is listed as **vulnerable by IUCN**.
 - The mugger is mainly **a freshwater species**, and found in lakes, rivers and marshes.
 2. **Gharial:**
 - The Gharial or **fish-eating crocodile is native to the Indian subcontinent**.
 - It is listed as **a Critically Endangered by IUCN**.
 - Small released populations are present and increasing in the rivers of the National Chambal Sanctuary, Katarniaghat Wildlife Sanctuary, Son River Sanctuary and the rainforest biome of Mahanadi in Satkosia Gorge Sanctuary, Orissa.
 3. **Saltwater Crocodile:**
 - It is the largest of all living reptiles. It listed **as least concern by IUCN**. It is found throughout the east coast of India.

4. Great Indian Bustard

- **IUCN status:** critically endangered.
- **Found in** Gujarat, Maharashtra, Karnataka and Andhra Pradesh.
- Listed in **Schedule I of the Indian Wildlife (Protection) Act, 1972, Appendix I of CMS Convention and in Appendix I of CITES**.
- Identified as one of the species for **the recovery programme under the Integrated Development of Wildlife Habitats of the Ministry of Environment and Forests**.
- **Project Great Indian Bustard** — state of Rajasthan — identifying and fencing off bustard breeding grounds in existing protected areas as well as provide secure breeding enclosures in areas outside protected areas.
- **Protected areas:** Desert National Park Sanctuary — Rajasthan, Rollapadu Wildlife Sanctuary — Andhra Pradesh and Karera Wildlife Sanctuary— Madhya Pradesh.



5. Project Dolphin

- The government is planning to launch a programme called “**Project Dolphin**”, along the lines of “Project Tiger” to enhance the population of these dolphins.
- Protection status:**
 - Dolphins have been included in **Schedule I of the Indian Wild Life (Protection) Act 1972, in Appendix I of the Convention on International Trade in Endangered Species (CITES), in Appendix II of the Convention on Migratory Species (CMS) and categorised as ‘Endangered’ on the International Union for the Conservation of Nature’s (IUCN) Red List.**
- Characteristic features:**
 - The Gangetic river dolphins can **only live in freshwater, are blind and catch their prey in a unique manner, using ultrasonic sound waves.**
 - They are distributed across seven states in India:** Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.
- The Gangetic river dolphins were **officially discovered in 1801** and are **one of the oldest creatures in the world along with some species of turtles, crocodiles and sharks**, according to the World Wildlife Fund (WWF).
- They once lived in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh, but are now mostly extinct from many of its early distribution ranges.
- Today, their numbers have dwindled mainly because of direct killing, habitat fragmentation by dams and barrages and indiscriminate fishing.
- Some of the efforts made to preserve and increase the numbers of these dolphins include:**
 - Setting up of **the Conservation Action Plan for the Gangetic Dolphin (2010-2020)**, which has identified threats to Gangetic dolphins and impact of river traffic, irrigation canals and depletion of prey-base on dolphin populations.
 - The Gangetic dolphins have been **included in Schedule -I of the Wildlife Protection Act, 1972**, which means they have the highest degree of protection against hunting.
 - They are also one among the 21 **species identified under the centrally sponsored scheme, “Development of Wildlife Habitat”.**

6. Houbara Bustard

- Pakistan had issued special permits to the Emir of Qatar and nine other members of the royal family to hunt **the houbara bustard**, an internationally protected bird species.

- Key facts:**

- The houbara bustard, which lives in arid climates, comes in **two distinct species as recognised by the IUCN, one residing in North Africa (*Chlamydotis undulata*) and the other in Asia (*Chlamydotis macqueenii*).**
- The population of the Asian houbara bustards extends from northeast Asia, across central Asia, the Middle East, and the Arabian Peninsula to reach the Sinai desert.
- After breeding in the spring, the Asian bustards migrate south to spend the winter in Pakistan, the Arabian Peninsula and nearby Southwest Asia.
- IUCN Conservation status:** Vulnerable.



7. Sumatran Rhino

- Context:** Sumatran rhino is now extinct in Malaysia.
- Now, **there are now just 80 Sumatran rhinos left in the world, all of them in Indonesia**, especially on the island of Sumatra and the Indonesian part of Borneo.
- Background:**

- The Sumatran rhino is **the smallest of the five extant rhino species in the world**. The other species include the White Rhino, the Black Rhino, the Greater One-Horned Rhinoceros and the Javan Rhino.
- **In the Indian subcontinent in the 19th century**, the Sumatran rhinoceros occurred in parts of Assam, Nagaland, Manipur, Tripura, Mizoram, northern Bengal, Bhutan, Comilla and the Chittagong Hill Tracts.



8. Assam roofed turtle

- The multipurpose **Assamese gamosa**, a ubiquitous, white cotton towel, has been assigned a new function — conservation of rare freshwater turtles- **Assam roofed turtle**.
- **Key facts:**
 - It is an endangered small freshwater species.
 - Protected under Schedule I of the wildlife protection act.



9. Guru Ghasidas National Park

- This will be **Chhattisgarh's 4th tiger reserve**.
- **Current 3 tiger reserves:** Achanakmar, Udanti- Sitanadi and Indravati tiger reserves.

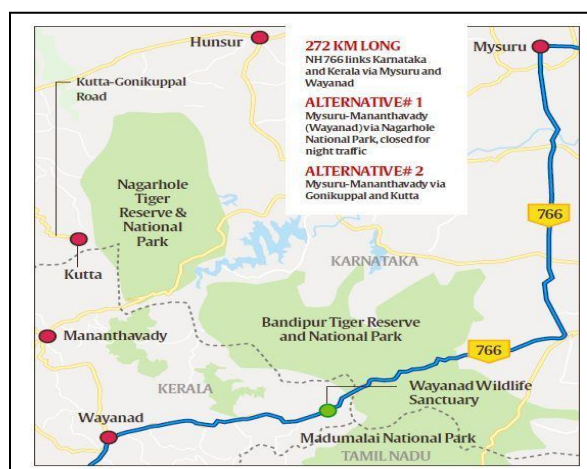


10. Etawah Lion Safari

- Located in **Uttar Pradesh**.
- There are 18 lions in the premises.
- The park is officially categorised in Multiple Safari Park, Asiatic Lion Breeding Centre & Visitor Facilitation Centre.

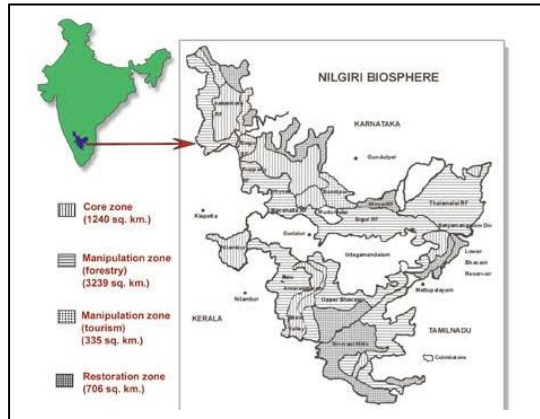
11. Bandipur National Park

- **Bandipur National Park** established in 1974 as a tiger reserve under Project Tiger, is a national park located in the Indian state of Karnataka.
- Bandipur is known for its wildlife and has many types of biomes, but **dry deciduous** forest is dominant.
- Together with the adjoining **Nagarhole National Park, Mudumalai National Park and Wayanad Wildlife Sanctuary**, it is **part of the Nilgiri Biosphere Reserve**, making it the largest protected area in southern India and largest habitat of wild elephants in south Asia.



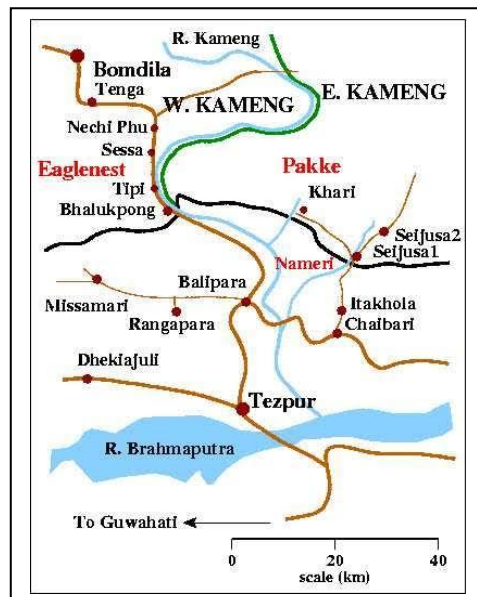
12. Wayanad Wildlife Sanctuary (WWS)

- The Wayanad Wildlife Sanctuary (WWS), though home to more than half the number of tigers present in Kerala, may not be notified as a tiger reserve as the proposal lacks public support.
- About Wayanad wildlife sanctuary:**
 - Located in Kerala.
 - It is the second largest wildlife sanctuary in Kerala.
 - The 'Status of Tigers in India' report released last year had estimated the tiger population of Wayanad as between 75 and 80 individuals.
 - The sanctuary is now an integral part of **the Nilgiri Biosphere Reserve**.
 - It is **bounded by protected area network** of Nagarhole and Bandipur of Karnataka in the northeast, and on the southeast by Mudumalai of Tamil Nadu.



13. Pakke tiger reserve

- Arunachal Pradesh** State government is planning to build a 692.7 km highway through the **Pakke Tiger Reserve (PTR)** in East Kameng district.
- Named **the East-West Industrial Corridor**, the highway aims to connect BhairabKunda in West Kameng district and Manmao in Changlang district along Arunachal Pradesh's border with Assam.
- Key facts:**
 - Pakke Tiger Reserve is also known as **Pakhui Tiger Reserve**.
 - This Tiger Reserve has won India Biodiversity Award 2016 in the category of '**Conservation of threatened species**' for its Hornbill Nest Adoption Programme.
 - It is bounded by Bhareli or Kameng River in the west and north, and by Pakke River in the east.
 - Neighbours: Papum Reserve Forest in Arunachal Pradesh, Assam's Nameri National Park, Doimara Reserve Forest and Eaglenest Wildlife Sanctuary.
 - The main perennial streams in the area are the Nameri, Khari and Upper Dikorai. West of Kameng River is Sessa Orchid Sanctuary.



14. Emperor Penguins

- It is one of **Antarctica's most iconic species**.
- It is listed as '**near threatened**' in the Red List of International Union for Conservation of Nature (IUCN).
- Recent demands:**
 - Experts have demanded that the IUCN status of species should be changed to 'vulnerable' from 'near threatened'.
 - The experts also advocated that the emperor penguin should be listed by the Antarctic Treaty as a Specially Protected Species.

- The 1959 treaty sets aside Antarctica as a scientific preserve, establishes freedom of scientific investigation, and bans military activity on the continent.

15. Snow Leopard

- **First National Protocol to Enumerate Snow Leopard Population** in India Launched.
- Launched on the occasion of **International Snow Leopard Day**.
- **Key facts:**
 - Listed as **Vulnerable** on the IUCN Red List of Threatened Species.
 - **Inhabit alpine and subalpine zones** at elevations from 3,000 to 4,500 m (9,800 to 14,800 ft).
 - **State animal of Himachal Pradesh** and the **National Heritage Animal of Pakistan**.
 - **Habitat extends through twelve countries:** Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan. **China contains as much as 60% of all snow leopard habitat areas.**
 - Listed on **Appendix I of the Convention on International Trade of Endangered Species (CITES)**.
 - **Global Snow Leopard Forum, 2013:** 12 countries encompassing the snow leopard's range (Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan).
 - **Bishkek Declaration:** To protect the species and its environment.
 - **Global Snow Leopard and Eco-system Protection Program:** It is a joint initiative of range country governments, international agencies, civil society, and the private sector. Goal — secure the long-term survival of the snow leopard in its natural ecosystem.

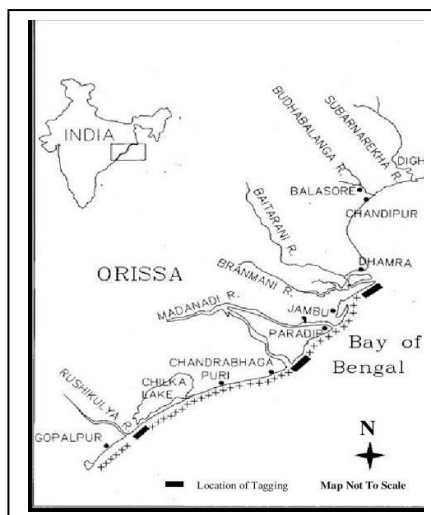
16. Pangolin

- Pangolins could be responsible for the spread of the deadly coronavirus in China, scientists have said after they found the genome sequence separated from the endangered mammals 99 per cent identical to that from infected people.
- **About Pangolin:**
 - It is the **only scaly mammal on the planet**.
 - According to Convention on International Trade in Endangered Species (CITES), it is also the **most illegally traded vertebrate** within its class (Mammalia).
 - **Protection Status:** Chinese pangolin has been listed as “critically endangered” by UN affiliated International Union for Conservation of Nature’s (IUCN) Red List. Indian pangolin (*Manis crassicaudata*) has been listed as “endangered” in IUCN Red List. It is also a **Schedule I category protected animal, under the Wildlife Protection Act (1972)**.



17. Olive Ridley turtles

- Preparations are almost done at the **Rushikulya rookery** on the Odisha coast to welcome and protect **olive ridley turtles** during mass nesting.
- The Olive Ridleys are the second smallest and most abundant of all sea turtles found in the world.
- They inhabit warm waters of the Pacific, Atlantic and Indian Oceans.
- It is well known for its arribadas or annual mass nestings.
- **IUCN Status:** Vulnerable.
- Protection under CITES Appendix 1 and the Indian Wildlife Protection Act of 1972.
- **Operation Kachhapa:** Launched by the Wildlife Protection Society of India in collaboration with the Orissa State Forest Department and the Wildlife Society of Odisha and other local NGOs.



18. Pashmina products receive BIS Certification

- Bureau of Indian Standards (BIS) has published an Indian Standard for identification, marking and labelling of **Pashmina products** to **certify its purity**.
- **Significance and the need for certification:**
 - The certification will help **curb the adulteration of Pashmina**.
 - **Protect the interests of local artisans and nomads** who are the producers of Pashmina raw material.
 - **Assure the purity** of Pashmina for customers.
 - **Discourage counterfeit or substandard products** presently mislabeled and sold as genuine Pashmina in the market.
 - **Motivate the younger generation** to continue in this profession as well as encourage more families to take up this occupation.
- **About Changthangi or Pashmina goat:**
 - It is a special breed of goat **indigenous to the high-altitude regions of Ladakh in Jammu and Kashmir**.
 - They are **raised for ultra-fine cashmere wool, known as Pashmina** once woven.
 - These goats are **generally domesticated and reared by nomadic communities called the Changpa** in the Changthang region of Greater Ladakh.
 - The Changthangi goats have revitalized the economy of Changthang, Leh and Ladakh region.
- **About BIS:**
 - The Bureau of Indian Standards (BIS) is the **national Standards Body of India** working under the aegis of **Ministry of Consumer Affairs, Food & Public Distribution**.
 - It is established by the **Bureau of Indian Standards Act, 1986**.
 - The Minister in charge of the Ministry or Department having administrative control of the BIS is the ex-officio President of the BIS.
 - Composition: As a corporate body, it has 25 members drawn from Central or State Governments, industry, scientific and research institutions, and consumer organisations.
 - It also works as WTO-TBT (Technical Barriers to Trade) enquiry point for India.

19. Tamil yeoman

- Tamil yeoman (*Cirrochroa thais*) butterfly species **endemic to Western Ghats** has been declared **the state butterfly of Tamil Nadu**.

- For the **first time Tamil Nadu has declared its state butterfly** and only **fifth in the country to do so. Maharashtra** was the **first to declare Blue Mormon** as its state butterfly, followed by Uttarakhand (Common peacock), Karnataka (Southern bird wings) and Kerala (Malabar banded peacock).



20. Hangul

- Massive decline in the population of Kashmir's iconic wildlife species, the Hangul (*Cervus hanglu hanglu*).
- It is the state animal of **Jammu & Kashmir**.
- It is restricted to the **Dachigam National Park**.
- It is placed under **Schedule I** of the Indian Wildlife (Protection) Act, 1972 and the J&K Wildlife Protection Act, 1978.
- The Hangul was once widely distributed in the mountains of Kashmir and parts of Chamba district in neighbouring Himachal Pradesh.
- The IUCN's Red List has classified it as **Critically Endangered** and is similarly listed under the Species Recovery Programme of the Wildlife Institute of India (WII) and the Environmental Information System (ENVIS) of the MoEFCC.



21. KAPPAPHYCUS ALVAREZII

- It is an invasive, which smothers and kills coral reefs.
- Concerns:** It has spread its wings to coral reef areas in Valai island in the Gulf of Mannar (GoM) and set to invade new coral colonies in the marine national park. It has already invaded Shingle, Kurusadai and Mulli islands in Mandapam cluster of the GoM, the red algae invaded Valai island along Kilakarai coast following its cultivation in south Palk Bay.
- Regulation:** A 2005 Government Order had restricted cultivation of the exotic seaweed only to the seawaters north of the Palk Bay and South of Thoothukudi coast.

Environment Protection

1. Miyawaki method of afforestation

- The **Miyawaki method of afforestation** is to come up on the government office premises, residential complexes, school premises, and puramboke land in Kerala.
- **What is Miyawaki method?**
 - The Miyawaki method, developed by a Japanese botanist after whom it is named, **involves planting saplings in small areas, causing them to "fight" for resources and grow nearly 10 times quicker.**
 - It **originated in Japan**, and is now increasingly adopted in other parts of the world, including our Chennai. It has revolutionised the concept of urban afforestation by turning backyards into **mini-forests**.



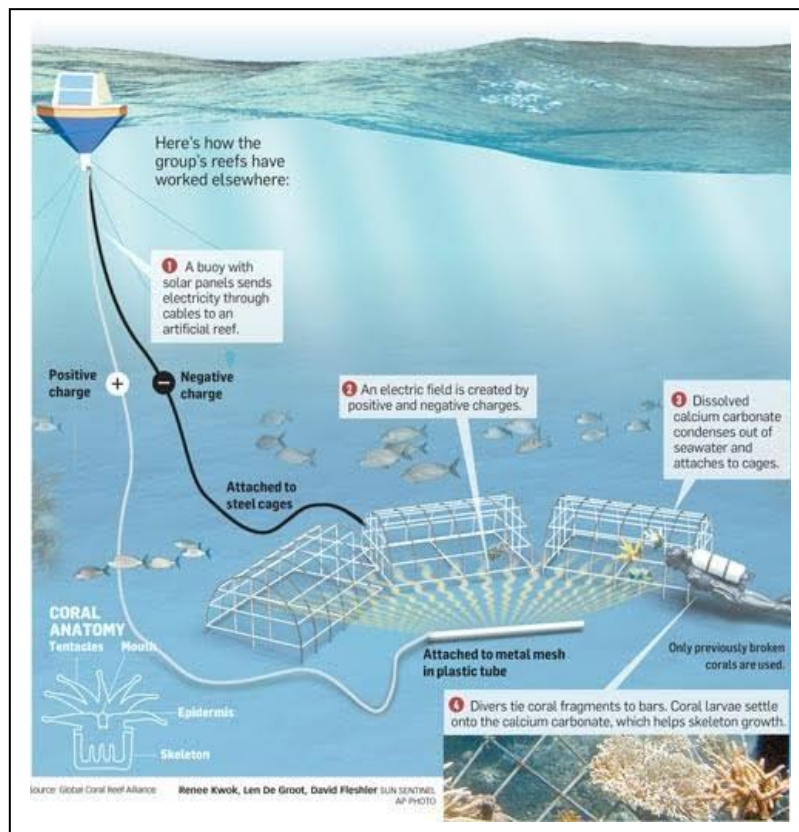
2. Australian Bushfires

- Australia was recently ravaged by **the worst wildfires seen in decades**.
- **What caused the fires?**
 - Each year there is **a fire season during the Australian summer**, with hot, dry weather making it easy for blazes to start and spread.
 - **Natural causes** are to blame most of the time, like lightning strikes in drought-affected forests.
 - **Dry lightning** was responsible for starting a number of fires in Victoria's East Gippsland region.
 - **Humans can also be to blame.** NSW police have charged at least 24 people with deliberately starting bushfires.
- **Challenges that Australia is facing:**
 - Australia is experiencing **one of its worst droughts in decades**- last spring was the driest on record.
 - Meanwhile, **a heatwave** in December broke the record for highest nationwide average temperature.
 - **Strong winds** have also made the fires and smoke spread more rapidly.
 - Experts say **climate change** has worsened the scope and impact of natural disasters like fires and floods -- weather conditions are growing more extreme, and **for years, the fires have been starting earlier in the season and spreading with greater intensity.**

3. Biorock or Mineral Accretion Technology

- **The Zoological Survey of India (ZSI)**, with help from Gujarat's forest department, is attempting for the first time a process to restore coral reefs using **biorock or mineral accretion technology** in the Gulf of Kachchh.
- **What is Biorock?**
 - It is the name given to **the substance formed by electro accumulation of minerals dissolved in seawater on steel structures** that are lowered onto the sea bed and are connected to a power source, in this case solar panels that float on the surface.
- **How they are formed?**
 1. The technology works by passing a small amount of electrical current through electrodes in the water.
 2. When a positively charged anode and negatively charged cathode are placed on the sea floor, with an electric current flowing between them, calcium ions combine with carbonate ions and adhere to the structure (cathode).

3. This results in calcium carbonate formation. Coral larvae adhere to the CaCO_3 and grow quickly.
4. Fragments of broken corals are tied to the biorock structure, where they are able to grow at least four to six times faster than their actual growth as they need not spend their energy in building their own calcium carbonate skeletons.



