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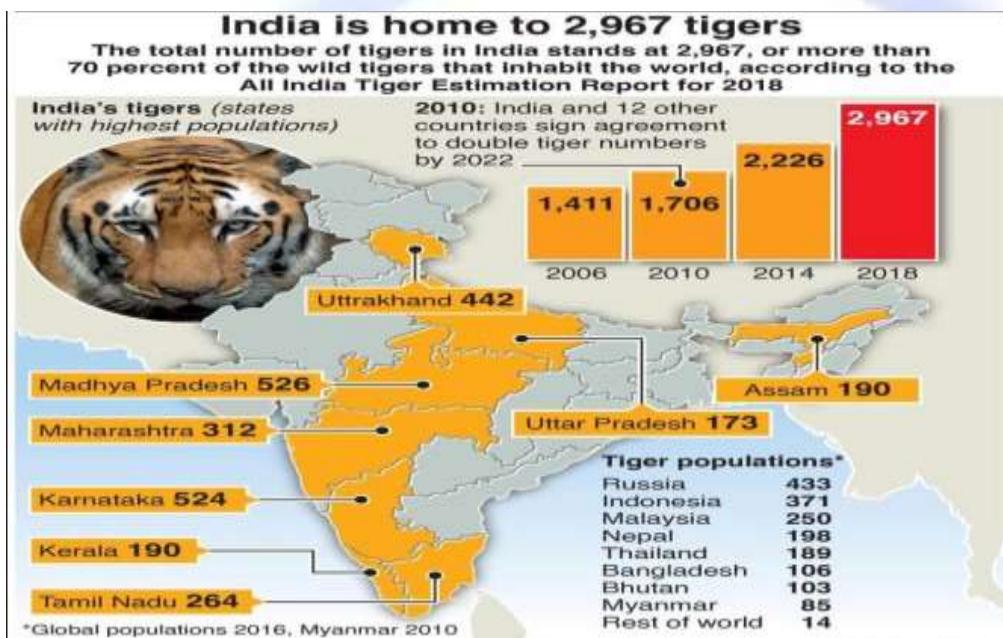
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1.National Tiger Conservation Authority

- It's a **statutory body** under the **Ministry of Environment Forests and Climate Change** constituted under enabling provisions of the **Wildlife (Protection) Act, 1972, under the amendment of 2006**
- Union minister for Environment is the **chairperson of NTCA**
- As per the WLPA, every **State Government has the authority to notify** an area as a tiger reserve. However, the **Tiger Conservation Plans sent by the state government need to be approved by the NTCA first**. Alternatively, Central Government via NTCA may advise the state governments to forward a proposal for creation



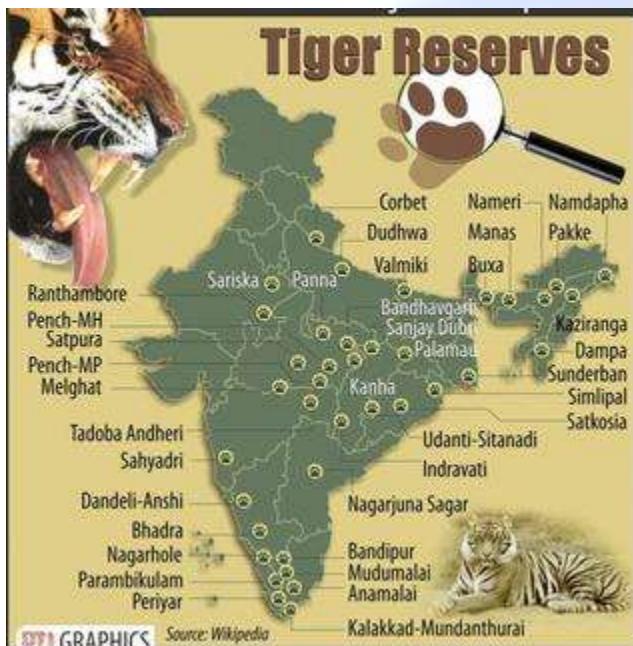
4th Tiger census:

According to results of the Tiger census, the total count of tigers has risen to 2,967 from 2,226 in 2014 — an increase of 741 individuals (aged more than one year), or 33%, in four years.

India has achieved the target of doubling the tiger count four years ahead of the deadline of 2022. St.Petersburg Declaration, of doubling Tiger population.

Tiger Sanctuaries: An evaluation of India's 50 tiger sanctuaries was also released along with the 4th National Tiger Estimation (Tiger census).

- Madhya Pradesh's **Pench Sanctuary** and Kerala's **Periyar sanctuary** emerged as the best-managed tiger reserves in the country.
- **Sathyamangalam Tiger Reserve** in Tamil Nadu registered the "maximum improvement" since 2014.
- **The Dampa and Rajaji reserves**, in Mizoram and Uttarakhand respectively are at the bottom of the list in terms of Tiger count.
- **No tiger** has been found in the **Buxa** (West Bengal), **Palamu** (Jharkhand) and **Dampa** (Mizoram) reserves.