4. Senna Spectabilis

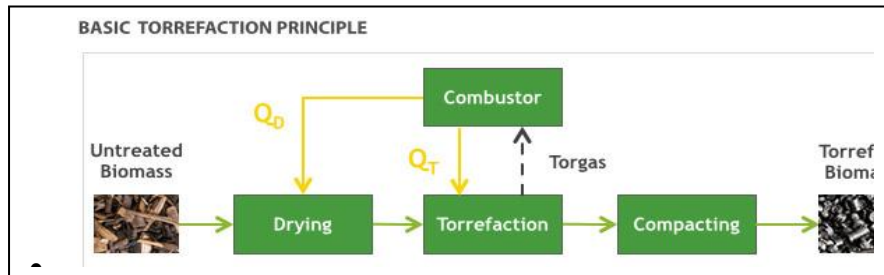
- The Kerala Government is planning to arrest the rampant growth of *Senna spectabilis*, in the forest areas of **the Nilgiri Biosphere Reserve (NBR), including the Wayanad Wildlife Sanctuary.**
- It is a deciduous tree native to tropical areas of America.
- It grows up to 15 to 20 metres in a short period of time and distributes thousands of seeds after flowering.
- It is an invasive species.
- **Concerns:** The thick foliage of the tree arrests the growth of other indigenous tree and grass species. Thus, it causes food shortage for the wildlife population, especially herbivores. It also adversely affect the germination and growth of the native species.
- It is categorised as 'Least Concern' under IUCN Red List.



5. Torrefaction technology

- India tests Swedish **torrefaction technology** to reduce stubble burning.
- **What is torrefaction?**
 - It is **a thermal process** used to produce **high-grade solid biofuels from various streams of woody biomass or agro residues.**

- **The end product** is a stable, homogeneous, high quality solid biofuel with far greater energy density and calorific value than the original feedstock, providing significant benefits in logistics, handling and storage, as well as opening up a wide range of potential uses.



- **How it works?**

1. Biomass torrefaction involves **heating the biomass** to temperatures between 250 and 300 degrees Celsius in a low-oxygen atmosphere.
2. When biomass is heated at such temperatures, the moisture evaporates and various low-calorific components (volatiles) contained in the biomass are driven out.
3. During this process the hemi-cellulose in the biomass decomposes, which transforms the biomass from a fibrous low-quality fuel into a product with excellent fuel characteristics.

6. Dal Lake area to be Eco-sensitive Zone

- The Jammu and Kashmir UT will set up a 10-member committee that will declare **Dal Lake, an Eco-sensitive Zone**.
- **What are Eco-sensitive zones?**
 - The **Environment Protection Act, 1986** does not mention the word “Eco-sensitive Zones”.
 - 1. **The section 3(2)(v) of the Act**, says that Central Government can restrict areas in which any industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards
 - 2. **Besides the section 5 (1)** of this act says that central government can prohibit or restrict the location of industries and carrying on certain operations or processes on the basis of considerations like the biological diversity of an area, maximum allowable limits of concentration of pollutants for an area, environmentally compatible land use, and proximity to protected areas.
 - The above two clauses have been effectively used by the government to declare Eco-Sensitive Zones or Ecologically Fragile Areas (EFA). The same criteria have been used by the government to declare No Development Zones.
- **Criteria:**
 - The MoEF (Ministry of Environment & Forests) has approved a comprehensive set of guidelines laying down parameters and criteria for declaring ESAs.
 - **These include Species Based** (Endemism, Rarity etc), **Ecosystem Based** (sacred groves, frontier forests etc) and **Geomorphologic feature based** (uninhabited islands, origins of rivers etc).
- **About Dal:**
 - Also known as **the summer capital of Jammu and Kashmir**, dal lake, which is the second largest in the state, is integral to tourism and recreation in Kashmir and is named the “Jewel in the crown of Kashmir” or “Srinagar’s Jewel”. The lake is also an important source for commercial operations in fishing and water plant harvesting.
 - The lake is located in **the Zabarwan mountain valley**, in the foothills of the Shankracharya hills, which surrounds it on three sides.

- The lake has four main interconnected basins namely, **Hazratbal, Bod dal, Gagribal and Nagin**.

7. Ozone hole

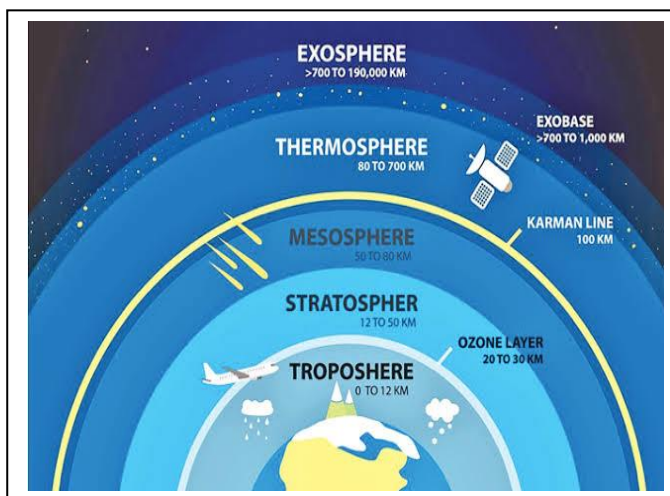
- During 2019 September and October, the annual ozone hole over the Antarctic reached its peak extent of 16.4 million sq km on September 8, then shrank to less than 10 million sq km. This **has been the smallest observed since 1982**. NASA has described it as great news for the Southern Hemisphere.

- **Why it's small?**

- There have been abnormal weather patterns in the atmosphere over Antarctica. In warmer temperatures, fewer polar stratospheric clouds form and they don't persist as long, limiting the ozone-depletion process.

- **What is ozone layer?**

- A layer of ozone envelops the Earth and **keeps damaging ultraviolet, or UV, radiation from reaching living things on the planet's surface**.
- The ozone layer **exists mainly in the stratosphere**, a layer of the atmosphere that reaches from 10 to 50 kilometers (about 6 to 30 miles) above the Earth's surface.



- **What is ozone hole?**

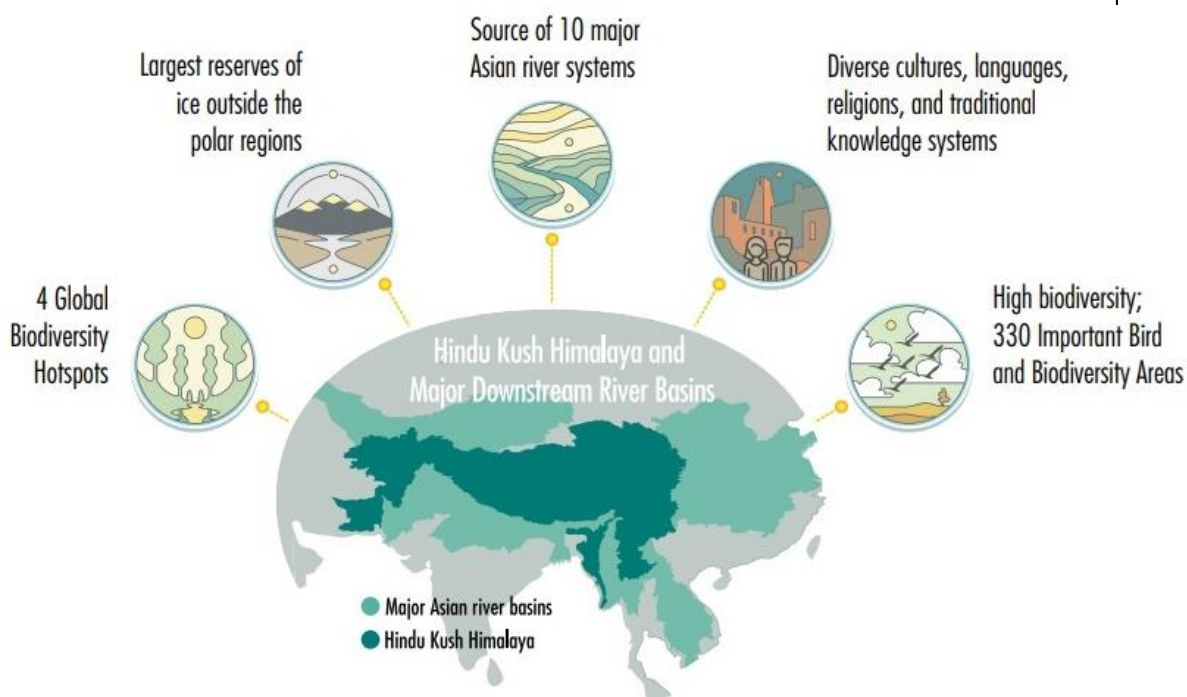
- The ozone hole is a region of depleted layers of ozone above the Antarctic region, whose creation is linked to increased cases of skin cancer.
- **Manufactured chemicals deplete the ozone layer**. Each spring over Antarctica, atmospheric ozone is destroyed by chemical processes. This creates the ozone hole, which **occurs because of special meteorological and chemical conditions that exist in that region**.

- **Factors responsible for the depletion of ozone:**

- Depletion of ozone is due to many factors, **the most dominant of which is the release of chlorine from CFCs (Chlorofluorocarbons)** which destroys the ozone. CFCs are released by products such as hairsprays, old refrigerators etc.

8. Hindu Kush- Himalayan Region and the Climate Change

- To better gauge the impact of climate change on **the Hindu Kush mountains**, which includes the Himalayas, and spruce up data-gathering, the India Meteorological Department (IMD) will collaborate with meteorological agencies in China and Pakistan, among others, to provide climate forecast services to countries in the region.
- **About Hindu Kush-Himalayan region:**
 - The Hindu Kush-Himalayan region spans an area of more than 4.3 million square kilometres in Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.
 - The region stores more snow and ice than anywhere else in the world outside the polar regions, giving its name: **'The Third Pole'**.
 - It contains the world's highest mountains, including all 14 peaks above 8,000 metres, is the source of 10 major rivers, and forms a formidable global ecological buffer.



240 million

people depend directly on the HKH for their lives and livelihoods

1.9 billion

people depend on the HKH for water, food, and energy

> 35%

of the world population benefits indirectly from HKH resources and ecosystem services

- **The Third Pole Environment (TPE):** TPE, an international research program, was launched in 2009 and focuses on the Tibetan Plateau and surrounding mountain ranges.

9. Definition of Forest

- Centre clarifies on **definition of forest**.
- **Clarifications given by the Forest Advisory Committee (FAC) of the Environment Ministry:**
 - States need not take the Centre's approval to define what constitutes unclassified land as forest.
- **Do we have a comprehensive legal definition for forest?**
 - Since 2014, the Ministry of Environment, Forest and Climate Change (MoEF&CC) has been considering evolving a legal definition of forest and reportedly prepared drafts as late as 2016. These, however, were never made public.
- **How is a forest defined?**
 - The freedom to define land, not already classified as forests by the Centre or State records, as forest has been the prerogative of the States since 1996 and stems from a Supreme Court order, called the **Godavarman judgment**.
 - The Supreme Court judgment expanded the definition of forest to include lands that were already notified by the Centre as forests, that appear in government records as forests as well as those that fell in the "dictionary definition" of forest.
 - The latter clause allows the States to evolve their own criteria and define tracts of land as forest, and these would then be bound by forest conservation laws.
- **Why it is difficult to have an all-encompassing definition of forest?**
 - An all-encompassing definition of forest is difficult for India because **the country has 16 different kinds of forest**.
 - A tract of grassland in one State might qualify in one region as forest, but not in another. However, **once a State applied a criteria, it couldn't be reversed**.

- The onus on the States to define forests is also significant because ***the States often claim that they are helpless in preventing encroachment because a patch of land in question hadn't been notified as forest.***

10. Shola Grasslands

- Expanding plantations of exotic species, including tea, in the Nilgiris can wipe out Shola vegetation, according to a report filed by an expert committee formed by the Madras High Court.
- **Key findings:**
 - This change in vegetation will result in loss of water sources and is already leading to massivelandslides.
 - Invasive species like eucalyptus, tea plantations and wattle and naturalised alien species like Lantana camara, Opuntia stricta, Chromolaena odorata, Parthenium hysterophorus and Senna spectabilis have had a serious impact on the Shola forest and grasslands.
- **What are Shola Grasslands?**
 - The Shola vegetation are **tropical montane forests** found in the Western Ghats separated by rolling grasslands in high altitudes.
 - Shola grasslands consist of dwarf trees growing 25-30 feet.
 - It is a stunted forest growths of diverse grass species.
 - Vegetation is double layered storey with closed canopy which hardly permits a single ray of sunlight to penetrate in the natural vegetation.
 - Nilgiris upper region is classified as southern grassland mountain grassland.
 - Between 1973-2014 Shola grasslands area had seen a 66.7% decline.
- **Significance:**
 - The Shola forests and associated grasslands store **large quantities of water on the mountain ranges**, thus serving as huge water harvesting and storage structures.
 - Many of the rivers in Kerala and Tamil Nadu originate from the Shola grasslands and were perennial. With depletion of Sholas and other forests, the streams that supply water to them dry up in summer.
 - They are rich store houses of biodiversity and also home to extremely rich wildlife.

11. Green Bonus

- Himalayan states met at a conclave to demand **a separate ministry to deal with problems endemic to them and a green bonus** in recognition of their contribution to environment conservation.
- A “**Mussoorie resolution**” was passed at the conclave making a collective pledge to conserve and protect their rich cultural heritage, bio-diversity, glaciers, rivers and lakes besides making their own contribution to the nation’s prosperity.
- **Indian Himalayan region:**
 - **IHR is the section of Himalayas within India, spanning 11 Indian states** (Arunachal Pradesh, Assam Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand) & 2 districts of Bengal and that **runs along 2500 km of Himalayan ranges between Indus river basin in North- West and Brahmaputra in the East.**
 - Approximately 9,000 glaciers of IHR store about 12,000 km³ of freshwater.
 - **This region is endowed with rich vegetation & is home to almost 36% of India’s total biodiversity.** More than 41.5% area of IHR states is under forests, representing 1/3rd of total forest cover of India & nearly half (47%) of the “very good” forest cover of the country.
 - The total geographical area of IHR states is approximately 591,000 sq. km (18% of India) and it is inhabited **by about 3.8% of the country’s population.**

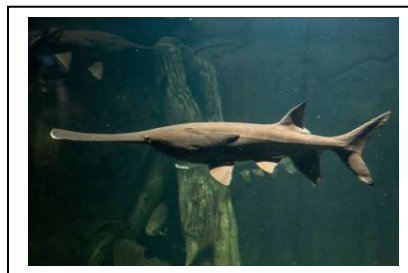
- The **strategic importance of the IHR is evident from the fact that IHR states share borders with 6 neighbouring countries.**
- This is one of India's **major carbon sink**. Besides it averts soil erosion from the world's youngest mountain range.

NOTES

Species Discovery / Species Sighted / Species Extinct

1. Chinese paddlefish found in the Yangtze declared extinct

- It is **native to the Yangtze**, Asia's longest river.
- It is **one of the world's largest species of freshwater species**.
- It has been **declared extinct by Chinese scientists**. The last confirmed sighting of the fish was in 2003.
- It is thought to have become **functionally extinct** — which means there are no breeding pairs left — in 1993.
- Two other notable Yangtze species — **reeves shad**, a type of fish and **the baiji**, or Yangtze River dolphin — were declared 'functionally extinct' in 2015 and 2006 respectively.



2. Steppe Eagle

- Sighted recently near Vijayawada.
- **IUCN status:** Endangered.
- **Scientific name:** *Aquila nipalensis*.
- Like all eagles, it belongs to the family **Accipitridae**.
- **Habitat:** It breeds from Romania east through the south Russian and Central Asian steppes to Mongolia. The European and Central Asian birds winter in Africa, and the eastern birds in India.
- Throughout its range **it favours open dry habitats, such as desert, semi-desert, steppes, or savannah**.
- The Steppe Eagle appears on **the flag of Kazakhstan**. It is also the **National bird (animal) of Egypt and appears on its flag**.



3. Ophichthus kailashchandrai

- This is **a new snake eel species** residing in the Bay of Bengal. It was **discovered** recently.
- It has been named **Ophichthus kailashchandrai** to honour the vast contributions of **Dr. Kailash Chandra**, Director of ZSI, to Indian animal taxonomy.
- It is **the eighth species of the Ophichthus genus found on the Indian coast**.



4. Bar-headed goose

- Also known as **Anser indicus**, it is known to be one of the highest flying birds in the world. It can fly at altitudes of 25,000 feet, while migrating over the Himalayas, where oxygen and temperature levels are extremely low.
- The species has been reported as **migrating south from Tibet, Kazakhstan, Mongolia and Russia before crossing the Himalaya**.
- It is classified as **"Least Concerned"** as per the IUCN Red List.

5. Tibetan Gazelles

- Also known as the Goats (*Procapra picticaudata*).
- A species of antelope that inhabits the Tibetan plateau.
- IUCN Status- Near Threatened.



- Their fur lacks an undercoat, consisting of long guard hairs only, and is notably thicker in winter.
- They are almost restricted to the Chinese provinces of Gansu, Xinjiang, Tibet, Qinghai, and Sichuan, with tiny populations in the Ladakh and Sikkim regions of India.

6. Polypedates Bengalensis

- It is a newly discovered frog species from West Bengal.
- Also known as the Brown Blotched Bengal Tree Frog
- It belongs to the genus Polypedates. There are 25 other Polypedates species round the world. Polypedates bengalensis is the 26th.
- The frog's body colour is yellowish-brown to greenish-brown.



7. What is Pliosaur

- They are the largest aquatic carnivorous reptiles that have ever lived.
- They are often dubbed "sea monsters". Scientifically, they are placed in the suborder Pliosauroidea.
- **Context:** Interest in these giants has been revived with the recent discovery of their bones in a cornfield in the Polish village of **Krzyzanowice**. Remains of pliosaurs are rare in Europe.

8. Idris Elba

- A species of wasp has been named Idris Elba.
- The wasp, recently discovered in Mexico, was found living as a parasite in the eggs of another insect, known as the bagrada bug, which is a major pest of cruciferous vegetables.
- This newly discovered wasp species could be the ultimate weapon in the battle against the stink bug -- also known as the painted bug -- by "parasitizing" stink bug eggs and thus preventing offspring from growing.



9. Trachischium apteii

- It is **a newly discovered snake species from Arunachal Pradesh**.
- It was found in **Tally Valley Wildlife Sanctuary**.
- It belongs to a group of **fossorial** (adapted to digging) snakes that live mostly underground, and surface mainly during or after a heavy monsoon shower.

10. Urban bent-toed gecko

- It is a new species of lizard discovered in Guwahati, Assam.
- **Scientific name:** Cyrtodactylus urbanus).
- Urbanization is a major threat to the survival of geckos.



11. Craspedotropis gretathunbergae

- It is **a new species of land snail** discovered recently.
- It is named in honour of Swedish climate activist **Greta Thunberg**.
- The new species comes from **tropical rainforests** and is sensitive to drought and extreme temperatures.
- The snails were found during a field course conducted by Taxon Expeditions at Kuala Belalong Field Studies Centre in **Brunei**.



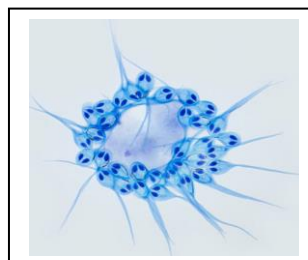
- **Features:** The two-millimetre-long snails have dark grey tentacles, a pale body and a concave shell, whose outer part is greenish-brown.

12. World's largest cave fish discovered in Meghalaya

- World's **largest species of cave fish** has been discovered in **Meghalaya's Jaintia Hills**.
- The cave fish is around one and a half feet in length and has no eyes and is white due to a lack of melanin pigmentation.

13. What is Henneguya salminicola?

- It is a **non-oxygen breathing animal** discovered recently.
- It is a fewer-than-10-celled microscopic parasite that lives in **salmon muscle**.
- It relies on **anaerobic respiration** (through which cells extract energy without using oxygen).
- It does not have a **mitochondrial genome**. Mitochondria is the "powerhouse" of the cell, which captures oxygen to make energy.



Pollution

1. Hydrochlorofluorocarbons (HCFC)

- India has successfully achieved the complete phase out of **hydrochlorofluorocarbon (HCFC)-141 b**, claims the ministry of environment, forest and climate change.
- **About HCFC- 141 b:**
 - It is a chemical used by foam manufacturers.
 - It is used mainly as a **blowing agent in the production of rigid polyurethane (PU) foams**.
 - It is one of the most potent ozone depleting chemical after Chlorofluorocarbons (CFCs).
- **Background:**
 - On 31 December 2019, as part of the move towards environment friendly technologies, the ministry of environment, forest and climate change (MoEFCC) also brought out a Gazette notification **prohibiting the issuance of import licence for HCFC-141b from 1 January 2020 under Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2019 issued under the Environment (Protection) Act, 1986**.
- **Significance:**
 - Nearly, 50% of the consumption of ozone depleting chemicals in the country was attributable to HCFC-141 b in the foam sector.
 - India has now emerged as one among the few countries globally and a pioneer in some cases in the use of technologies, which are non-Ozone Depleting and have a **low Global Warming Potential (GWP)**.
- **Montreal Protocol:**
 - The complete phase out of HCFC 141 b from the country in foam sector is among the first at this scale in **Article 5 parties (developing countries) under the Montreal Protocol**.
- **Benefits of this move:**
 - The phase out of HCFC-141b from the country has twin **environmental benefits**, viz, assisting the healing of the stratospheric ozone layer, and towards climate change mitigation due to transitioning of foam manufacturing enterprises at this scale under HPMP to low global warming potential alternative technologies.
- **What are HCFCs?**
- Hydrochlorofluorocarbons (HCFCs) are a large group of compounds, whose **structure is very close to that of Chlorofluorocarbons (CFCs)**, but including one or more hydrogen atoms.
 1. **Under normal conditions, HCFCs are gases or liquids** which evaporate easily. They are generally fairly stable and unreactive.
 2. HCFCs **do not usually dissolve in water, but do dissolve in organic (carbon-containing) solvents**.
 3. HCFCs are chemically similar to **Hydrobromofluorocarbons (HBFCs)**, **Chlorofluorocarbons (CFCs)** and **Halons** and therefore display some similar properties, though they are much less stable and persistent.
 4. HCFCs are also part of a group of chemicals known as **the volatile organic compounds (VOCs)**.
- **How might it affect the environment?**
- HCFCs are unlikely to have any impact on the environment in the immediate vicinity of their release.
 1. As VOCs, they may be slightly involved in reactions to produce ozone, which can cause damage to plants and materials on a local scale.
 2. At a global level however, releases of HCFCs have serious environmental consequences. Although not as stable and therefore not so persistent in the

atmosphere as CFCs, HBFCs or Halons, they can still end up in the higher atmosphere (stratosphere) where they can destroy the ozone layer, thus reducing the protection it offers the earth from the sun's harmful UV rays.

3. HCFCs also **contribute to Global Warming** (through "the Greenhouse Effect"). Although the amounts emitted are relatively small, they have a powerful warming effect (a very high "Global Warming Potential").

2. UN's new rules for ships in the Arctic region

- **The International Maritime Organization (IMO)** has issued new rules aiming **to reduce sulphur emissions**, due to which ships are opting for newer blends of fuels.
- But, recently environmental activists called for **a ban on the use of new low sulphur marine fuel in the Arctic region**, citing a research which shows that **blends of very low-sulfur fuel oil (VLSFO) contribute to highly polluting black carbon emissions in the environment**.
- **What do the new IMO rules say?**
 - The IMO has **banned ships from using fuels with a sulphur content above 0.5 per cent, compared with 3.5 per cent previously**.
 - The new limits are **monitored and enforced by national authorities of countries** that are members of **the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI**.
 - Under the new policy, only ships fitted with sulphur-cleaning devices, known as **scrubbers**, are allowed to continue burning high-sulphur fuel.
 - Alternatively, **they can opt for cleaner fuels, such as marine gasoil (MGO) and very low-sulfur fuel oil (VLSFO)**.
 - There are complaints against VLSFO as well, as testing companies have claimed that **high sediment formation due to the fuel's use could damage vessel engines**.
- **Concerns associated with Sulphur usage:**
 - Sulphur oxides (SOx), which are formed after combustion in engines, are known to cause respiratory symptoms and lung disease, while also leading to acid rain.
- **About International Convention for the Prevention of Pollution from Ships (MARPOL):**
 - The Convention was adopted on 2 November 1973 at IMO.
 - It includes **regulations aimed at preventing and minimizing pollution from ships – both accidental pollution and that from routine operations**.
 - All ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail and member nations are responsible for vessels registered on their national ship registry.

3. Recycling of Ships Bill, 2019

- The Union Cabinet has approved the proposal for enactment of **Recycling of Ships Bill, 2019** and accession to **the Hong Kong International Convention for Safe and Environmentally Sound Recycling of Ships, 2009**.
- **What is Hong Kong convention?**
 - **The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009** (the Hong Kong Convention), was adopted at a diplomatic conference held in Hong Kong, China in 2009.
 - It was adopted by the International Maritime Organization (IMO) in 2009.
 - The Convention is aimed at ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risks to human health, safety and to the environment.
 - The Convention is yet to come into force because it has not been ratified by 15 nations, representing 40 per cent of the world merchant shipping by gross tonnage (capacity) and a maximum annual ship recycling volume of not less than 3 per cent of the combined tonnage of the countries.

4. Smog Tower

- **Delhi** gets its **first smog tower**.
- In November, **the Supreme Court had directed the Centre and the Delhi government to prepare a plan to install 'smog towers' across the capital** to deal with air pollution.

What is a 'smog tower'?

- Smog towers are **structures designed to work as large-scale air purifiers**. They are usually fitted with multiple layers of air filters, which clean the air of pollutants as it passes through them. After the cleaning, the tower releases clean air.
- The filters installed in the tower will use **carbon nanofibres** as a major component and will be fitted along its peripheries. The tower will focus on reducing particulate matter load.



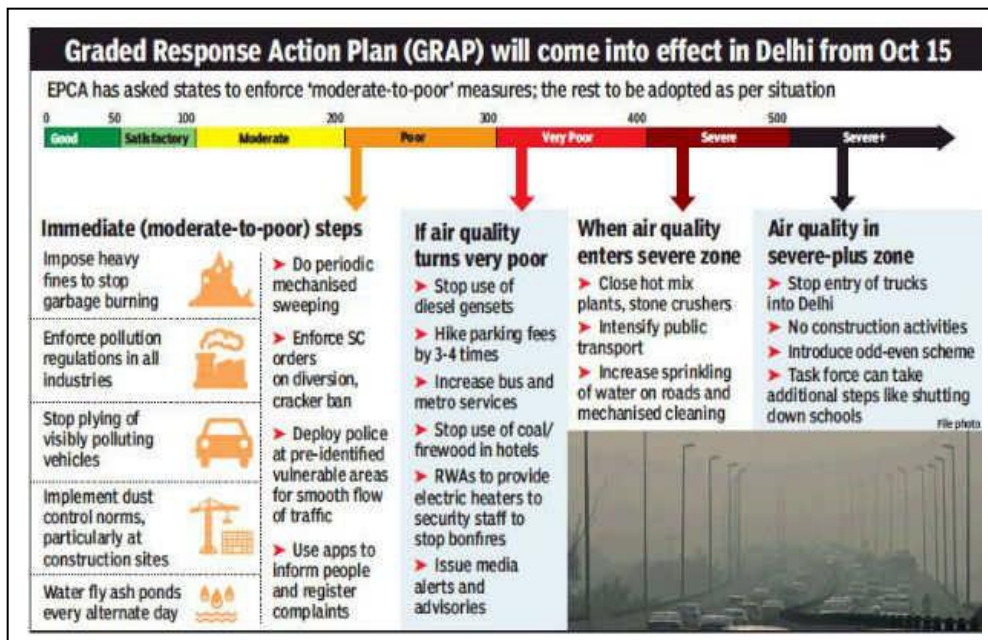
5. Heavy metals contaminating rivers

- Central Water Commission (CWC) has released a report on **heavy metals contaminating Indian rivers**.
- Iron emerged as the most common contaminant.
- **Arsenic and zinc** are the two toxic metals whose concentration is always found within the limits.
- **Other major contaminants** found in the samples were lead, nickel, chromium, cadmium and copper.
- **Metals found in Non-Monsoon Period:** Lead, cadmium, nickel, chromium and copper.
- **Monsoon Period:** Iron, lead, chromium and copper exceeded 'tolerance limits' in this period most of the time.
- **The main sources of heavy metal pollution** are mining, milling, plating and surface finishing industries that discharge a variety of toxic metals into the environment.
- The **presence of metals in drinking water to some extent is unavoidable and certain metals**, in trace amounts, are required for good health. However, when present above safe limits, they are associated with a range of disorders.
- **Long-term exposure** to the heavy metals may result in physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease, Parkinson's disease, muscular dystrophy and multiple sclerosis.
- **What are heavy metals?**
 - Metals with relatively high densities, atomic weights, or atomic numbers.
 - A density of more than 5 g/cm³ **is sometimes quoted as a commonly used criterion**.

6. Public Health Emergency declared in Delhi

- EPCA declares **public health emergency in Delhi-NCR**.
- **AQI** entered the **"severe plus" or "emergency" category**.
- **Background-** Pollution levels and indicators:
An AQI between 0-50 is considered 'good', 51-100 'satisfactory', 101-200 'moderate', 201-300 'poor', 301-400 'very poor' and 401-500 'severe'. Above 500 falls in the 'severe-plus emergency' category.
- **Graded Response Action Plan (GRAP):**
 - Approved by **the Supreme Court** in 2016.
 - It works only **as an emergency measure**.
 - As such, **the plan does not include action by various state governments to be taken throughout the year to tackle industrial, vehicular and combustion emissions**.

- When the air quality shifts from poor to very poor, the measures listed have to be followed since the plan is incremental in nature.



7. Punjab Preservation of Subsoil Water Act, 2009

- **The Punjab Preservation of Subsoil Water Act, 2009** is being blamed for contributing to the air pollution over Delhi and surrounding areas.
- **Why?**
 - The law led to **the sowing and transplantation of the summer paddy crop** to be delayed by about a fortnight, and moved the **harvesting season to end-October and early November** — a time when **the moist air and largely inactive wind systems cause particulate matter and gases from burning paddy stubble to hang in the atmosphere**. This air is carried by **northwesterly winds towards Delhi**, which lies to the southeast of Punjab.
- **What is The Punjab Preservation of Subsoil Water Act, 2009?**
 - The law aimed at **conserving groundwater by mandatorily delaying the transplanting of paddy to beyond June 10**, when the most severe phase of **evapotranspiration** (transfer of water from land to the atmosphere through evaporation from the soil and plant transpiration) is over. **Farmers were forbidden from sowing paddy before May 10, and transplanting it before June 10.**

8. Stubble Burning

- Stubble burning is a common practice followed by farmers to prepare fields for sowing of wheat in November as there is little time left between the harvesting of paddy and sowing of wheat.
- **Stubble burning results in emission of harmful gases** such as carbon dioxide, sulphur dioxide, nitrogen dioxide along with particulate matter.
- **Advantages of stubble burning:**
 1. It quickly clears the field and is the cheapest alternative.
 2. Kills weeds, including those resistant to herbicide.
 3. Kills slugs and other pests.
 4. Can reduce nitrogen tie-up.

9. Single-use plastic

- **What are Single-use plastics?**

- They are **disposable plastics meant for use-and-throw**.
- **These comprise** polythene bags, plastic drinking bottles, plastic bottle caps, food wrappers, plastic sachets, plastic wrappers, straws, stirrers and Styrofoam cups or plates.
- According to **World Wildlife Fund (WWF)**, plastic is harmful to the environment as it is non-biodegradable, takes years to disintegrate.
 1. Single-use plastics slowly and gradually break down into smaller pieces of plastic known as **microplastics**.
 2. It can take thousands of years for plastic bags to decompose, thus **contaminating our soil and water** in the process.
 3. The noxious chemicals used to produce plastic gets transmitted to animal tissue, and finally, enter the human food chain.
- **Government measures in place:**
 - **Extended Producer Responsibility (EPR) scheme** was introduced in the Plastic Waste Management (PWM) Rules, 2011, and was largely redefined in PWM 2016, wherein producers, importers and brand owners were asked to take primary responsibility for collection of used multi-layered plastic sachets or pouches or packaging.
- **Swachhata Hi Seva India Plog Run-** To propagate the idea of shunning plastics, the **Fit India Plog Run** has been launched.
- **Plogging** involves **picking up litter while jogging**.

10.Green Crackers

- **Indian Council of Scientific and Industrial Research (CSIR)** has developed green crackers, which are new and improved formulations of the previous sound-emitting crackers and other fireworks.
- **What are green crackers?**
 - They are less harmful and less dangerous than the conventional ones. They are the crackers with reduced emission and decibel level. They **are known as 'green' firecrackers because they have a chemical formulation that produces water molecules**, which substantially reduces emission levels and absorbs dust.
 - It promises a reduction in particulate matters and harmful gases, like nitrous oxide and sulfur oxide, by 30- 35 per cent.
 - The green crackers will be 25-30 per cent cheaper to manufacture and manufacturers would not have to make any changes in their facilities.
- **What gives colour to the firecrackers?**
 - **Red:** Strontium salts (Nitrates, carbonates and sulphates of strontium).
 - **Orange:** Calcium salts (Carbonates, chlorides and sulphates of calcium).
 - **Yellow:** Sodium salts (Nitrates and oxalates of sodium).
 - **Green:** Barium salts (Nitrates, carbonates, chlorides and chlorates of barium).
 - **Blue:** Copper salts (Carbonates and oxides of copper).
 - **Purple:** A combination of copper and strontium compounds.
 - **White:** The burning of metals like magnesium, aluminium and titanium).

11.Fly Ash

- Popularly known as **Flue ash** or **pulverised fuel ash**, it is **a coal combustion product**.
- **Composition:**
 - **Composed of the particulates** that are driven out of coal-fired boilers together with the **flue gases**.
 - Depending upon the source and composition of the coal being burned, **the components of fly ash vary considerably**, but all fly ash includes substantial amounts of **silicon dioxide (SiO₂)**, **aluminium oxide (Al₂O₃)** and **calcium oxide (CaO)**, the main mineral compounds in coal-bearing rock strata.

- **Minor constituents include:** arsenic, beryllium, boron, cadmium, chromium, hexavalent chromium, cobalt, lead, manganese, mercury, molybdenum, selenium, strontium, thallium, and vanadium, along with very small concentrations of dioxins and PAH compounds. It also has **unburnt carbon**.
- **How is it regulated?**
 - In the past, fly ash was generally released into the atmosphere, but air pollution control standards now require that it be captured prior to release by fitting pollution control equipment.
 - For example, in **the United States**, fly ash is generally stored at coal power plants or placed in landfills. About 43% is recycled, often used as a **pozzolan** to produce **hydraulic cement or hydraulic plaster** and a replacement or partial replacement for **Portland cement** in concrete production.
 - In modern coal-fired power plants, fly ash is generally captured by electrostatic precipitators or other particle filtration equipment before the flue gases reach the chimneys.
- **Health and environmental hazards:**
 - **Toxic heavy metals present:** All the heavy metals found in fly ash nickel, cadmium, arsenic, chromium, lead, etc—are toxic in nature. They are minute, poisonous particles accumulate in the respiratory tract, and cause gradual poisoning .
 - **Radiation:** For an equal amount of electricity generated, fly ash contains a hundred times more radiation than nuclear waste secured via dry cask or water storage.
 - **Water pollution:** The breaching of ash dykes and consequent ash spills occur frequently in India, polluting a large number of water bodies.
 - **Effects on environment:** The destruction of mangroves, drastic reduction in crop yields, and the pollution of groundwater in the Rann of Kutch from the ash sludge of adjoining Coal power plants has been well documented.
- **However, fly ash can be used in the following ways:**
 1. Concrete production, as a substitute material for Portland cement, sand.
 2. Fly-ash pellets which can replace normal aggregate in concrete mixture.
 3. Embankments and other structural fills.
 4. Cement clinker production - (as a substitute material for clay).
 5. Stabilization of soft soils.
 6. Road subbase construction.
 7. As aggregate substitute material (e.g. for brick production).
 8. Agricultural uses: soil amendment, fertilizer, cattle feeders, soil stabilization in stock feed yards, and agricultural stakes.
 9. Loose application on rivers to melt ice.
 10. Loose application on roads and parking lots for ice control.

12. Delhi water doesn't conform to ISO standards

- The **Bureau of Indian Standards (BIS)** has submitted its report to the Supreme Court of India on **drinking water standards in Delhi**.
- **Key findings:**

- None of the drinking water samples randomly collected from across Delhi conforms to the ISO standards of purity in one or more requirements.

Characteristics	Desirable limit	Permissible limit
Essential Characteristics		
Colour, Hazen Units, Max	5	25
Odour	Unobjectionable	-
Taste	Agreeable	-
Turbidity, NTU, Max	5	10
PH value	6.5 to 8.5	-
Total Hardness (as CaCO ₃), mg/l, Max	300	600
Iron (as Fe), mg/l, Max	0.3	1.0
Chlorides (as Cl), mg/l, Max	250	1,000
Residual free chlorine, mg/l, Max	0.2	-
Desirable Characteristics		
Dissolved solids, mg/l, Max	500	2,000
Calcium as (Ca), mg/l, Max	75	200
Magnesium (as Mg), mg/l, Max	30	75
Copper (as Cu), mg/l, Max	0.05	1.5

- All the drinking water samples drawn from Delhi were non-conforming in one or more requirements as per IS 10500:2012 [specification for drinking water].
- One of the main reasons for contamination in Delhi was leaking pipes.

13. Air Quality Index (AQI)

- Air Quality Index (AQI) is a tool for effective dissemination of **air quality information to people**.
- There are six AQI categories**, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe.
- AQI will consider eight pollutants** (PM₁₀, PM_{2.5}, NO₂, SO₂, CO, O₃, NH₃, and Pb) for which short-term (up to 24-hourly averaging period) National Ambient Air Quality Standards are prescribed.

14. Black Carbon

- According to a recent study published, black carbon particles emitted by the vehicular exhaust and coal-fired power plants, have been detected on the fetus-facing side of the placenta.
- This is expected to affect the overall development of the unborn baby.
- Findings:**
 - Concentration of black carbon particles was highest in the placentas of women who are most exposed to airborne pollutants in their daily life.
 - Inhalation of these particles by the mother gets translocated from the mothers' lungs to the placenta, resulting in life-long changes to the development of the baby along with permanently damaging the lung tissues.
 - The link between exposure to dirty air and increased cases of miscarriages, premature births, and low birth weights which in turn increases the chances for diabetes, asthma, stroke, heart disease and a lot of other conditions, has been established in this study.
- What is Black Carbon?**
 - Black carbon consists of **pure carbon in several linked forms**. It is formed through the **incomplete combustion** of fossil fuels, biofuel, and biomass, and is emitted in both anthropogenic and naturally occurring soot.
- Harmful effects of BC:**
 - Black carbon (BC) is a pollutant known to aggravate breathing disorders. Because BC particles strongly absorb solar and terrestrial radiation and heats up the atmosphere it can upset the monsoon system. If deposited on snow, it could accelerate the heating of snow and quicken the melting of glaciers.

15. Germany to phase out Glyphosate

- **Germany** took this step to **protect insect populations** that play a pivotal role in ecosystems and pollination of food crops.
- **Glyphosate** is used widely in agriculture, forestry, urban and home applications.
- **Concerns:** Its use has been surrounded by much debate due to safety concerns. The World Health Organization's **International Agency for Research on Cancer (IARC)** had declared glyphosate it "probably" carcinogenic to humans.

16. India largest emitter of sulphur dioxide in the world

- **India is the largest emitter of anthropogenic sulphur dioxide in the world**, as per the data released by environmental NGO Greenpeace on August 19, 2019.
- Anthropogenic sulphur dioxide is produced from burning of coal and it is known to largely contribute to air pollution.
- **Key findings:**
 - SO₂ hotspots across the world have been mapped.
 - The SO₂ hotspots were detected by the **OMI (Ozone Monitoring Instrument) satellite**.
 - India has over 15 percent of all anthropogenic sulphur dioxide (SO₂) hotspots in the world.
 - **The main SO₂ hotspots in India include** Singrauli in Madhya Pradesh, Korba in Chhattisgarh, Talcher and Jharsuguda in Odisha, Neyveli and Chennai in Tamil Nadu, Kutch in Gujarat, Ramagundam in Telangana and Chandrapur and Koradi in Maharashtra.
 - Norilsk smelter complex in Russia is the largest SO₂ emission hotspot in the world.

17. PROLIFERATION OF KELPS IN THE ARCTIC

- Climate change is altering marine habitats such as kelp forests.
- **What are Kelps? How do they survive underwater?**
 - Kelps are **large brown algae seaweeds** that make up the order Laminariales. There are about 30 different genera.
 - Kelps have adapted to the severe conditions. These **cool water species have special strategies to survive freezing temperatures and long periods of darkness, and even grow under sea ice**.
 - In regions with cold, nutrient-rich water, they can attain **some of the highest rates of primary production of any natural ecosystem on Earth**.
- **Significance of kelps:**
 - Kelps function underwater in the same way trees do on land.
 - They create habitat and modify the physical environment by shading light and softening waves.
 - The underwater forests that kelps create are used by many animals for shelter and food.
 - Kelp forests also help protect coastlines by **decreasing the power of waves during storms and reducing coastal erosion**.
 - Kelp forests throughout the world play an important role in coastal economies, supporting **a broad range of tourism, recreational and commercial activities**.
 - Kelp is a coveted **food source in many countries**, full of potassium, iron, calcium, fibre and iodine.
 - In the Arctic, **Inuit** traditionally use kelp as food and wild harvest numerous species.
- **How climate change is leading to expansion of Kelps?**
 - Genetic evidence reveals that **most kelps reinvaded the Arctic from the Atlantic Ocean quite recently** (approximately 8,000 years ago, following the last Ice Age). As a result, **most kelps in the Arctic are living in waters colder than their optimal**

temperature. Ocean warming will also move conditions closer to temperatures of maximum growth, and could increase the productivity of these habitats.

- As waters warm and sea ice retreats, **more light will reach the seafloor, which will benefit marine plants.** Researchers predict a **northern shift of kelp forests as ice retreats.**

- **Facts for prelims:**

- The Canadian Arctic is the **longest Arctic coastline in the world.**
- In the northwestern Canadian Arctic, **lack of rock substrate and a harsher climate support smaller, fragmented kelp forests.**

18. Dead Zone

- Unxygenated “dead zones” appear in waterways wherever algae are overfed by runoff from human activities such as urbanization and agriculture – a phenomenon called **eutrophication.**
- **What caused dead zone in Gulf of Mexico?**
 - The dead zone in the Gulf of Mexico, fueled by the **nutrient-laden water spilling from the mouth of the Mississippi River**, is the second-largest in the world.
 - It **blooms every summer**, when warming waters accelerate the metabolisms of microorganisms, and it is expected to get even worse as the climate continues to change.
 - **The primary culprits in eutrophication** appear to be excess nitrogen and phosphorus—from sources including fertilizer runoff and septic system effluent to atmospheric fallout from burning fossil fuels—which enter waterbodies and fuel the overgrowth of algae, which, in turn, reduces water quality and degrades estuarine and coastal ecosystems.
- **Effects of Eutrophication:**
 - Eutrophication can also produce carbon dioxide, which lowers the PH of seawater (ocean acidification). This slows the growth of fish and shellfish, may prevent shell formation in bivalve mollusks, and reduces the catch of commercial and recreational fisheries, leading to smaller harvests and more expensive seafood.

19. Arsenic in groundwater

- Arsenic is toxic to almost all life forms, but now researchers at the University of Washington have discovered that some microbes in the Pacific Ocean not only tolerate the stuff, but actively breathe it. The discovery has implications for how life may adapt to a changing climate, as well as where we might find it on other planets.
- **Arsenic in groundwater:**
 - Arsenic in ground water is a **geogenic contaminant** i.e. caused by natural geologic processes.
 - Concerns: **Incidence of high arsenic in groundwater reported from various parts of the country, particularly in the Ganga- plains** is a serious threat to the health of human being.
 - Arsenic is naturally present at high levels in the groundwater of a number of countries.
- **What's the difference between organic arsenic and inorganic arsenic?**
 - Atoms of arsenic bond with other elements to form molecules — if carbon is one of these elements, then the arsenic compound is an organic compound. If there is no carbon present, then the arsenic compound is in an inorganic compound.
 - **Inorganic arsenic is a known human carcinogen** — it is this form of arsenic that is linked with increased risks of cancer and other health effects.

Events / Celebrations

1. World Soil Day

- **World Soil Day** is celebrated every year on 5th of December by Food and Agriculture Organization (FAO) of United Nations.
- **Aim:** To communicate messages on importance of soil quality for food security, healthy ecosystems and human well-being.
- **Theme 2019:** 'Stop Soil Erosion, Save Our Future'.
- **SDGs:**
 - In the Agenda for Sustainable Development 2030, **the Sustainable Development Goals 2, 3, 12, and 15** have targets which commend direct consideration of soil resources, especially soil pollution and degradation in relation to food security.

2. Green good deeds

- The campaign has been launched by the Environment Ministry.
- **Aim:** To sensitise the people and students, in particular, about climate change and global warming. The objective of the campaign is to restore and return the clean and green environment to the next generation.
- The Ministry of Environment, Forest & Climate Change had drawn up a list of over 500 Green Good Deeds and asked people to alter their behaviour to Green Good Behaviour to fulfil their Green Social Responsibility.

3. World Wetlands Day 2019

- **World Wetlands Day** is celebrated on **February 2** each year to mark the Day **the Convention on Wetlands** was adopted in the Iranian City of **Ramsar in 1971**.
- **India is a party to the Convention since 1982** and committed to the Ramsar approach of wise use of wetlands.
- **The theme for 2020** is 'Wetlands and Biodiversity'.
- **Wetlands in India:**
 - The country has over 757,000 wetlands with a total wetland area of 15.3 million ha, accounting for nearly 4.7% of the total geographical area of the country.
 - India has 37 Ramsar sites now, covering an area of 1.07 million ha. **The latest additions include Maharashtra's first Ramsar site, the Nandur Madhmeshwar bird sanctuary;** three more from Punjab (in Keshopur-Miani, Beas Conservation Reserve and Nangal); and six more from Uttar Pradesh (in Nawabganj, Parvati Agra, Saman, Samaspur, Sandi and Sarsai Nawar).
- **About Ramsar convention:**
 - The Ramsar Convention is an international treaty for the **conservation and wise use of wetlands**.
 - It is named after the Iranian city of Ramsar, on the Caspian Sea, where the treaty was signed on 2 February 1971.
 - Known officially as '**the Convention on Wetlands of International Importance especially as Waterfowl Habitat**' (or, more recently, just 'the Convention on Wetlands'), it came into force in 1975.
- **Montreux Record:**
 - Montreux Record under the Convention is a **register of wetland sites** on the List of Wetlands of International Importance where **changes in ecological character have occurred, are occurring, or are likely to occur** as a result of technological developments, pollution or other human interference.
 - **It is maintained as part of the Ramsar List.** The Montreux Record was established by **Recommendation of the Conference of the Contracting Parties (1990)**. Sites may be

added to and removed from the Record only with the approval of the Contracting Parties in which they lie.

- Currently, two wetlands of India are in Montreux record: Keoladeo National Park (Rajasthan) and Loktak Lake (Manipur).
- **Chilka lake (Odisha)** was placed in the record but was later removed from it.

- **Significance of wetlands:**

- Wetlands provide a wide range of important ecosystem services, such as food, water, groundwater recharge, water purification, flood moderation, erosion control, microclimate regulation, landscape aesthetics and, of course, livelihood opportunities.
- They are in fact a major source of water and the principal place from which India's cities receive their freshwater.

4. International Day for Preservation of Ozone Layer

- The International Day for Preservation of Ozone Layer (or World Ozone Day) is observed every year on September 16 for the preservation of the Ozone Layer.
- **World Ozone Day 2019 Theme: 32 Years and Healing.**
- **Significance of the day:**
 - In 1994, the UN General Assembly proclaimed 16 September the International Day for the Preservation of the Ozone Layer, commemorating the date of the signing, in 1987, of the Montreal Protocol on Substances that Deplete the Ozone Layer.
- **What you need to know about the Ozone layer?**
 - Absorbs most of the Sun's ultraviolet light which is harmful to human life and other life forms.
 - Absorbs about 97 to 99% of ultraviolet rays and maintain the ozone-oxygen cycle.
- **Montreal Protocol on Substances that Deplete the Ozone Layer:**
 - Designed to reduce the production and consumption of ozone depleting substances in order to reduce their abundance in the atmosphere, and thereby protect the earth's fragile ozone Layer.
 - The original Montreal Protocol was agreed on 16 September 1987 and entered into force on 1 January 1989.
 - The Protocol includes a unique adjustment provision that enables the Parties to the Protocol to respond quickly to new scientific information and agree to accelerate the reductions required on chemicals already covered by the Protocol.
 - These adjustments are then automatically applicable to all countries that ratified the Protocol.

5. Global Tiger Day

- **Global Tiger Day**, often called **International Tiger Day**, is an annual celebration to raise awareness for tiger conservation, held annually on **29 July**.
- It was created in 2010 at the Saint Petersburg Tiger Summit.
- The **goal of the day** is to promote a global system for protecting the natural habitats of tigers and to raise public awareness and support for tiger conservation issues.
- 4th cycle of all India Tiger Estimation:
 - On the eve Global Tiger Day, a census report of tigers in India-'**The Tiger Estimation Report 2018**'- has been released.
- **Key findings:**
 - 2967 tigers are present in India. Highest number of tigers have found in **Madhya Pradesh** (526), after that Karnataka has 524 and Uttarakhand is accommodating 442 tigers.
 - In five years, the number of protected areas increased from 692 to over 860, community reserves from 43 to over 100.

- While the 2014 census pegged the total number of striped big cats in the country at 2,226, the 2010 census put the figure at 1,706 and the 2006 version at 1,411, indicating that tiger numbers have been on the up.
- While **Pench Tiger Reserve in Madhya Pradesh recorded the highest number of tigers**, Sathyamangalam Tiger Reserve in Tamil Nadu registered the “maximum improvement” since 2014.
- Chhattisgarh and Mizoram saw a decline in their tiger numbers while tiger numbers in Odisha remained constant. All other states witnessed a positive trend.
- India has one of the **lowest per capita forest areas** in the world. Depletion of forests is responsible for reduction of tiger habitats.
- **Conservation efforts:**
 - The National Tiger Conservation Authority (NTCA) has launched the **M-STripes (Monitoring System for Tigers – Intensive Protection and Ecological Status)**, a mobile monitoring system for forest guards.
 - At the **Petersburg Tiger Summit in 2010**, leaders of 13 tiger range countries resolved to do more for the tiger and embarked on efforts **to double its number in the wild, with a popular slogan ‘T X 2’**.
 - The **Global Tiger Initiative (GTI)** program of the World Bank, using its presence and convening ability, brought global partners together to strengthen the tiger agenda.
 - Over the years, the initiative has institutionalised itself as a separate entity in the form of the **Global Tiger Initiative Council (GTIC), with its two arms** –the Global Tiger Forum and the Global Snow Leopard Ecosystem Protection Program.
 - The **Project Tiger**, launched way back in 1973, has grown to more than 50 reserves amounting to almost 2.2% of the country’s geographical area.

6. World Environment Day

- On the eve of World Environment Day, Union Environment Ministry has launched a people’s campaign called **#SelfiewithSapling**, urging people to advocate the cause on social media.
- **World Environment Day:**
 - Every year **June 5th is World Environment Day**.
 - The World Environment Day is **a part of the United Nations Environmental Program (UNEP)** for creating awareness and action worldwide for the environment. The first World Environment Day was celebrated in 1973.
 - **The theme for 45th World Environment Day** is Beat Air Pollution. It is the call for action to combat the global crisis for ‘fresh air’.
 - **Host:** China.

Reports / Releases

1. India State of Forest Report (ISFR) 2019

- The report is published by the **Forest Survey of India (FSI)** which has been mandated to assess the forest and tree resources of the country including wall-to-wall forest cover mapping in a **biennial cycle**. Starting 1987, 16 assessment have been completed so far. ISFR 2019 is the 16th report in the series.
- The total forest and tree cover of the country is 80.73 million hectare which is 24.56 percent of the geographical area of the country.
- **Compared to the assessment of 2017, there is an increase of 5,188 sq. km in the total forest and tree cover of the country.**
- **Top three states showing increase in forest cover are Karnataka (1,025 sq. km) followed by Andhra Pradesh (990 sq km) and Kerala (823 sq km)."**
- **Area-wise Madhya Pradesh has the largest forest cover in the country** followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
- In terms of forest cover as percentage of total geographical area, the top five States are Mizoram (85.41%), Arunachal Pradesh (79.63%), Meghalaya (76.33%), Manipur (75.46%) and Nagaland (75.31%).
- **Mangrove cover** has been separately reported in the ISFR 2019 and the total mangrove cover in the country is 4,975 sq km. An increase of 54 sq Km in mangrove cover has been observed as compared to the previous assessment of 2017. Top three states showing mangrove cover increase are Gujarat (37 sq km) followed by Maharashtra (16 sq km) and Odisha (8 sq km).
- The extent of **bamboo bearing area** of the country has been estimated 16.00 million hectare. There is an increase of 0.32 million hectare in bamboo bearing area as compared to the last assessment of ISFR 2017. The total estimated green weight of bamboo culms is 278 million tonnes, slowly an increase of 88 million tonnes as compared to ISFR 2017.
- Under the current assessment the **total carbon stock** in country's forest is estimated 7,124.6 million tonnes and there an increase of 42.6 million tonnes in the carbon stock of country as compared to the last assessment of 2017.
- FSI's assessment is largely based on **digital data** whether it is satellite data, vector boundaries of districts or data processing of field measurements.

2. Carbon Disclosure Project

- The **CDP India annual report** has been released by **CDP (Carbon Disclosure Project) India**.
- The report examines **carbon reduction activities of companies**.
- India is now among **the top five countries globally when it comes to adopting science-based target initiatives (SBT)** with as many as 38 Indian companies in 2019 committing to going beyond policy requirements to plan urgent climate action, a significant rise from 25 firms in 2018.
- **About CDP:**
 - The CDP is a global disclosure system that enables companies, cities, states and regions to measure and manage their environmental impacts.
 - It collects and collates self-reported environmental data in the world.
 - It is aimed at **measuring the carbon reduction activities** undertaken by different companies and firms operating in various countries across the globe.

3. Global Climate Risk Index 2020

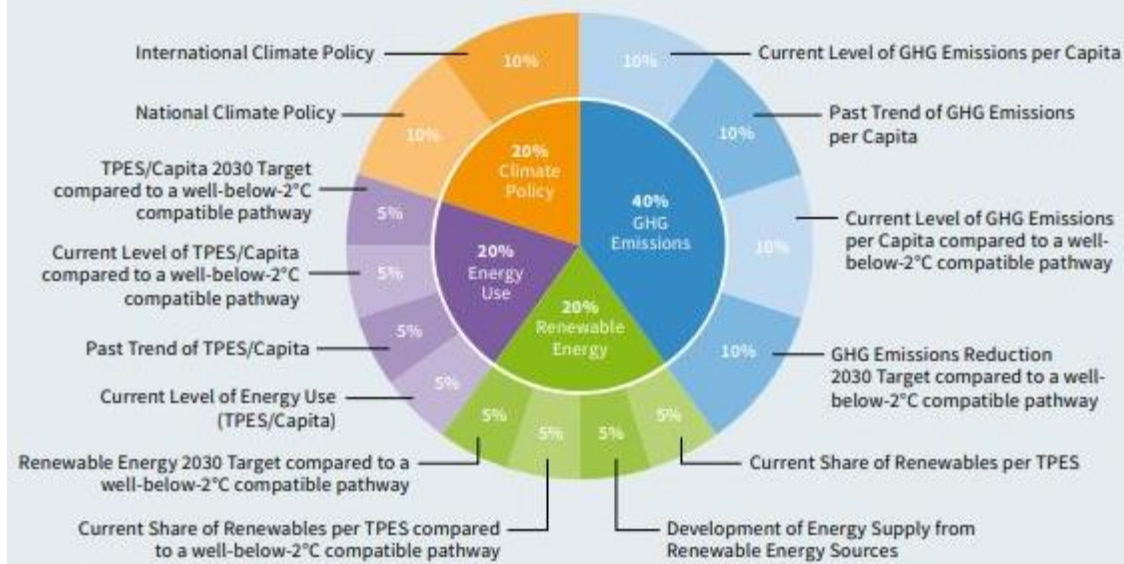
- The international environmental think tank '**Germanwatch**' has recently released **the Global Climate Risk Index 2020**.
- The annually published **Risk Index** analyses to what extent countries have been affected by the impacts of weather-related loss events (storms, floods, heat waves etc.).

- **Germanwatch**, based in Bonn and Berlin (Germany), is an independent development and environmental organisation which works for sustainable global development.
- India is the fifth most vulnerable country to climate change.

4. Climate Change Performance Index (CCPI) 2019

- The latest edition of **Climate Change Performance Index (CCPI)** was recently presented at **the climate summit in Madrid**.
- **What is Climate Change Performance Index (CCPI)?**
- Designed by **the German environmental and development organisation Germanwatch e.V.**
 - **Published** in cooperation with the NewClimate Institute and Climate Action Network International and with financial support from Barthel Foundation.
 - **Objective:** To enhance transparency in international climate politics.
 - **First published in 2005** and an updated version is presented at the UN Climate Change Conference annually.
 - **In 2017, the methodology of the CCPI was revised and adapted to the new climate policy framework of the Paris Agreement from 2015.** The CCPI was extended in order to include the measurement of a country's progress towards **the Nationally Determined Contributions (NDCs) and the country's 2030 targets**.
- The national performances are assessed based on 14 indicators in the following four categories:
 1. GHG Emissions (weighting 40%).
 2. Renewable Energy (weighting 20%).
 3. Energy Use (weighting 20%).
 4. Climate Policy (weighting 20%).
- India, at **rank 9**, joins **the top ten countries**.

Components of the CCPI



5. Brown to Green Report 2019

- **The 2019 Brown to Green Report** has been published by the **Climate Transparency partnership**, an international research collaboration.
- The report is **the most comprehensive review of G20 countries' climate performance**, mapping achievements and drawbacks in their efforts to reduce emissions, adapt to climate impacts and green the financial system.
- **Carbon emissions** from the world's 20 biggest economies, including India, are **rising**.

6. Water Quality Report

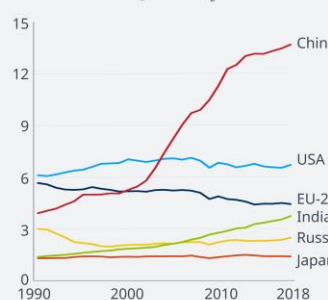
- The Centre has released **the Water Quality Report**.
- The report is in line with **the Jal Jeevan Mission** that was launched to provide clean and safe drinking water to all by 2024.
- **Background:**
 - In order to ensure that clean and safe drinking water is provided to all, Department of Consumer Affairs decided to undertake a study through **the Bureau of India Standards (BIS)** on the quality of piped drinking water being supplied in the country and also rank the States, Smart Cities and even Districts based on the quality of tap water.
- **Performance of cities:**
 1. In Delhi, all the samples drawn from various places did not comply with the requirements of the Indian Standard & failed on several parameters.
 2. All the 10 samples drawn from Mumbai were found to comply with the requirements.

7. Emissions Gap Report

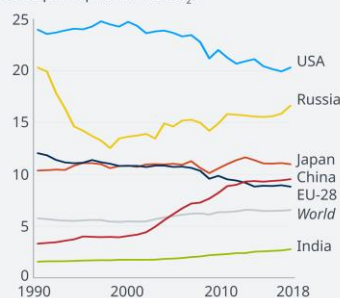
- The annual **United Nations Environment Programme (UNEP) flagship Emissions Gap Report** has been released.
- **What is the “Emissions Gap”?**
 - Also called as the **“Commitment Gap”**, it is **the difference between the low level of emissions that the world needs to drop to, compared with the projected level of emissions** based on countries' current commitments to decarbonization.
 - It measures **the gap between what we need to do and what we are actually doing to tackle climate change**.
- The Emissions Gap Report measures and projects three key trendlines:
 1. The amount of greenhouse gas emissions every year up to 2030.
 2. The commitments countries are making to reduce their emissions and the impact these commitments are likely to have on overall emission reduction.
 3. The pace at which emissions must be reduced to reach an emission low that would limit temperature increase to 1.5°C, affordably.
- **The top four emitters** (China, USA, EU and India) contributed to over 55% of the total emissions over the last decade, excluding emissions from land-use change such as deforestation.
- India is **the fourth-largest emitter of Green House Gases (GHGs)**. It is among a small group of countries that are on their way to achieve their self-declared climate targets under the Paris Agreement.

Top greenhouse gas emitters
Excluding land-use change emissions

Absolute emissions in Gigatons CO₂e



Emissions per capita in tons CO₂e



Source: UN Emissions Gap Report 2019

© DW

8. Global Mobility Report

- **Global Mobility Report** has been released by **Sustainable Mobility for All (SuM4All) initiative**.

What is SuM4All?

The SuM4All initiative, launched in 2017, is an umbrella platform that brings together 55 public and private organisations and companies to act collectively to implement the SDGs and transform the transport sector.

Key findings:

- Not a single country — developed or developing — is on track to achieve sustainability in the transportation sector and attain the Sustainable Development Goals (SDGs) mandated by the United Nations.

Global Roadmap for Action (GRA):

The report charted a **Global Roadmap for Action (GRA)**, which provides a catalogue of policy measures that have been used and tested around the world to achieve four policy goals — universal access, efficiency, green mobility and safety.

The GRA will **help countries to identify gaps, crucial steps and appropriate policies to ensure that transport sector contributes to attain the SDGs by 2030.**

9. Future of Earth 2020

- **The Future of Earth 2020 report** has been released by the South Asia **Future Earth Regional Office**, Divecha Centre for Climate Change, Indian Institute of Science.
- The report was prepared with the aim of **reducing carbon footprint and halting global warming below 2 degree Celsius by 2050.**
- **Five global risks:**
 - The report lists five global risks that have the potential to impact and amplify one another in ways that may cascade to create a global systemic crisis. They are:
 1. Failure of climate change mitigation and adaptation.
 2. Extreme weather events.
 3. Major biodiversity loss and ecosystem collapse.
 4. Food crises.
 5. Water crises.

10.State of India's Birds 2020

- The research titled **'State of India's Birds 2020' (SoIB)**, put together by over ten institutions and numerous citizen scientists, was released recently at the **United Nations 13th Conference of the Parties to the Convention on Migratory Species in Gandhinagar, Gujarat.**
- **Key findings:**
 1. The populations of raptors (eagles, hawks, kites, etc.), migratory seabirds and birds that live in specialised habitats were the most affected in the past decades.
 2. The number of birds in the Western Ghats, which is considered one of the world's foremost biodiversity hotspots, also declined by almost 75 per cent since 2000.
 3. **Indian Peafowl, the national bird, has shown a dramatic increase in both abundance and distribution across the country.** The number of house sparrows has also stabilised nationwide, although there is still a marked decline in their population in cities.
- **Categorisation:**
 1. It categorises 101 species as **'High Conservation Concern for India'.**
 2. 319 species are classified under **the 'Moderate Conservation Concern'** category. These species must be carefully monitored to rapidly detect and act upon signs of continuing decline.

11. World Air Quality Report 2019

- **World Air Quality Report 2019** was released by the pollution tracker IQAir and Greenpeace.
- The ranking is based on a comparison of PM 2.5 levels.
- **Bangladesh emerged as the most polluted country for PM 2.5.** Pakistan, Mongolia, Afghanistan and India followed behind respectively.
- The report also points India's launch of the country's **first National Clean Air Programme (NCAP)** which aims to reduce PM 2.5 and the bigger particulate PM 10 air pollution in 102 cities by 20-30% by 2024 compared to 2017 levels.
- **Background:**
 - PM 2.5 includes pollutants such as sulfate, nitrates and black carbon. Exposure to such particles has been linked to lung and heart disorders and can impair cognitive and immune functions.

MOST POLLUTED CITIES IN 2019

Rank	City	PM2.5 (micrograms/cu. m)
1	Ghaziabad (India)	110.2
2	Hotan (China)	110.1
3	Gujranwala (Pak)	105.3
4	Faisalabad (Pak)	104.6
5	Delhi (India)	98.6
6	Noida (India)	97.7
7	Gurgaon (India)	93.1
8	Raiwind (Pak)	92.2
9	Greater Noida (India)	91.3
10	Bandhwari (India)	90.5

MOST POLLUTED COUNTRIES (ACCOUNTING FOR POPULATION)

Rank	Country	PM2.5 (micrograms/cu. m)	Population
1	Bangladesh	83.30	166 mn
2	Pakistan	65.81	201 mn
3	Mongolia	62.00	3 mn
4	Afghanistan	58.80	36 mn
5	India	58.08	1,354 mn

12. Special Report on the Ocean and Cryosphere in a Changing Climate

- The Intergovernmental Panel on Climate Change (IPCC) released - '**Special Report on the Ocean and Cryosphere in a Changing Climate**'. The report underlines the dire changes taking place in oceans, glaciers and ice-deposits on land and sea.
- It was prepared following an IPCC Panel decision in 2016 to prepare three Special Reports and follows the Special Reports on Global Warming of 1.5°C, and on Climate Change and Land (SRCCL).

13. Composite Water Management Index (CWMI)

- **NITI Aayog** has released its report on Composite Water Management Index (CWMI).
- NITI Aayog has ranked all states in the index on the composite water management, comprising 9 broad sectors with 28 different indicators covering various aspects of ground water, restoration of water bodies, irrigation, farm practices, drinking water, policy and governance.
- **Gujarat is ranked one** in the reference year (2017-18).

14. COMPREHENSIVE CENSUS OF ORCHIDS OF INDIA

- Orchids can be broadly categorised into three life forms:
 - **epiphytic** (plants growing on another plants including those growing on rock boulders and often termed lithophyte).
 - **terrestrial** (plants growing on land and climbers).
 - **mycoheterotrophic** (plants which derive nutrients from mycorrhizal fungi that are attached to the roots of a vascular plant).
- **State-wise distribution:**
 - **Himalayas, North-East parts of the country and Western Ghats are the hot-spots of the beautiful plant species.**
 - The highest number of orchid species is recorded from Arunachal Pradesh with 612 species, followed by Sikkim 560 species and West Bengal; Darjeeling Himalayas have also high species concentration, with 479 species.
 - While north-east India rank at the top in species concentration, the Western Ghats have high endemism of orchids.
 - Kerala has 111 of these endemic species while Tamil Nadu has 92 of them.

- Among the 10 bio geographic zones of India, the Himalayan zone is the richest in terms of orchid species followed by Northeast, Western Ghats, Deccan plateau and Andaman & Nicobar Islands.
- **Protection:** The entire orchid family is listed **under appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)** and hence any trade of wild orchid is banned globally.

15. Not all animals migrate by choice' Campaign

- **UN Environment India and Wildlife Crime Control Bureau (WCCB)** of India have launched an awareness campaign 'Not all animals migrate by choice'.
- **About the campaign:**
 - The campaign aims at creating awareness and garnering public support for the protection and conservation of wildlife, prevention of smuggling and reduction in demand for wildlife products.
 - The campaign also complements worldwide action on illegal trade in wildlife through UN Environment's global campaign, **Wild for Life**.
 - In the first phase of the campaign, Tiger, Pangolin, Star Tortoise and Tokay Gecko have been chosen as they are highly endangered due to illegal trading in International markets.
- **About WCCB:**
 - Wildlife Crime Control Bureau is a **statutory multi-disciplinary body** established by the Government of India under the Ministry of Environment and Forests, to combat organized wildlife crime in the country.
- **Under Section 38 (Z) of the Wild Life (Protection) Act, 1972, it is mandated:**
 - to collect and collate intelligence related to organized wildlife crime activities and to disseminate the same to State and other enforcement agencies for immediate action so as to apprehend the criminals.
 - to establish a centralized wildlife crime data bank.
 - co-ordinate actions by various agencies in connection with the enforcement of the provisions of the Act.
 - assist foreign authorities and international organization concerned to facilitate co-ordination and universal action for wildlife crime control.
 - capacity building of the wildlife crime enforcement agencies for scientific and professional investigation into wildlife crimes and assist State Governments to ensure success in prosecutions related to wildlife crimes.
 - advise the Government of India on issues relating to wildlife crimes having national and international ramifications, relevant policy and laws.
 - Assist and advise the Customs authorities in inspection of the consignments of flora & fauna as per the provisions of Wild Life Protection Act, CITES and EXIM Policy governing such an item.

International Efforts

1. Asian Elephant Specialist Group (AsESG)

- **The International Union for Conservation of Nature's (IUCN) 10th Asian Elephant Specialist Group (AsESG)** Meeting was held recently at **Kota Kinabalu in Sabah, Malaysia**.
- **The IUCN Asian Elephant Specialist Group (AsESG)** is a global network of specialists (both scientists and non-scientists) concerned with the study, monitoring, management, and conservation of **Asian Elephants (*Elephas maximus*)**.
- **Aim:** To promote the long-term conservation of Asia's elephants and, where possible, the recovery of their populations to viable levels.
- AsESG is an integral part of **the Species Survival Commission (SSC)** of the International Union for Conservation of Nature (IUCN).
- **Functions:**
 - It shall provide the best available scientifically grounded evidence to the abundance, distribution, and demographic status of Asian elephant populations in **all 13 range states**.
 - **Gajah** is the bi-annual journal of the IUCN/SSC Asian Elephant Specialist Group (AsESG).

2. Adaptation Fund

- **What is Adaptation fund?**
 - Established under **the Kyoto Protocol of the UN Framework Convention on Climate Change**.
 - It finances projects and programmes that help vulnerable communities in developing countries adapt to climate change.
 - Initiatives are based on country needs, views and priorities.
- **Financing:**
 - **The Fund is financed in part by government and private donors**, and also from **a two percent share of proceeds of Certified Emission Reductions (CERs)** issued under the Protocol's **Clean Development Mechanism projects**.
- **Governance:**
 - The **Fund is supervised and managed by the Adaptation Fund Board (AFB)**. The AFB is composed of 16 members and 16 alternates and meets at least twice a year.
 - **The World Bank** serves as trustee of **the Adaptation Fund on an interim basis**.

3. European Green Deal

- On the sidelines of Madrid Climate talks, the European Union came up with an announcement **on additional measures it would on climate change**. It is Called **the European Green Deal**.
- **Overview and key features of the European Green Deal:**
- **Climate neutrality:** The EU has promised to bring a law, binding on all member countries, to ensure it becomes "climate neutral" by 2050.
 - **What is it?** Climate neutrality, sometimes also expressed as a state of net-zero emissions, is achieved when a country's emissions are balanced by absorptions and removal of greenhouse gases from the atmosphere. Absorption can be increased by creating more carbon sinks like forests, while removal involves technologies like carbon capture and storage.
- **Increase in 2030 emission reduction target:**
 - In its climate action plan declared under the Paris Agreement, the EU was committed to making a 40 per cent reduction in its emissions by 2030 compared to 1990 levels. It

is now promising to increase this reduction to at least 50 per cent and work towards 55 per cent.

- The EU is now the first major emitter to agree to the 2050 climate neutrality target.
- The EU also happens to be **only one among major emitters to retain the 1990 baseline for emission cuts**, originally mandated under **the Kyoto Protocol** for all developed countries. Most other countries have shifted their baselines to 2005 or even later under the 2015 Paris Agreement.
- **What else is expected from developed regions like EU?**
 - EU has not been fulfilling all its climate obligations. **The Kyoto Protocol required the rich and developed countries to provide finance and technology to the developing countries to help them fight climate change.**

4. International Treaty of Plant Genetic Resources for Food and Agriculture (ITPGRFA)

- **The eighth session** of the Governing Body of **International Treaty of Plant Genetic Resources for Food and Agriculture (ITPGRFA)** was held in Rome, Italy.
- During the session, informed the delegates about the uniqueness of Indian legislation **“Protection of Plant Varieties and Farmers’ Rights (PPV&FR) Act”** to protect Farmers’ Rights and breeder’s rights.
- **About the treaty:**
 - **The International Treaty on Plant Genetic Resources for Food and Agriculture** was adopted by the **Thirty-First Session of the Conference of the Food and Agriculture Organization** of the United Nations on 3 November 2001.
 - It is also known as **Seed Treaty** as it is a comprehensive international agreement for ensuring food security through the conservation, exchange and sustainable use of the world’s Plant Genetic Resources for Food and Agriculture (PGRFA).
- **The Treaty aims at:**
 1. recognizing the enormous contribution of farmers to the diversity of crops that feed the world;
 2. establishing a global system to provide farmers, plant breeders and scientists with access to plant genetic materials;
 3. ensuring that recipients share benefits they derive from the use of these genetic materials with the countries where they have been originated.
- **Main Provisions:**
 - **Multilateral system:** The treaty puts 64 of our most important crops – crops that together account for 80 percent of the food we derive from plants – into **an easily accessible global pool of genetic resources** that is freely available to potential users in the Treaty’s ratifying nations for some uses.
 - **Access and benefit sharing:** The Treaty facilitates access to the genetic materials of the 64 crops in the Multilateral System for research, breeding and training for food and agriculture. **Those who access the materials must be from the Treaty’s ratifying nations and they must agree to use the materials totally for research, breeding and training for food and agriculture. The Treaty prevents the recipients of genetic resources from claiming intellectual property rights** over those resources in the form in which they received them.
 - **Farmers’ rights:** The Treaty recognizes the enormous contribution farmers have made to the ongoing development of the world’s wealth of plant genetic resources. It calls for protecting the traditional knowledge of these farmers, increasing their participation in national decision-making processes and ensuring that they share in the benefits from the use of these resources.
 - **Sustainable use:** The Treaty helps maximize the use and breeding of all crops and promotes development and maintenance of diverse farming systems.
- **The Protection of Plant Varieties and Farmers’ Rights (PPV&FR) Act, 2001:**

- Enacted by India in 2001 adopting *sui generis system*.
- It is **in conformity with International Union for the Protection of New Varieties of Plants (UPOV), 1978**.
- The legislation **recognizes the contributions of both commercial plant breeders and farmers in plant breeding activity and also provides to implement TRIPs** in a way that supports the specific socio-economic interests of all the stakeholders including private, public sectors and research institutions, as well as resource-constrained farmers.
- **Rights under the Act:**
 - **Breeders' Rights:** Breeders will have exclusive rights to produce, sell, market, distribute, import or export the protected variety. Breeder can appoint agent/ licensee and may exercise for civil remedy in case of infringement of rights.
 - **Researchers' Rights:** Researcher can use any of the registered variety under the Act for conducting experiment or research. This includes the use of a variety as an initial source of variety for the purpose of developing another variety but repeated use needs prior permission of the registered breeder.
- **Farmers' Rights:**
 1. A farmer who has evolved or developed a new variety is entitled for registration and protection in like manner as a breeder of a variety;
 2. Farmers variety can also be registered as an extant variety;
 3. A farmer can save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under the PPV&FR Act, 2001 in the same manner as he was entitled before the coming into force of this Act provided farmer shall not be entitled to sell branded seed of a variety protected under the PPV&FR Act, 2001;
 4. Farmers are eligible for recognition and rewards for the conservation of Plant Genetic Resources of land races and wild relatives of economic plants;
 5. There is also a provision for compensation to the farmers for non-performance of variety under Section 39 (2) of the Act, 2001 and
 6. Farmer shall not be liable to pay any fee in any proceeding before the Authority or Registrar or the Tribunal or the High Court under the Act.

5. Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC)

- Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC) is **a principle within the United Nations Framework Convention on Climate Change (UNFCCC)**.
- It acknowledges **the different capabilities and differing responsibilities of individual countries in addressing climate change**.
- Reflecting CBDR-RC, **the Convention divided countries into "Annex I" and "non-Annex I,"** the former generally referring to developed countries and the latter to developing countries.
- Under the Convention **Annex I countries have a greater mitigation role than non Annex-I countries**.
- CBDR-RC and the annex classifications were **codified in the 1997 Kyoto Protocol**, and Annex I country emissions reductions were legally bound.

6. US Exiting the Paris Agreement

- United States initiated the process of leaving **the Paris Agreement**, notifying the United Nations of its withdrawal from the landmark climate deal. The withdrawal will **take effect one year from delivery of the notification**.
- After it leaves, **the US will be the only country left out of the global protocol**.
- **What is the Paris Agreement?**

- The Paris Agreement of 2016 is a historic international accord that brings almost 200 countries together in setting **a common target to reduce global greenhouse emissions in an effort to fight climate change.**
- The pact seeks to keep global temperature rise to below 2 degrees Celsius from pre-industrial levels, and to try and limit the temperature increase even further to 1.5 degrees Celsius.
- To this end, each country has pledged to implement targeted action plans that will limit their greenhouse gas emissions.
- The Agreement asks rich and developed countries to provide financial and technological support to the developing world in its quest to fight and adapt to climate change.
- **How does a country leave the Agreement?**
 - **Article 28** of the Paris Agreement allows countries to leave the Paris Agreement and lays down the process for leaving.
 - A country can only give a notice for leaving at least three years after the Paris Agreement came into force.
 - The withdrawal is not immediate, however. It takes effect one year after the submission of the notice. It means the United States will be out of Paris Agreement only on November 4 next year.
- **Is it possible that the US returns to the Paris Agreement at a later date?**
 1. It can indeed, return. There is no bar on a country rejoining the Paris Agreement.
 2. It is also possible that the United States does a rethink and actually never leaves the Paris Agreement. It has one full year to reconsider its decision.
- **But assuming the US finally walks, will it mean the end of its entire association with the war on climate change?**
 - No, the US will not be entirely missing from the climate negotiations.
 - While it is pulling out of the Paris Agreement, it remains part of the UNFCCC, the mother agreement that was finalised in 1994.
 - The Framework Convention was the first international agreement to identify and acknowledge the problem of climate change.
 - It had laid down the principles and guidelines to achieve the objective of stabilising the greenhouse gas concentrations in the atmosphere to levels that would cause least damage to climate system.
 - The Paris Agreement is an instrument of the Framework Convention to achieve that objective.
 - The United States will be out of the Paris Agreement, but by virtue of being a signatory to the UNFCCC would continue to be a part of the other processes and meetings under the Framework Convention.

7. Green Climate Fund

- In a move that may positively impact over 10 million people living on the coastline, India has kicked-off **a USD 43 million project to boost climate resilience in three coastal states of Andhra Pradesh, Maharashtra and Odisha in partnership with the United Nations Development Programme (UNDP).**
- The project is funded by **the Green Climate Fund.**
- **About GCF:**
 - The GCF was **set up in 2010** under the UNFCCC's **financial mechanism to channel funding from developed countries to developing countries** to allow them to mitigate climate change and also adapt to disruptions arising from a changing climate.
- **How it helps?**
 - The Green Climate Fund will support projects, programmes, policies and other activities in developing country Parties using thematic funding windows.

- It is intended to be the centrepiece of efforts to raise Climate Finance of \$100 billion a year by 2020.
- The Fund will promote the paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change.
- The Fund will strive to maximize the impact of its funding for adaptation and mitigation, and seek a balance between the two, while promoting environmental, social, economic and development co-benefits and taking a gender-sensitive approach.
- **Who will govern the Fund?**
 - The Fund is governed and supervised by a Board that will have full responsibility for funding decisions and that receives the guidance of **the Conference of Parties (COP)**. The Fund is accountable to, and functions under the guidance of, the COP.

8. EU declares Climate Emergency

- **European Union (EU)** has become **the first multilateral bloc to declare climate emergency**. A resolution in this regard was recently passed.
- **Who else have declared climate emergency?**
 - Similar climate emergency declarations have already been made in several EU member states, including Spain, France and the United Kingdom. Outside Europe only Canada, Argentina and Bangladesh have declared a climate emergency.
- **What is Climate Emergency?**
 - There is no single definition of what that means but many local areas say they want **to be carbon-neutral by 2030**.
 - It varies. For example, for UK government it is **to reduce carbon emissions by 80% (compared to 1990 levels) by 2050**.

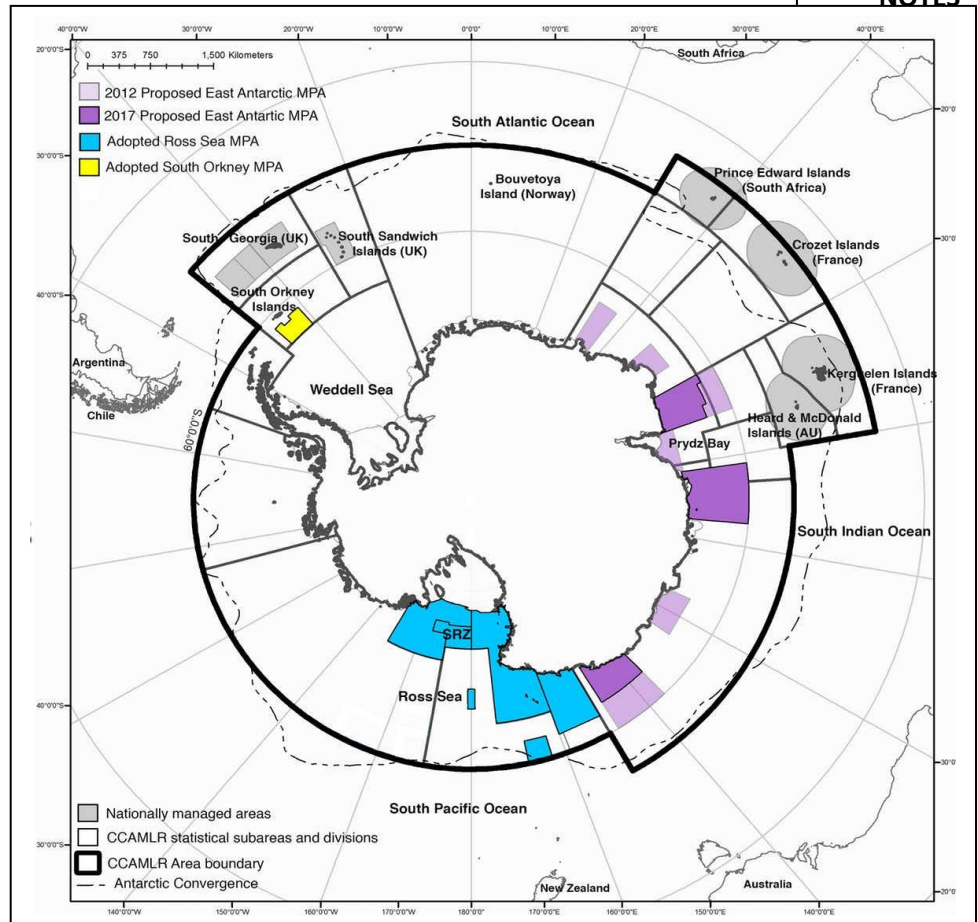
9. Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAIC) Expedition

- India's Vishnu Nandan will be the only Indian aboard **the multidisciplinary drifting observatory for the Study of Arctic Climate (MOSAIC) expedition**.
- He will be aboard the German research vessel **Polarstern**, anchored on a large sheet of sea ice in the Central Arctic, drifting along with it during the pitch-black Polar winter.
- **About MOSAiC:**
 - Spearheaded by **the Alfred Wegener Institute in Germany**.
 - It is the **largest ever Arctic expedition in history**.
 - It will be **the first to conduct a study of this scale at the North Pole for an entire year**.
 - The aim of the expedition will be **to parameterise the atmospheric, geophysical, oceanographic and all other possible variables in the Arctic, and use it to more accurately forecast the changes in our weather systems**.
 - The international expedition will involve more than 60 institutions from 19 countries.
- **Significance:**
 - MOSAiC will contribute to a quantum leap in our understanding of the coupled Arctic climate system and its representation in global climate models.
 - The focus of MOSAiC lies on direct in-situ observations of the climate processes that couple the atmosphere, ocean, sea ice, biogeochemistry, and ecosystem.

10. East Antarctic Marine Protected Area

- This protected area was **proposed by Australia and the European Union**.

- The area would conserve examples of biodiversity in **the high latitudes of the Indian sector of the Southern Ocean**.
- The area contains distinctive deep water flora and fauna and supports important ecosystem roles, such as feeding areas for marine mammals, penguins and other seabirds.
- **Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)** already has two existing **marine protected areas (MPAs)**, one on the South Orkney Islands southern shelf (established in 2009), and the other in the Ross Sea region (established in 2016).



11. Basel Ban Amendment

- The **1995 Basel Ban Amendment**, a global waste dumping prohibition, has become an international law after **Croatia (97th country to ratify) ratified it on September 6, 2019**.
- **What next?**
 - It will become a new Article in the Convention and will **enter into force in the 97 countries after 90 days — on December 5**.
- **Basel Convention — Control of Transboundary Movements of Hazardous Wastes and Their Disposal:**
 - Opened for signature on 22 March 1989
 - entered into force on 5 May 1992
 - Parties — 187.
 - It is an international treaty that was designed **to reduce the movements of hazardous waste between nations**, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs).
 - It **does not address the movement of radioactive waste**.

About the 1995 Basel Ban Amendment:

- Adopted by the parties to the **Basel Convention in 1995**.
- To protect human health and the environment against **the adverse effects of hazardous wastes**.
- **The amendment prohibits** all export of hazardous wastes, including electronic wastes and obsolete ships from 29 wealthiest countries of the Organization of Economic Cooperation and Development (OECD) to non-OECD countries.

12. Global Coalition to protect Pollinators

- The initiative to form a coalition was taken by the Netherlands on December 12, 2016 at the **Conference of the Parties–Convention of Biological Diversity held in Mexico**.

- It was formed to follow up on the findings of IPBES Assessment on Pollinators, Pollination and Food Production, which found that many of the world's pollinator species are on the decline.
- **Joining the coalition means adopting the following measures:**
 - Taking action to protect pollinators and their habitats by developing and implementing national pollinator strategies.
 - Sharing experience and lessons learnt in developing and implementing national pollinator strategies, especially knowledge on new approaches, innovations and best practices.
 - Reaching out to seek collaboration with a broad spectrum of stakeholders—countries as well as businesses, NGOs, farmers and local communities.
 - Developing research on pollinator conservation.
 - Supporting and collaborating with each other—and those parties that are willing to join the coalition.

13. International Solar Alliance (ISA)

- The International Solar Alliance (ISA) is an alliance of more than 122 countries initiated by India, most of them being sunshine countries, which lie either completely or partly between the Tropic of Cancer and the Tropic of Capricorn, now **extended to all members of UN**.
- The **Paris Declaration establishes ISA as an alliance dedicated to the promotion of solar energy among its member countries**.
- **Objectives:** The ISA's major objectives include global deployment of over 1,000GW of solar generation capacity and mobilisation of investment of over US\$ 1000 billion into solar energy by 2030.
- **What it does?** ISA brings together countries with rich solar potential to aggregate global demand, thereby reducing prices through bulk purchase, facilitating the deployment of existing solar technologies at scale, and promoting collaborative solar R&D and capacity building.
- **When it entered into force?** When the ISA Framework Agreement entered into force on December 6th, 2017, ISA formally became a de-jure **treaty based International Intergovernmental Organization**, headquartered at Gurugram, India.

14. World Wildlife Fund (WWF)

- It is an international non-governmental organization Founded in 1961
- Headquarter — Gland (Switzerland).
- Aim: wilderness preservation & the reduction of human impact on the environment
- It is the world's largest conservation organization
- **Objectives:**
 - Conserving the world's biological diversity
 - Ensuring that the use of renewable natural resources is sustainable
 - Promoting the reduction of pollution and wasteful consumption
- **Reports & programmes:**
 - **Living Planet Report**— published every two years by WWF since 1998; it is based on a Living Planet Index and ecological footprint calculation Earth hour
 - **Debt-for-nature swaps**—financial transactions in which a portion of a developing nation's foreign debt is forgiven in exchange for local investments in environmental conservation measures.
 - **Marine Stewardship Council (MSC)** — independent non-profit organization which sets a standard for sustainable fishing
 - **Healthy Grown Potato** — eco-brand that provides high-quality, sustainably grown, packaged, and shipped potatoes to consumers by leveraging integrated pest management (IPM) farming practices on large scale farms.

Protocols / Conventions

1. Coastal Regulation Zone (CRZ) Rules

- In India, **the Coastal Regulation Zone (CRZ) Rules** govern **human and industrial activity close to the coastline**, in order to protect the fragile ecosystems near the sea. They **restrict certain kinds of activities** — like large constructions, setting up of new industries, storage or disposal of hazardous material, mining, reclamation and bunding — within a certain distance from the coastline.
- **Background:**
 - After the passing of **the Environment Protection Act in 1986**, CRZ Rules were first framed in 1991. After these were found to be restrictive, the Centre notified new Rules in 2011, which also included exemptions for the construction of the Navi Mumbai airport and for projects of the Department of Atomic Energy.
 - In 2018, **fresh Rules were issued**, which aimed to remove certain restrictions on building, streamlined the clearance process, and aimed to encourage tourism in coastal areas.
- **What is the regulation zone?**
 - In all Rules, the regulation zone has been defined as **the area up to 500 m from the high-tide line**.
- **What are the restrictions?**
 - **The restrictions depend on criteria** such as the population of the area, the ecological sensitivity, the distance from the shore, and whether the area had been designated as a natural park or wildlife zone.
 - The latest Rules have **a no-development zone of 20 m for all islands close to the mainland coast, and for all backwater islands in the mainland**.
- For the so-called **CRZ-III (Rural) areas**, two separate categories have been stipulated.
 1. **In the densely populated rural areas (CRZ-IIIA)** with a population density of 2,161 per sq km as per the 2011 Census, **the no-development zone is 50 m from the high-tide level, as against the 200 m stipulated earlier**.
 2. **CRZ-IIIB category (rural areas with population density below 2,161 per sq km) areas** continue to have **a no-development zone extending up to 200 m from the high-tide line**.
- **Implementation:**
 - While the CRZ Rules are made by the Union environment ministry, **implementation is to be ensured by state governments through their Coastal Zone Management Authorities**.
 - The states are also supposed to frame their own coastal zone management plans in accordance with the central Rules.

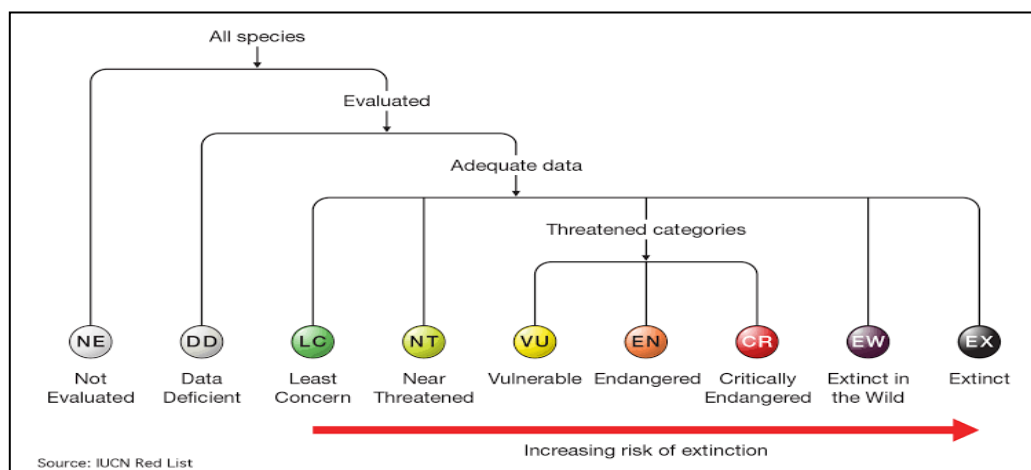
2. Centre eases CRZ rules for 'Blue Flag' beaches

- Centre eases CRZ rules for 'Blue Flag' beaches.
- This is **to help States construct infrastructure and enable them to receive 'Blue Flag' certification**.
- **Need:**
 - The Blue Flag certification requires beaches to **create certain infrastructure** — portable toilet blocks, grey water treatment plants, a solar power plant, seating facilities, CCTV surveillance and the like. However, **India's CRZ laws don't allow the construction of such infrastructure on beaches and islands**.
- **Blue flag programme:**
 - The Blue Flag Programme for beaches and marinas is run by the international, non-governmental, non-profit organisation **FEE (the Foundation for Environmental Education)**.

- It **started in France in 1985** and has been implemented in Europe since 1987, and in areas outside Europe since 2001, when South Africa joined.
- **Definition:**
 - The 'Blue Flag' beach is an 'eco-tourism model' and marks out beaches as providing tourists and beachgoers clean and hygienic bathing water, facilities/amenities, a safe and healthy environment, and sustainable development of the area.
- **Key facts:**
 - Japan and South Korea are the only countries in South and south-eastern Asia to have Blue Flag beaches.
 - **Spain tops the list with 566 such beaches;** Greece and France follow with 515 and 395, respectively.
- **Criteria:**
 - There are nearly 33 criteria that must be met to qualify for a Blue Flag certification, such as the water meeting certain quality standards, having waste disposal facilities, being disabled- friendly, have first aid equipment, and no access to pets in the main areas of the beach. **Some criteria are voluntary and some compulsory.**
- **Beaches identified in India:**
 - **13 pilot beaches** have been identified for the certification.
 - **These include** Ghoghala Beach (Diu), Shivrajpur beach (Gujarat), Bhogave (Maharashtra), Padubidri and Kasarkod (Karnagaka), Kappad beach (Kerala) etc.
 - **Chandrabhaga beach** of Odisha's Konark coast has completed the Blue Flag certification process.

3. IUCN Red List of Threatened Species

- The **International Union for the Conservation of Nature (IUCN)** has added about **1,840 new species to its updated "Red List of Threatened Species"**. The list now contains over 30,000 species under threat of disappearing.
- **What is IUCN red list of threatened species?**
 - It is the world's most comprehensive **inventory of the global conservation status of plant and animal species.**
- **How are species categorised?** It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species.
- **The IUCN Red List Categories:**
 - The IUCN Red List Categories define the extinction risk of species assessed. **Nine categories extend from NE (Not Evaluated) to EX (Extinct).**
 - Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species are considered to be threatened with extinction.
- **The IUCN system uses a set of five quantitative criteria to assess the extinction risk of a given species. In general, these criteria consider:**
 1. The rate of population decline.
 2. The geographic range.
 3. Whether the species already possesses a small population size.
 4. Whether the species is very small or lives in a restricted area.
 5. Whether the results of a quantitative analysis indicate a high probability of extinction in the wild.



CRITERIA ⇒ ↓ CATEGORY	A Population trend % decline	B Geographic distribution Area in km ²	C & D Population size Number of mature individuals	E Extinction % probability
EXTINCT				
EX: Extinct	Certainty that the last wild individual has died			
EW: Extinct in the Wild	Certainty that the last wild individual has died, but captive individuals persist			
THREATENED				
CR: Critically Endangered	≥80 ^{A2/3/4} to ≥90 ^{A1}	<10 ^{B2} to <100 ^{B1}	<50 ^{D1} to <250 ^C	≥50 in 10yr or 3ge ^C
EN: Endangered	≥50 ^{A2/3/4} to ≥70 ^{A1}	<500 ^{B2} to <5,000 ^{B1}	<250 ^{D1} to <2,500 ^C	≥20 in 20yr or 5ge ^C
VU: Vulnerable	≥30 ^{A2/3/4} to ≥50 ^{A1}	<2,000 ^{B2} to <20,000 ^{B1}	<1,000 ^{D1} to <10,000 ^C or <20km ^{D2} or ≤5 sites ^{D2}	≥10 in 100 yr
NOT THREATENED				
NT: Near Threatened	Close to qualifying among threatened categories			
LC: Least Concern	Widespread and abundance taxa			
UNKNOWN STATUS				
DD: Data Deficient	Not enough information to asses extinction risk			
NE: Not Evaluated	Not assessed against criteria			
REGIONAL (in addition to global categories)				
RE: Regionally Extinct	Extinct regionally but not elsewhere			
NA: Not Applicable	Individuals are vagrant, outside their natural range or introduced for no conservation purposes			

Superindexes indicate codes for criteria A to D and sub-criteria 1 to 4 — yr = years, ge = generations

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

- It is an International agreement to **regulate worldwide commercial trade in wild animal and plant species**.
- It restricts trade in items made from such plants and animals, such as food, clothing, medicine, and souvenirs.
- It was signed on March 3, 1973 (Hence world wildlife day is celebrated on march 3).
- It is **administered by the United Nations Environment Programme (UNEP)**.
- Secretariat — Geneva (Switzerland).
- CITES is **legally binding on state parties to the convention**, which are obliged to adopt their own domestic legislation to implement its goals.
- Classifications:**
 - It classifies plants and animals according to three categories, or appendices, based on how threatened. They are.
 - Appendix I:** It lists species that are in danger of extinction. It prohibits commercial trade of these plants and animals except in extraordinary situations for scientific or educational reasons.
 - Appendix II species:** They are those that are not threatened with extinction but that might suffer a serious decline in number if trade is not restricted. Their trade is regulated by permit.

- **Appendix III species:** They are protected in at least one country that is a CITES member states and that has petitioned others for help in controlling international trade in that species.
- STAR TORTOISE, OTTERS GET HIGHER PROTECTION AT CITES:
 - India's proposal to upgrade the protection of **star tortoises (*Geochelone elegans*)**, **the smooth-coated otter (*Lutrogale perspicillata*)** and **small-clawed otters (*Anonyx cinereus*)** in CITES have been approved.
 - These species have been listed under **Appendix I of CITES** and will now enjoy the highest degree of protection as there will be a complete international ban enforced on their trade.

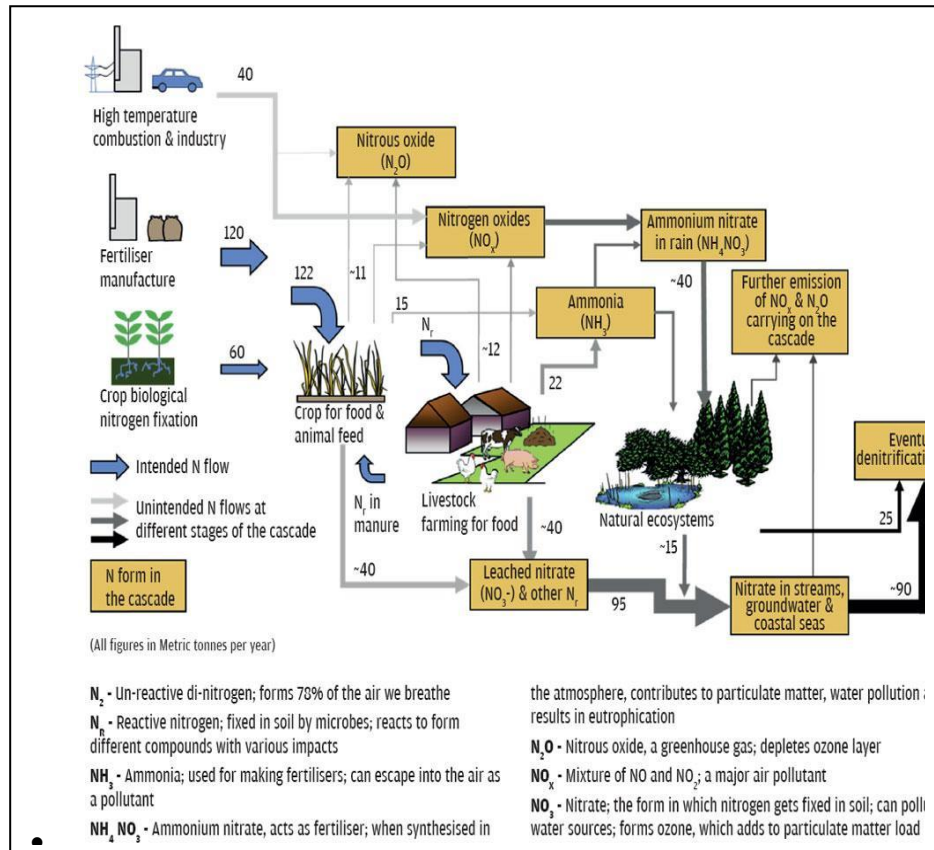
5. C40 Clean Air Cities Declaration

- **'Clean Air Cities Declaration'** was unveiled at the **C40 World Mayors Summit in Copenhagen, an event that occurs once every three years and is designed to implement "substantive clean air policies by 2025"**.
- **About C40 Clean Air Cities Declaration:**
 - Through this Declaration, mayors commit to **using their power and influence to reduce air pollution and work towards meeting the World Health Organization's Air Quality Guidelines**.
 - This means cities will continually reduce their local emissions, and advocate for reductions in regional emissions, resulting in continuous declines in air pollution levels that move towards the WHO guidelines.
- **Signatories of the declaration pledge to:**
 - Set ambitious pollution reduction targets within two years that meet or exceed national commitments, putting them on a path towards meeting World Health Organization guidelines;
 - Implement substantive clean air policies by 2025 that address the unique causes of pollution in their cities; and
 - Publicly report progress on achieving these goals.

6. UNEP Colombo Declaration

- **UN Environment Programme (UNEP)** member states recently adopted the **"Colombo Declaration"** which calls for **tackling global nitrogen challenge**.
- **How Nitrogen turned into pollutant from nutrient how it is affecting health and environment?**
 1. Nitrogen is **an inert gas** that's necessary for life. But we're changing it into forms that are harmful, overloading the environment with it, and throwing the natural nitrogen cycle out of whack.
 2. **Nitrogen compounds running off farmland have led to water pollution problems** around the world, while nitrogen emissions from industry, agriculture and vehicles make a big contribution to air pollution.
 3. **Over 80% of the nitrogen in soil is not utilised by humans.** While over four-fifths of the nitrogen is used to feed livestock, only about six per cent reaches humans in case of non-vegetarian diet, as compared to the 20% that reaches the plate of a vegetarian.
 4. **Nitrogen becomes a pollutant when it escapes into the environment and reacts with other organic compounds.** It is either released into the atmosphere, gets dissolved in water sources such as rivers, lakes or groundwater, or remains in the soil. While it might lead to favourable growth of species that can utilise this nutrient, nitrogen as a pollutant is often detrimental to the environment and health.
 5. According to the World Health Organization, **nitrate-contaminated drinking water can cause reduced blood function, cancer and endemic goiters.** Surplus inputs of nitrogen compounds have been found to cause soil acidification. The lowering pH, as a result of

the acidification, can lead to nutrient disorders and increased toxicity in plants. It may also affect natural soil decomposition.



7. Species included in Appendix I of UN Convention on Migratory Species

- The **Great Indian Bustard, Asian Elephant and Bengal Florican** have been included in **Appendix I of UN Convention on Migratory Species**.
 - This was done at the ongoing 13th Conference of the Parties (COP) to the Convention on Migratory Species (CMS) in Gandhinagar (Gujarat).
 - India has been designated the President of the COP for the next three years.
- About Asian Elephant:**
 - Found in** India, Nepal, Bangladesh, Bhutan and Myanmar.
 - IUCN status:** Endangered.
 - It is also listed in **Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** and **Schedule I of the Wildlife (Protection) Act, 1972**.
- About Great Indian Bustard:**
 - It is **one of the heaviest flying birds in the world**.
 - Its largest populations are **found in the Indian state of Rajasthan**.
 - State bird of Rajasthan**.
 - It is listed as '**Critically Endangered**' on the IUCN Red List.
 - It is also listed in **Appendix I of CITES and Schedule I of the Indian Wildlife (Protection) Act, 1972**.
- About Bengal Florican:**
 - In India it is found in Uttar Pradesh, Assam and Arunachal Pradesh.
 - It has been listed as '**Critically Endangered**' on the IUCN Red List.
 - The bird is listed under **Schedule I of the Wildlife Protection Act of India, 1972 and Appendix I of CITES**.
- About CMS:**

- In order to protect the migratory species throughout their range countries, a Convention on Conservation of Migratory Species (CMS), has been in force, under the aegis of **United Nations Environment Programme**.
- Also referred to as **the Bonn Convention**, it provides **a global platform for the conservation and sustainable use of migratory animals and their habitats** and brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range.
- **Classification of species:**
 - Under this convention, migratory species threatened with extinction are listed on Appendix I and Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention.
 - **CMS is only global and UN-based intergovernmental organization** established exclusively for conservation and management of terrestrial, aquatic and avian migratory species throughout their range.
- **What are migratory species?**
 - Migratory species are those animals that move from one habitat to another during different times of the year, due to various factors such as food, sunlight, temperature, climate, etc.

8. United Nations Convention to Combat Desertification (UNCCD)

- The 14th meeting of the Conference of Parties to the United Nations Convention to Combat Desertification (UNCCD COP 14) was held in New Delhi.
- India took over **the Presidency of the COP from China**.
- Framework for the Assessment of Benefits of Action/Cost of Inaction for Drought Preparedness report was released at the 14th Conference of Parties (COP14) to the United Nations Convention to Combat Desertification (UNCCD).
- **About UNCCD:**
 - Established in **1994**.
 - It is the sole legally binding international agreement linking environment and development to sustainable land management.
 - It is **the only convention stemming from a direct recommendation of the Rio Conference's Agenda 21**.
 - To help publicise the Convention, **2006 was declared "International Year of Deserts and Desertification"**.
 - **Focus areas:** The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.
 - **Aim:** Its 197 Parties aim, through partnerships, to implement the Convention and achieve the Sustainable Development Goals. The end goal is to protect land from over-use and drought, so it can continue to provide food, water and energy.
 - The Ministry of Environment, Forest and Climate Change is **the nodal Ministry for this Convention**.
- **Bamboonomics**
 - It is a **movement to combat desertification and climate change** which will involve the tribal community of India since they have the expertise in this field.
 - The movement will ensure that tribals can earn a livelihood without causing environmental harm.
 - It was launched at the COP 14 of the United Nations Convention to Combat Desertification (UNCCD).

9. Intergovernmental Panel on Climate Change (IPCC)

- IPCC Working Group III met in India for the preparation of Sixth Assessment Report.
- **What is Sixth Assessment Report (AR6)?**
 - It will examine topics such as the link between consumption and behaviour and greenhouse gas emissions, and the role of innovation and technology.
 - It will assess the connection between short to medium-term actions and their compatibility with the long-term temperature goal in the Paris Agreement.
 - It will assess mitigation options in sectors such as energy, agriculture, forestry and land use, buildings, transport and industry.
- **About the IPCC:**
 - The Intergovernmental Panel on Climate Change (IPCC) is the **UN body** for assessing the science related to climate change.
 - **Established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988.**
 - **Aim:** to provide political leaders with periodic scientific assessments concerning climate change, its implications and risks, as well as to put forward adaptation and mitigation strategies.
 - **Composition:** It has 195 member states.
- **The IPCC has three working groups:**
 - Working Group I, dealing with the physical science basis of climate change.
 - Working Group II, dealing with impacts, adaptation and vulnerability.
 - Working Group III, dealing with the mitigation of climate change.

10. BRS Conventions

- The 14th meeting of the Conference of the Parties (COP) to Basel Convention (COP 14) was held along with the 9th meeting of the COP to Rotterdam Convention and the 9th meeting of the COP to Stockholm Convention in Geneva, Switzerland.
- **Theme:** “Clean Planet, Healthy People: Sound Management of Chemicals and Waste”.
- **BRS Conventions – Brief Background:**
 - The Basel, Rotterdam and Stockholm (BRS) Conventions are multilateral environmental agreements, which share the **common objective of protecting human health and the environment from hazardous chemicals and wastes.**
- **(B) Basel Convention:**
 - The **Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal** was created to protect people and the environment from the negative effects of the inappropriate management of hazardous wastes worldwide. It is the most comprehensive global treaty dealing with hazardous waste materials throughout their lifecycles, from production and transport to final use and disposal.
- **(R) Rotterdam Convention:**
 - The **Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides** in international trade provides Parties with a first line of defence against hazardous chemicals. It promotes international efforts to protect human health and the environment as well as enabling countries to decide if they want to import hazardous chemicals and pesticides listed in the Convention.
- **(S) Stockholm Convention:**
 - The **Stockholm Convention on Persistent Organic Pollutants** is a global treaty to protect human health and the environment from highly dangerous, long-lasting chemicals by restricting and ultimately eliminating their production, use, trade, release and storage.

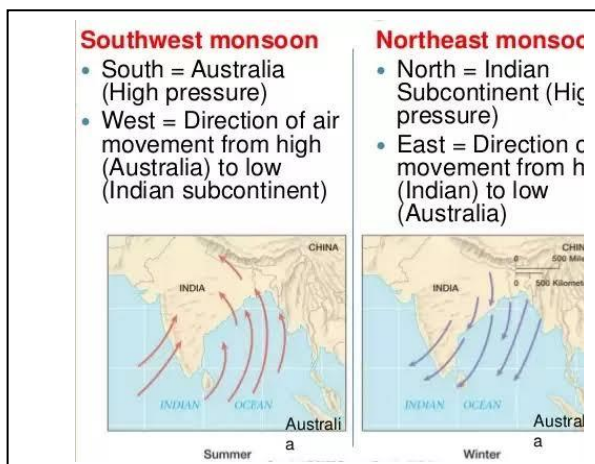
Geographical Features

1. Northeast Monsoon

- The year 2019 witnessed the rare meteorological coincidence of the northeast (winter) monsoon making its onset on the same day as the southwest monsoon withdrew officially.

- What is the northeast (winter) monsoon?**

- Though much less heard of, especially in the north of the country, **the northeast monsoon is as permanent a feature of the Indian subcontinent's climate system** as the summer monsoon.
- The India Meteorological Department (IMD) recognises **October to December as the time for the northeast monsoon.**
- During this period, **rainfall is experienced over Tamil Nadu, Kerala, and Andhra Pradesh, along with some parts of Telangana and Karnataka.**



- Difference between Northeast and Southwest monsoons?**

- The Northeast monsoon derives its name from **the direction in which it travels** — from the northeast to the southwest.
- Similarly, the summer monsoon moves in exactly the opposite direction — **from the southwest to the northeast**. That is why it is called the southwest monsoon.

- When does the northeast monsoon set in?**

- Although October, November, and December are supposed to comprise the northeast monsoon season, the rains normally set in only around October 20.
- The southern peninsular region receives rain in the first half of October as well, but that is attributable to the retreating summer monsoon.
 - The summer monsoon season ends on September 30 but the withdrawal does not happen overnight.
 - The southward withdrawal takes place over a period of three to four weeks. It usually starts around the second week of September and continues till about the second week of October, bringing rain as it retreats.

- Where does it rain during the northeast monsoon season?**

- The northeast monsoon brings rain to just **five of the 36 meteorological divisions in the country** — Tamil Nadu (which includes Puducherry), Kerala, Coastal Andhra Pradesh, Rayalaseema and South Interior Karnataka.
- As such, this season contributes only **11 per cent to India's annual rainfall of 1,187 mm**, compared to about 75 per cent in the summer monsoon season (the remaining rain comes in other non-monsoon months).

- Impact on northern states:**

- Many other parts of the country, like the Gangetic plains and northern states, also receive some rain in November and December but this is **not due to the northeast monsoon**.
- It is caused mainly by **the Western Disturbances**, an eastward-moving rain-bearing wind system that originates beyond Afghanistan and Iran, picking up moisture from as far as the Mediterranean Sea, even the Atlantic Ocean.
- In the higher reaches of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand, the precipitation is often in the form of snow.

2. Taal volcano

- It is a volcano on **the island of Luzon in Philippines**.
- It erupted recently.
- It is classified as a “**complex**” volcano. **A complex volcano, also called a compound volcano, is defined as one that consists of a complex of two or more vents, or a volcano that has an associated volcanic dome, either in its crater or on its flanks.**

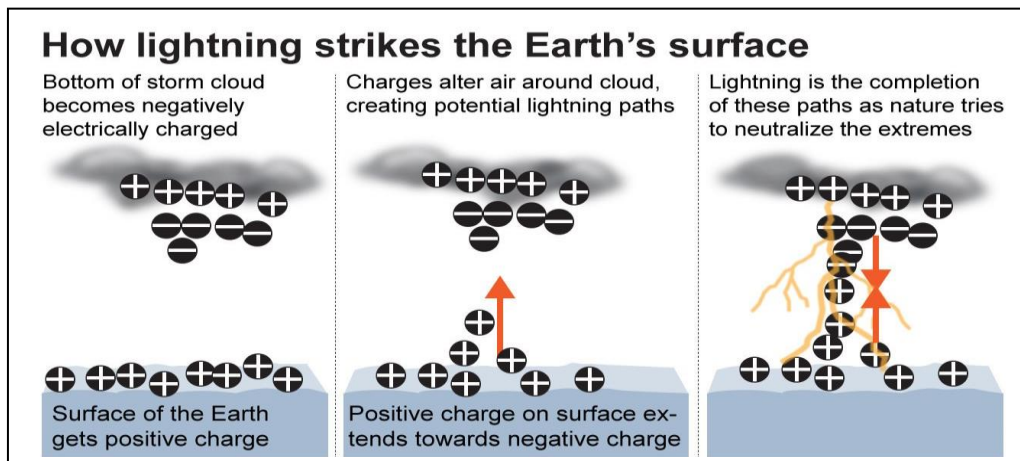
3. Winter solstice 2019

- **2019 Winter Solstice** was on **December 22**.
- **What is Winter Solstice?**
 - The winter solstice **happens every year when the Sun reaches its most southerly declination of -23.5 degrees**. In other words, it is when the North Pole is tilted farthest away from the Sun, delivering the fewest hours of sunlight of the year.
 - **The Sun is directly overhead of the Tropic of Capricorn in the Southern Hemisphere** during the December solstice and is closer to the horizon than at any other time in the year.
 - The day after **the winter solstice marks the beginning of lengthening days, leading up to the summer solstice in June**.
- **What does ‘solstice’ mean?**
 - The term ‘solstice’ derives from the Latin word ‘**solstitium**’, meaning ‘**Sun standing still**’. On this day the Sun seems to stand still at the Tropic of Capricorn and then reverses its direction as it reaches its southernmost position as seen from the Earth. Some prefer the more teutonic term ‘**sunturn**’ to describe the event.[

4. How Lightning Strikes?

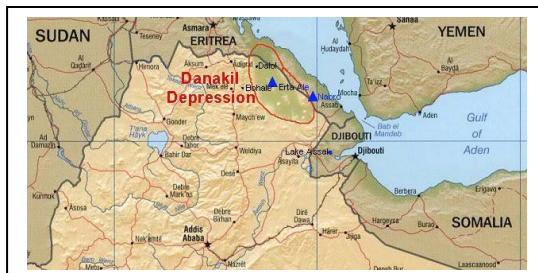
- As per IMD, With 9 lakh lightning strikes between April 1 and July 31 in 2019, **Odisha recorded the highest number of lightning strikes in the country**, while **Jammu and Kashmir recorded the least with about 20,000 strikes**.
- **Key findings:**
 1. The highest intensity lightning strikes were observed in Chhotanagpur plateau in East Singhbhum district of Jharkhand. The area also received the maximum number of strikes for a district.
 2. The number of lightning days (number of days when lightning strikes happened) across India has been increasing every month. July witnessed the highest number of lightning days, especially in the latter half due to the onset of monsoon.
- **What is lightning?**
 - It is **a very rapid — and massive — discharge of electricity** in the atmosphere, some of which is directed towards the Earth’s surface.
 - These discharges are **generated in giant moisture-bearing clouds that are 10-12 km tall**.
- **How does it strike?**
 1. The base of these clouds typically lies within 1-2 km of the Earth’s surface, while their top is 12-13 km away. **Temperatures towards the top of these clouds are in the range of minus 35 to minus 45 degrees Celsius**.
 2. As water vapour moves upward in the cloud, **the falling temperature causes it to condense. Heat is generated in the process, which pushes the molecules of water further up**.
 3. As they move to temperatures below zero degrees celsius, the water droplets change into small ice crystals. They continue to move up, gathering mass — until they are so heavy that they start to fall to Earth.
 4. This leads to a system in which, simultaneously, **smaller ice crystals are moving up and bigger crystals are coming down**.

5. **Collisions follow, and trigger the release of electrons** — a process that is very similar to the generation of sparks of electricity. As the moving free electrons cause more collisions and more electrons, **a chain reaction ensues**.
 6. This process results in a situation in which **the top layer of the cloud gets positively charged, while the middle layer is negatively charged**. The electrical potential difference between the two layers is huge — of the order of a billion to 10 billion volts. In very little time, **a massive current, of the order of 100,000 to a million amperes, starts to flow between the layers**.
 7. An enormous amount of heat is produced, and this leads to the heating of the air column between the two layers of the cloud. **This heat gives the air column a reddish appearance during lightning. As the heated air column expands, it produces shock waves that result in thunder.**
- **How does this current reach the Earth from the cloud?**
 - While **the Earth is a good conductor of electricity**, it is electrically neutral. However, in comparison to the middle layer of the cloud, it becomes positively charged. As a result, about 15%-20% of the current gets directed towards the Earth as well. It is this flow of current that results in damage to life and property on Earth.
 - There is **a greater probability of lightning striking tall objects** such as trees, towers or buildings. Once it is about 80-100 m from the surface, lightning tends to change course towards these taller objects. This happens because **air is a poor conductor of electricity**, and electrons that are travelling through air seek both a better conductor and the shortest route to the relatively positively charged Earth's surface.



5. Danakil Depression

- A new study says that **active and naturally occurring life cannot be sustained at Danakil**.
- **Why? It identifies two barriers:** magnesium-dominated brines that cause cells to break down; and an environment having simultaneously very low pH and high salt, a combination that makes adaptation highly difficult.
- **Where is Danakil?**
 - The Danakil Depression in **northeastern Ethiopia** is one of the world's hottest places, as well as one of its lowest, at 100 metres below sea level.
 - At the northern end of **the Great Rift Valley**, and **separated by live volcanoes from the Red Sea**, the plain was formed by the evaporation of an inland water body.
 - All the water entering Danakil evaporates, and no streams flow out from its extreme environment. It is covered with more than 10 lakh tonnes of salt.

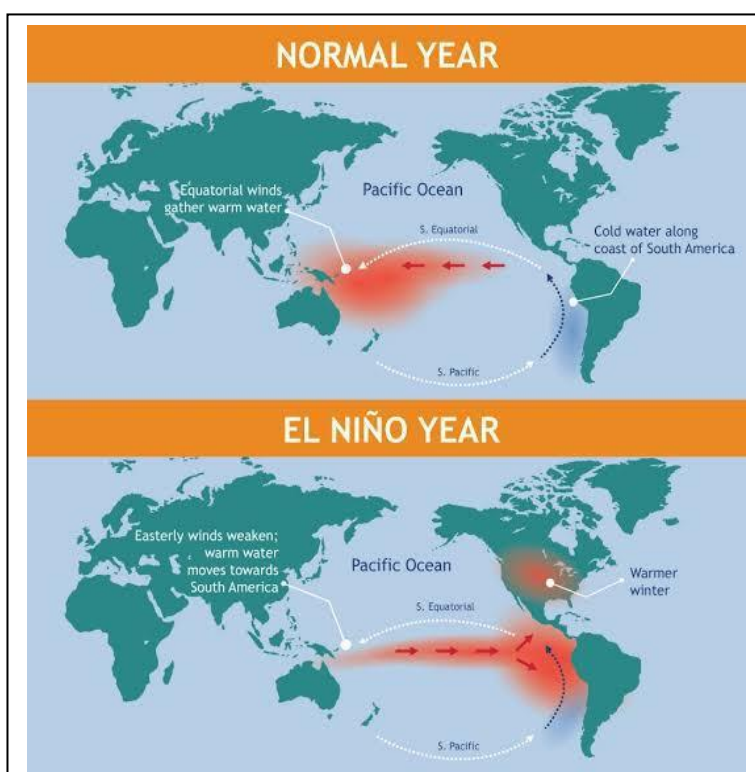


6. India's Cold Wave Zone

- India's cold-wave zone covers the north Indian states of Punjab, Himachal Pradesh, Uttarakhand, Delhi, Haryana, Rajasthan, Uttar Pradesh and also other states like Gujarat, Madhya Pradesh, and Bihar.
- Context:** India's cold-wave regions to have warm winter this year as per IMD.

7. El Niño

- In a new study, researchers have found that **because of climate change, extreme El Niño events are likely to become more frequent.**
- Key findings:**
 - There is a shift in El Niño behaviour since the late 1970s.
 - All events beginning in the eastern Pacific occurred prior to that time, while all events originating in the western-central Pacific happened since then.
 - Therefore, **climate change effects have shifted the El Niño onset location from the eastern Pacific to the western Pacific, and caused more frequent extreme El Niño events.**
- El Niños have become stronger and their pattern too has been changing, the world's first 400-year-long seasonal record of El Niño created by Australian scientists has revealed. Traditional El Niño events have also become more intense in nature.
- What revealed this?**
 - The El Niño trends of the past have been studied on the basis of **coral cores** spanning the Pacific Ocean.
 - It was made possible because **coral cores — like tree rings —** have centuries-long growth patterns and contain isotopes that can tell us a lot about the climate of the past. Hence, the key to unlocking the El Niño record was understanding that coral records contained enough information to identify seasonal changes in the tropical Pacific Ocean.
- What is El Niño?**
 - El Niño is **a climatic cycle characterised by high air pressure in the Western Pacific and low air pressure in the eastern.**
 - During this event, **there is a warming of the sea surface temperature in the eastern and central equatorial Pacific Ocean.**
 - It is **one phase of an alternating cycle known as El Niño Southern Oscillation (ENSO).**
- What causes El Niño?**
 - El Niño **sets in when there is anomaly in the pattern.**



1. **The westward-blowing trade winds weaken along the Equator** and due to changes in air pressure, **the surface water moves eastwards to the coast of northern South America.**
2. The **central and eastern Pacific regions warm up for over six months and result in an El Nino condition.**

- **Impact:**

1. The temperature of the water could rise up to 10 degrees Fahrenheit above normal.
2. Warmer surface waters increase precipitation and bring above-normal rainfall in South America, and droughts to Indonesia and Australia.
3. Favours eastern Pacific hurricanes and tropical storms. Record and unusual rainfall in Peru, Chile and Ecuador are linked to the climate pattern.
4. Reduces upwelling of cold water, decreasing the uplift of nutrients from the bottom of the ocean. This affects marine life and sea birds. The fishing industry is also affected.
5. A recent WHO report on the health consequences of El Nino forecasts a rise in vector-borne diseases, including those spread by mosquitoes, in Central and South America. Cycles of malaria in India are also linked to El Nino.

- **What is ENSO?**

- ENSO is nothing but **El Nino Southern Oscillation**. As the name suggests, it is an irregular periodic variation of wind and sea surface temperature that occurs over the tropical eastern Pacific Ocean. ENSO affects the tropics (the regions surrounding the equator) and the subtropics (the regions adjacent to or bordering the tropics). The warming phase of ENSO is called El Nino, while the cooling phase is known as La Nina.

- **What causes El Nino?**

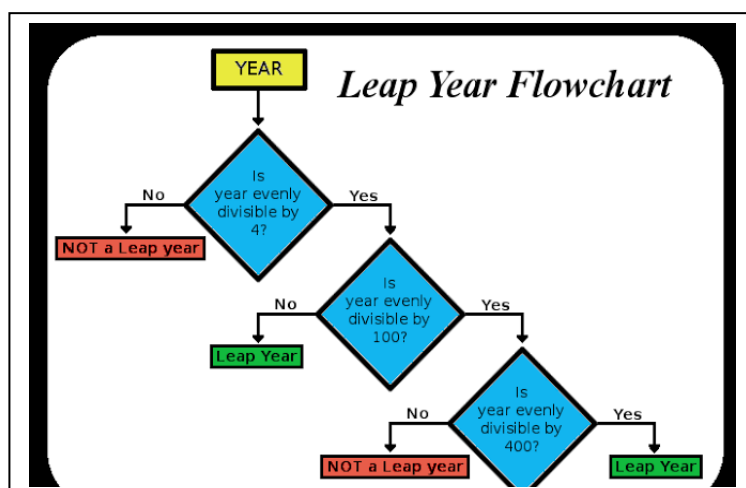
- El Nino sets in when there is anomaly in the pattern. The westward-blowing trade winds weaken along the Equator and due to changes in air pressure, the surface water moves eastwards to the coast of northern South America. The central and eastern Pacific regions warm up for over six months and result in an El Nino condition. The temperature of the water could rise up to 10 degrees Fahrenheit above normal. Warmer surface waters increase precipitation and bring above-normal rainfall in South America, and droughts to Indonesia and Australia.

8. Why we have leap years?

- The year **2020 is a 'leap year'**, meaning the month of **February will have 29 days instead of 28**, and the **total number of days will be 366 instead of 365**. This was also the case in 2016, and 2024 will again be a leap year.

- **Why do we have leap years?**

1. The time required by the Earth to complete its orbit around the Sun is approximately 365.242 days. But years are usually only 365 days.
2. To adjust for the extra 0.242 days in the orbital period, which becomes almost one full day in four years, the calendar adds an extra day once every four years.



3. This approximates the time to 365.25 days, which is close to the actual 365.242 days.

- **Exceptions:**

- In **the Gregorian calendar**, a century year (a year ending with 00) is not a leap year, even though it is a multiple of 4. Thus, the year 2100 will not be a leap year.
- To ensure that, some century years remain leap years. **In the Gregorian calendar, leap years include those century years which are exactly divisible by 400.** Thus, 2000 remained a leap year even though it ended with 00.

9. Hagibis Typhoon

- It is the latest typhoon and is said to be Japan's worst storm in decades.
- **What's the difference between hurricanes, cyclones and typhoons?**
 - Hurricanes, cyclones and typhoons are all tropical storms. They are all the same thing but are given different names depending on where they appear. When they reach populated areas they usually bring very strong wind and rain which can cause a lot of damage.
 - Hurricanes are tropical storms that form over the North Atlantic Ocean and Northeast Pacific. Cyclones are formed over the South Pacific and Indian Ocean. Typhoons are formed over the Northwest Pacific Ocean.

10. Mount Kilimanjaro

- Differently-abled man from Ernakulam district scales **Mount Kilimanjaro**.
- Mount Kilimanjaro is **a dormant volcano in Tanzania**.
- It is **the highest mountain in Africa**, with its summit about 4,900 metres (16,100 ft) from its base, and 5,895 metres (19,341 ft) above sea level.
- The first people known to have reached the summit of the mountain were **Hans Meyer and Ludwig Purtscheller**, in 1889.

11. Mt Paektu

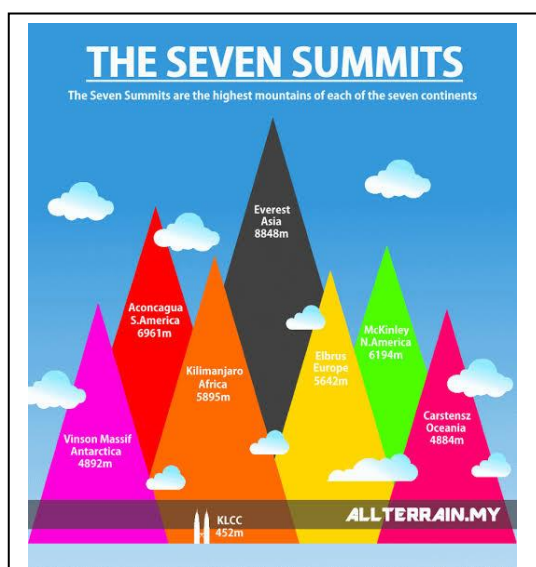
- Mount Paektu or **Changbai** (in Chinese) is a volcanic mountain that last erupted over 1,000 years ago.
- Situated at **the border between Democratic People's Republic of Korea and China**.
- At a height of about 9,000 feet, **it is also the highest peak in the Korean peninsula**.
- A reference to the mountain is made in **the South Korean national anthem as well**.

12. Mt. Aconcagua

- It is **the highest peak of the Andes Mountains in Argentina, South America**.
- It is **the highest mountain outside of Asia**, with a summit elevation of 6,960.8 metres.
- The mountain is **one of the so-called Seven Summits of the seven continents**.

13. Siachen glacier

- The **Siachen glacier** is "now open" for tourists and tourism.
- Lies in the **Karakoram Range system** which is a part of western Himalayas.
- Lies to the **south of the zone that separates Eurasian Plate** with the Indian Plate, which is the result of convergence boundary interaction in geographical terms.



- It is the **highest battle field** in the world and lies on LoC (Line of Control) between India and Pakistan. It has been continuously contested by Pakistan as its own part which has led to militarisation of the glacier.
- After the Indo-Pakistan war in 1971, an agreement was signed between the two countries in 1972, which came to be known as the **Shimla Agreement**, but it failed to clearly mention who controls the glacier.
- However, in 1984, the Pakistan army tried to enter the glacier, forcing India to launch a military operation known as "**Operation Meghdoot**" and since then we have control over the glacier. A ceasefire agreement was signed between India and Pakistan in 2003
- The glacier is the source of many rivers including **Nubra River**, a tributary of Shyok, which is a part of the Indus River System.
- Siachen Glacier also boasts of the **world's highest helipad built** by India at Point Sonam, to supply its troops. India also installed the world's highest telephone booth on the glacier.
- The region is also a home to rare **species** of snow leopard, brown bear etc which may be affected by military presence. This has led to talks in international forums about creating a "Peace Park" in the area and demilitarise it.

14. Saryu River

- 5.50 lakh earthen lamps on the banks of **Saryu River** has helped Uttar Pradesh enter into the Guinness Books of World Records for **lightening of record number of diyas on any occasion**.
- **Key facts:**
 - Sarayu flows through Uttarakhand and Uttar Pradesh. This river is of ancient significance, finding mentions in the Vedas and the Ramayana.
 - The Sarayu originates from Lake Mansarovar in the Himalayas and is also known as the Ghaghra and the Manas Nandini. It merges with the Ganga in Bihar's Saran district.
 - It forms at the confluence of the Karnali and Mahakali in Bahraich District.
 - Ayodhya is situated on the banks of this river.
 - It flows through the Kumaon Himalayas.

15. Mekong River

- Mekong's water levels fall as new Laos dam begins operations.
- The Mekong **originates in Tibet** and flows through China, Myanmar, Laos, Thailand, Cambodia and Vietnam.



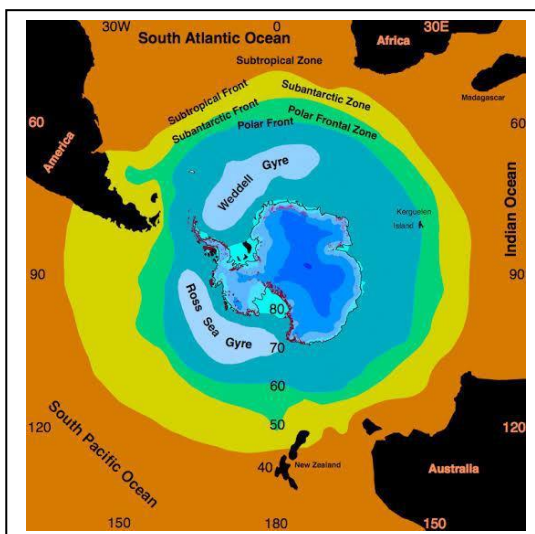
16. Burhi Dihing River

- A stretch of the eastern Assam's **Burhi Dihing River** was recently on fire for the last two days due to a leakage in the underwater oil pipeline.
- Dihing or Burhi Dihing is **a large tributary of the Brahmaputra River in Upper Assam**.
- **Originates** in the Eastern Himalayas (the Patkai Hills) in Arunachal Pradesh and flows through Tinsukia and Dibrugarh Districts in Assam to its **confluence with the Brahmaputra at Dihingmukh**.

17. ANDREX Project

- Scientists have discovered that, contrary to existing assumptions, biological processes far out at sea are the most important factors determining how the ocean absorbs carbon dioxide.

- This enhances the understanding of **the link between the Southern Ocean — next to Antarctica — and the atmospheric carbon dioxide levels.**
- Scientists studied data collected as part of the **ANDREX project (Antarctic Deep water Rates of Export)** which measured the physical, biological, and chemical properties of the waters in the gyre between 2008 and 2010.
- Significance:
 - Carbon dioxide is absorbed in the surface oceans and stored in the deep seas, gradually, over a timescale of 100s to 1,000s years.
 - The Southern Ocean plays a critical role in how the carbon dioxide is taken out of the atmosphere, and knowing how it functions helps scientists understand **this mechanism's role during dramatic climate transitions in the past, such as the ice ages, and better predict the current and future climate change.**
- **About ANDREX project:**
 - The project seeks **to assess the role of the Weddell gyre** in driving the southern closure of the meridional overturning circulation, in ventilating the deep global ocean, and in sequestering carbon and nutrients in the global ocean abyss.



18. Atlantic meridional overturning circulation (AMOC)

- Since the past 15 years, **Atlantic meridional overturning circulation (AMOC)** has been weakening — a development that could have dramatic consequences for Europe and other parts of the Atlantic rim. **Warming up of Indian Ocean** is said to be a key driver behind this.
- **How it affects?**
 - Warming in the Indian Ocean generates additional precipitation, which, in turn, draws more air from other parts of the world, including the Atlantic.
 - The higher level of precipitation in the Indian Ocean will reduce precipitation in the Atlantic and increase salinity in the waters.
- **What is the Atlantic Meridional Overturning Circulation?**
 - The Atlantic Meridional Overturning Circulation (AMOC) is a large system of ocean currents that carry warm water from the tropics northwards into the North Atlantic.
 - It aids in distributing heat and energy around the earth, as the warm water it carries releases heat into the atmosphere, and in absorbing and storing atmospheric carbon.
- **How does the AMOC work?**
 - The AMOC is a large system of ocean currents, like a conveyor belt, driven by differences in temperature and salt content — the water's density.
 - As warm water flows northwards it cools and some evaporation occurs, which increases the amount of salt. Low temperature and a high salt content make the water denser, and this dense water sinks deep into the ocean.
 - The cold, dense water slowly spreads southwards, several kilometres below the surface. Eventually, it gets
 - pulled back to the surface and warms in a process called “upwelling” and the circulation is complete.

19. Anthropocene

- A team of scientists have voted to declare “**Anthropocene**” as a new chapter in the Earth’s geological history- **the new epoch**. The result builds on an informal vote taken at the 2016 International Geological Congress in Cape Town, and lays the groundwork for a formal proposal by 2021 to the **International Commission on Stratigraphy**.
- What is it?**
 - Coined by **Paul Crutzen and Eugene Stoermer** in 2000 to denote the present geological time interval, Anthropocene has been used **to describe humanity’s large impact on the environment**.
 - Implications:** The move signals the end of the Holocene epoch, which began 12,000 to 11,600 years ago.

	Eon	Era	Period	Epoch	
<div>Younger</div> <div>Older</div>	Phanerozoic	Cenozoic	Quaternary	Holocene	← Today
				Pleistocene	← 11.8 Ka
			Neogene	Pliocene	
				Miocene	
		Paleogene		Oligocene	
				Eocene	
				Paleocene	← 66 Ma
		Mesozoic	Cretaceous	~	
			Jurassic	~	
			Triassic	~	
		Paleozoic	Permian	~	← 252 Ma
			Carboniferous	Pennsylvanian	~
				Mississippian	~
			Devonian	~	
			Silurian	~	
			Ordovician	~	
			Cambrian	~	
	Proterozoic	~	~	~	← 541 Ma
	Archean	~	~	~	← 2.5 Ga
	Hadean	~	~	~	← 4.0 Ga
					← 4.54 Ga

Disaster and Management

1. National Disaster Response Fund (NDRF)

- **National Calamity Contingency Fund (NCCF)** was renamed as **National Disaster Response Fund (NDRF)** with the enactment of **the Disaster Management Act in 2005**.
- Defined in **Section 46 of the Disaster Management Act, 2005 (DM Act)**.
- It is a fund **managed by the Central Government** for meeting the expenses for emergency response, relief and rehabilitation due to any threatening disaster situation or disaster.
- Constituted to supplement the funds of **the State Disaster Response Funds (SDRF)** of the states to facilitate immediate relief in case of calamities of a severe nature.
- **Key features of NDRF:**
 - Located in **the "Public Accounts"** of Government of India under **"Reserve Funds not bearing interest"**.
 - **Monitoring:** Department of Agriculture and Cooperation under Ministry of Agriculture (MoA) monitors relief activities for calamities associated with drought, hailstorms, pest attacks and cold wave /frost while rest of the natural calamities are monitored by Ministry of Home Affairs (MHA).
 - **Comptroller and Auditor General of India (CAG)** audits the accounts of NDRF.
- **What is it to be used for?**
 - NDRF amount can be **spent only towards meeting the expenses for emergency response, relief and rehabilitation**.
 - For projects exclusively **for the purpose of mitigation**, i.e, measures aimed at reducing the risk, impact or effect of a disaster or threatening disaster situation a separate fund called **National Disaster Mitigation Fund** has to be constituted.
- **Sources of Financing NDRF:**
 - Financed through **the levy of a cess on certain items**, chargeable to excise and customs duty, and approved annually through **the Finance Bill**.
 - The requirement for funds beyond what is available under the NDRF is met through general **budgetary resources**.
 - Currently, **a National Calamity Contingency Duty (NCCD)** is levied to finance the NDRF and additional budgetary support is provided as and when necessary.
 - A provision also exists in the DM Act **to encourage any person or institution to make a contribution to the NDRF**.

2. 'Red Atlas Action Plan Map' atlas and CFLOWS-Chennai

- Vice-President M Venkaiah Naidu recently unveiled **the 'Red Atlas Action Plan Map' atlas and the 'Coastal Flood Warning System App (CFLOWS-Chennai)' for flood mitigation in Chennai**, Tamil Nadu.
- **What is Red Atlas Action Plan Map?**
 - It is a first of its kind ready reckoner map, prepared by Union Ministry of Earth Sciences to aid state government of Tamil Nadu in effective flood mitigation in Chennai which witnessed the worst deluge in 2015.
 - The atlas is aimed at flood mitigation, preparedness, operations and management aspects.
- **Coastal Flood Warning System app for Chennai (CFLOWS- CHENNAI):**
 - Launched by NIOT.
 - It is **India's first integrated coastal flood warning system**.
 - It is an **integrated GIS-based decision support system** to provide forecast on potential inundation 10 days in advance.
 - It will be **hosted and made operational at National Centre for Coastal Research (NCCR)** with meteorological data inputs from India Meteorological Department (IMD), National Centre for Medium Range Weather Forecasting (NCMRWF) and Indian National Centre for Ocean Information Services (INCOIS).

- The system can *simulate the scenario and predict what will happen in a particular area.*

3. Coalition for Disaster Resilient Infrastructure (CDRI)

- ***Launched by Modi in September 2019 at the UN Secretary-General's Climate Action Summit in New York, US.***
- A platform where knowledge is generated and exchanged on different aspects of disaster and climate resilience of infrastructure.
- It will create a mechanism to assist countries to upgrade their capacities and practices, with regard to infrastructure development in accordance with their risk context and economic needs.
- ***Benefits and significance:***
 - This initiative will benefit all sections of society.
 - Economically weaker sections of society, women and children, are the most vulnerable to the impacts of disasters and hence, will be benefitted from the improvement of knowledge and practice in creating disaster resilient infrastructure.
 - It will also benefit all areas with high disaster risk.

4. International Day for Disaster Reduction

- International Day for Disaster Reduction was observed on October 13th.
- ***Theme:*** Reduce disaster damage to critical infrastructure and disruption of basic services.
- ***About Sendai Framework:***
 - The "Sendai Framework for Disaster Risk Reduction 2015-2030" was adopted during the ***Third UN World Conference on Disaster Risk Reduction held in Sendai, Japan in March, 2015.***
- ***Key features of the Sendai framework:***
 1. It is the first major agreement of the post-2015 development agenda, with seven targets and four priorities for action.
 2. It was endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR).
 3. The Framework is for 15-year. It is a voluntary and non-binding agreement which recognizes that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders.
 4. The new Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters.
- ***Implementation:***
 - The implementation of the Sendai Framework involves adopting integrated and inclusive institutional measures so as to work towards preventing vulnerability to disaster, increase preparedness for response and recovery and strengthen resilience.

Miscellaneous

1. Supreme Court bats against transfer of community resources

- Recently, the Supreme Court of India held that ***the Government has no right to transfer “invaluable” community resources like village water ponds to powerful people and industrialists for commercialisation of the property.***
- **Observations made by the Court:**
 1. Protection of such village commons is essential to safeguard the fundamental right guaranteed by **Article 21 of our Constitution.**
 2. These common areas are the lifeline of village communities, and often sustain various chores and provide resources necessary for life.
 3. The State cannot divest villagers of their existing source of water even if it promises to provide them an alternative site where the water body can be replicated. Such an attitude would display **“a mechanical application of environmental protection.”**
 4. There is no guarantee that the adverse effect of destroying the existing water body would be offset and people would be compelled to travel miles to access the alternative site.

2. Archaea

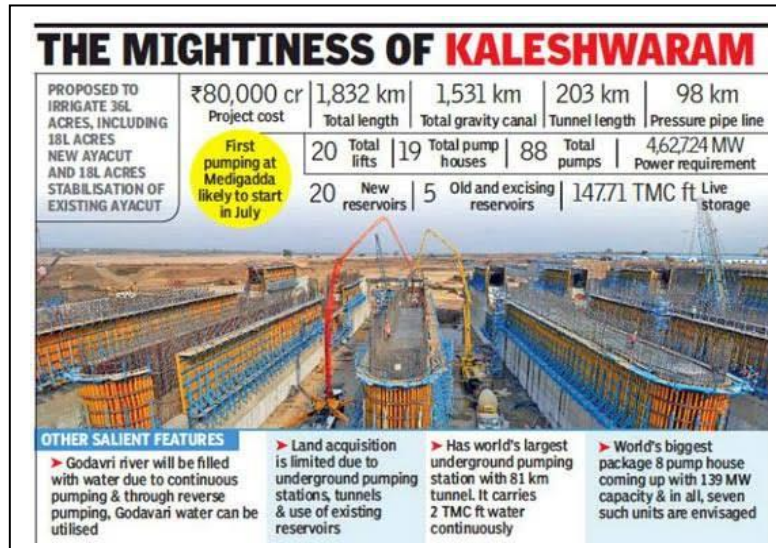
- They are **a primitive group of microorganisms** that thrive in extreme habitats such as hot springs, cold deserts and hypersaline lakes.
- These **slow-growing organisms** are also **present in the human gut**, and have a potential relationship with human health.
- They are known for **producing antimicrobial molecules, and for anti-oxidant activity** with applications in eco-friendly waste-water treatment.
- **Why in News?**
 - Scientists have reported a new **archaeon** (a kind of microorganism), which they discovered in **Sambhar Salt Lake in Rajasthan.**
 - It has been named **Natrialba swarupiae**, after Dr Renu Swarup, secretary, Department of Biotechnology.

3. Extra Neutral Alcohol (ENA)

- **Alcohol manufacturers** citing a shortage of domestic supplies have sought a reduction in import duty of **Extra Neutral Alcohol** to make it cost-effective for them to import from global markets.
- **What is ENA?**
 - It is **a byproduct of the sugar industry.**
 - **Formed from molasses** that are a residue of sugarcane processing.
 - It is **the primary raw material for making alcoholic beverages.**
- **Features:**
 - It is colourless food-grade alcohol that does not have any impurities.
 - It has a neutral smell and taste and typically contains over 95 per cent alcohol by volume.
- **Other applications of ENA:**
 1. An essential ingredient in the manufacture of cosmetics and personal care products such as perfumes, toiletries, hair spray, etc.
 2. Utilized in the production of some lacquers, paints and ink for the printing industry, as well as in pharmaceutical products such as antiseptics, drugs, syrups, medicated sprays.

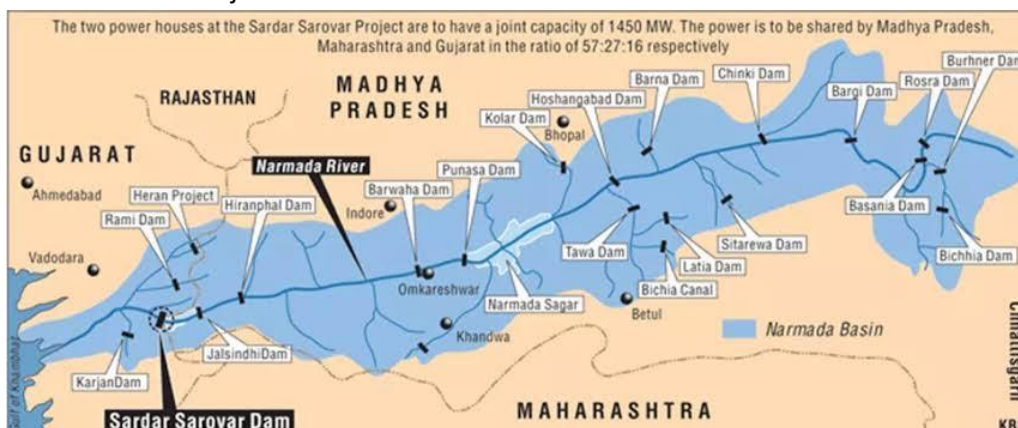
4. Kaleswaram project

- Telangana State government has requested the Centre to treat **Kaleshwaram Lift Irrigation Project (KLIP) as a National Project**.
- Why?**
 - National Projects are provided Central grant of 90% of the estimated cost** for their completion in a time bound manner.
- What's the project?**
 - The Kaleshwaram project is an off-shoot of the original **Pranahitha-Chevella Lift Irrigation Scheme**.
 - It is on **the Godavari River**.
 - The Centre under **the Andhra Pradesh Reorganisation Act, 2014 is mandated to support programmes for the development of backward areas in the successor States**, including expansion of physical and social infrastructure.
- What's unique?**
 - According to engineers, KLIP has many unique features, including the longest tunnel to carry water in Asia, running up to 81 km, between the Yellampally barrage and the Mallannasagar reservoir. The project would also utilise the highest capacity pumps, up to 139 MW, in the country to lift water.



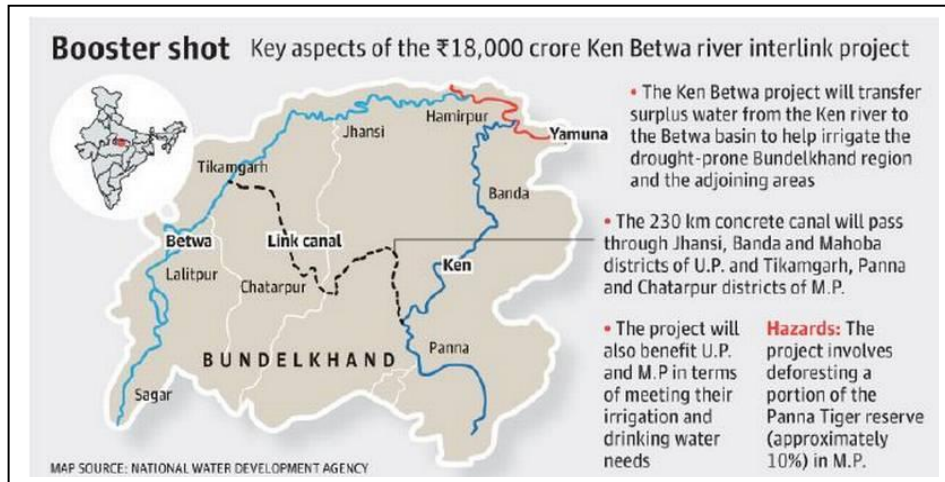
5. Sardar Sarovar Dam

- Taken up after the **Narmada Water Disputes Tribunal** gave its final award vis-à-vis Gujarat-Madhya Pradesh in 1979.
- Second biggest dam in terms of volume of concrete used in it.
- Third highest concrete dam** in India.
- Power generated from the dam would be shared among three states** — Madhya Pradesh, Maharashtra and Gujarat.



6. Ken-Betwa River Interlinking Project

- The government has said it is pushing Uttar Pradesh and Madhya Pradesh to make progress on **the Ken-Betwa river interlinking project**.



- What's the issue?**
 - The ₹18,000-crore project has been mired in several hurdles. The most recent one is a disagreement between the States on the share of water. There are outstanding environmental obstructions too. It **involves deforesting a portion of the Panna Tiger Reserve**.
- About Ken- Betwa project:**
 - Conceived as a two-part project, this is **the country's first river interlinking project**. It is perceived as a model plan for similar interstate river transfer missions.
 - The project aims **to transfer surplus water from the Ken river in MP to Betwa in UP to irrigate the drought-prone Bundelkhand region spread across the districts of two states** mainly Jhansi, Banda, Lalitpur and Mahoba districts of UP and Tikamgarh, Panna and Chhatrapur districts of MP.
- Key facts:**
 - Ken and Betwa rivers originate in MP and are the tributaries of Yamuna.
 - Ken meets with Yamuna in Banda district of UP and with Betwa in Hamirpur district of UP.
 - Rajghat, Paricha and Matatila dams are over Betwa river.
 - Ken River passes through Panna tiger reserve.

7. Coalbed Methane (CBM)

- India has the fifth-largest coal reserves in the world, and CBM has been looked at as a clean alternative fuel with significant prospects.
- The country's coal and CBM reserves are found in 12 states of India, with the Gondwana sediments of eastern India holding the bulk.
- The Damodar Koel valley and Son valley are prospective areas for CBM development.
- What is coalbed methane (CBM)?**
 - It is **an unconventional form of natural gas found in coal deposits or coal seams**.
 - CBM is **formed during the process of coalification, the transformation of plant material into coal**.
- CBM can be used**
 - In Power generation.
 - As Compressed natural gas (CNG) auto fuel.
 - As feedstock for fertilisers.
 - Industrial uses such as in cement production, rolling mills, steel plants, and for methanol production.

- **Challenges and concerns:**

1. Methane is **a greenhouse gas** emitted through CBM extraction. **Global methane emissions from coal mines are projected to account for approximately 8 percent of total global methane emissions.**
2. Disturbance of lands drilled and its effect on wildlife habitats results in **ecosystem damage.**
3. CBM production behavior is complex and difficult to predict in the early stages of recovery.
4. Another concern is the effect **water discharges from CBM development could potentially have on downstream water sources.**
5. **Disposal of the highly salinized water that must be removed in order to release the methane creates a challenge,** as its introduction into freshwater ecosystems could have adverse effects.

8. Bacteriophages

- They are the viruses that can kill the bacteria.
- They are comprised of a protein capsule around an RNA or DNA genome.
- They are ubiquitous viruses, found wherever bacteria exist.
- They are seen as **a possible therapy against multi-drug-resistant strains of many bacteria.**

9. Living Root Bridges

- Also known as **Jing Kieng Jri**, these are aerial bridges built by weaving and manipulating **the roots of the Indian rubber tree.**
- They have been serving **as connectors for generations in Meghalaya.**
- **Built over centuries**, the bridges, primarily **a means to cross streams and rivers**, have also become world-famous tourist attractions.

10. Malabar Tree Toad

- A Bengaluru-based non-profit is working to train and equip residents of villages in **the Western Ghats stretching from Maharashtra to Tamil Nadu** for mapping the range of an extremely rare species of toad- **Malabar Tree toad.**
- **About Malabar Tree Toad (MTT):**
 - It is a very rare species of amphibian endemic to the Ghats.
 - It is an endangered species that spends most of its life on trees, coming to the ground only during the first monsoon showers to mate.
 - The Western Ghats, where the MTT is found, is a biodiversity hotspot and is home to 179 recorded amphibian species, 80 per cent of which are not found anywhere else.

11. Haryana's Johads

- **What are they?** Johads are **community-owned rainwater storage wetland** mainly used for harnessing water resources.
- **Why in News?** Haryana state government has come out with a plan of rehabilitating over 16,400 ponds in rural areas across the state in order to analyze pond water to ascertain its suitability for irrigation and other uses.

12. What is Golden rice?

- It is **a genetically-engineered rice that contains beta-carotene.** Here, the traditional rice is changed by **inserting bacteria and daffodil and maize genes into it.**
- It is called golden rice because of **the golden colour of its grains.**
- It was claimed to be able to fight **Vitamin A deficiency**, which is the leading cause of blindness among children and **can also lead to death due to infectious diseases such as measles.**

13.1000 springs initiative

- It is an **online portal on GIS-based Spring Atlas with the hydrological and chemical properties of the springs mentioned.**
- **Aim:** To improve access to safe and adequate water for the tribal communities living in difficult and inaccessible part of rural areas in the country.
- It is an integrated solution around **natural springs.**
- **Key features:**
 - It includes the provision of infrastructure for piped water supply for drinking; provision of water for irrigation; community-led total sanitation initiatives; and provision for water for backyard nutrition gardens, generating sustainable livelihood opportunities for the tribal people.
- **Implementation:**
 - Under this initiative, more than 70 young tribal youths from the rural belt of three districts of Odisha namely, Kalahandi, Khandamal and Gajapati have been trained as barefoot hydro geologists by combining traditional and scientific knowledge for identification and mapping of springs, and undertaking rejuvenation and protection measures in their habitations.
- **What are Springs?**
 - Springs are natural sources of groundwater discharge and have been used extensively in the mountainous regions across the world.