The big cat count

The table shows the tiger population in India since the first tiger census in 2006. The Central India and Eastern Ghats landscape has seen the highest increase in tiger population since the 2014 cycle

Landscape	2006	2010	2014	2018
Shivalik Hills and Gangetic Plains	297	353	485	646
Central India and Eastern Ghats	601	601	688	1,033
Western Ghats	402	534	776	981
North East Hills and Brahmaputra	100	148	201	219
Sundarbans	NA	70	76	88

3.81
lakh sq. km. —
Forests surveyed
for tiger signs

5.23
Lakh km —
Foot surveys

5.94
lakh —
Man-days effort

76,651
Photographs
of tigers

While tiger occupancy has increased in Madhya Pradesh and Andhra Pradesh, it has seen a sharp decline in Chhattisgarh since 2014 and has stagnated for Odisha



Prime Minister Narendra Modi, with Ministers Prakash Javadekar and Babul Supriyo, at the release of the results of 4th cycle of All India Tiger Estimation in New Delhi. - PTI

With doubled tiger populations in India, the loss of habitat, a decline of prey and poaching continues to be a threat to tigers' survival. Along with these, a potential virus — **Canine Distemper Virus (CDV)** — that can be transmitted from CDV-infected dogs living in and around wildlife sanctuaries has started to raise concern among wildlife biologists. Last year, over 20 lions from the Gir forest succumbed to the viral infection and now a guideline has been prepared by the NTCA to prevent the spillover of the disease to wild animals.

Canine Distemper Virus It is highly contagious viral disease that attacks gastrointestinal, respiratory, central nervous systems, immune system and other vital organs of wide variety of animal species

1. Composite Water Management INDEX 2.0

NITI Aayog in association with Ministry of JAL Shakti and Ministry of Rural Development released CWMI 2.0 which assess and improve the performance of States/ Union Territories in efficient management of water resources.

In the report released today, Gujarat hold on to its rank one in the reference year (2017-18), followed by Andhra Pradesh, Madhya Pradesh, Goa, Karnataka and Tamil Nadu

Falkenmark indicator or water scarcity index: Defines water scarcity in terms of the total water resources that are available to the population of a

Indicator themes and weights

No.	Themes	Weights
1	Source augmentation and restoration of waterbodies	5
2	Source augmentation (Groundwater)	15
3	Major and medium irrigation—Supply side management	15
4	Watershed development—Supply side management	10
5	Participatory irrigation practices—Demand side management	10
6	Sustainable on-farm water use practices—Demand side management	10
7	Rural drinking water	10
8	Urban water supply and sanitation	10
9	Policy and governance	15
Total		100

80% of the states have shown improvement in their water management scores over the last three years.

2. Intergovernmental Panel on Climate Change (IPCC)

Created in 1988 by **WMO and UNEP**, the objective of the IPCC is to provide governments at all levels with scientific information that they can use to develop climate policies. IPCC does not conduct its own research. But assess the thousands of scientific papers published to provide comprehensive summary of climate change matters.

IPCC's Assessment Report

Comprehensive scientific assessment reports are published every 6 to 7 years; the latest, **the Fifth Assessment Report, was completed in 2014**, and provided the main scientific input to the Paris Agreement. Sixth Assessment Report (AR6) is expected by 2022.

3. JATROPHA

- *Jatropha curcas* is a species of **flowering plant, native to the American tropics** becoming naturalized or invasive in many areas. It is a semi-evergreen shrub that is resistant to a high degree of aridity, allowing it to grow in deserts. It contains **phorbol esters**, which are considered toxic.
- The seeds contain 27–40% oil, so **high-quality biodiesel fuel**, usable in a standard diesel engine. Edible (non-toxic) provenances can be used for animal feed and food. **National bio-fuel policy has added Jatropha in 2nd generation Fuel.**

In India, there is a vast potential for the production of biodiesel from *Jatropha curcas* (called *Jangli arandi* in Hindi and *Kattukkotai* in Tamil) and *Pongamia pinnata* (The Indian Beech called *Karanj* in Hindi and *Pungai* in Tamil) as they occur in plenty in forests and wastelands.

4. Paris deal

Paris Agreement is an international agreement to combat climate change. From 30 November to 11 December 2015, the governments of 195 nations gathered in Paris, France, and discussed a possible new **global agreement on climate change, aimed at reducing global greenhouse gas emissions** and thus reduce the threat of dangerous climate change.

The aims of Paris Agreement is as below:

1. Keep the global temperature rise this century **well below 2 degree Celsius** above the pre-industrial level.
 2. Pursue efforts to limit the temperature increase even **further to 1.5 degree Celsius**.
 3. Strengthen the ability of countries to **deal with the impacts of climate change**.
4. It also mentions the need to review each country's contribution to cutting emissions every five years so they scale up to the challenge.
5. **Rich countries should help poorer nations by providing "climate finance"** to adapt to climate change and switch to renewable energy.
 6. The Paris Agreement has a '**bottom up' structure** in contrast to most international environmental law treaties which are 'top down'.
 7. The agreement is binding in some elements like reporting requirements, while **leaving other aspects of the deal such as the setting of emissions targets for any individual country as non-binding**.

Paris Agreement (2015) vs Kyoto Protocol (1997)

- Paris Agreement is the world's first comprehensive climate agreement. Although developed and developing countries were parties **to Kyoto Protocol, developing countries were not mandated** to reduce their emissions.
- This means that while Paris Agreement is legally binding to all parties, Kyoto Protocol was not.
- Paris Agreement was reached on the twenty-first session of the Conference of the Parties (COP21) and the eleventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

Nationally Determined Contributions (NDC)

- The national pledges by countries to **cut emissions are voluntary**.
- There will also be a global stock take every 5 years to assess the collective progress towards achieving the purpose of the Agreement

and to inform further individual actions by Parties.

TARGETS FOR PARIS AGREEMENT			
			
INDIA	CHINA	USA	EU (28)
Emission intensity of GDP 33-35% below 2005 levels by 2030 , Power capacity to be 40% non fossil fuel based	Emission intensity of GDP 60-65% below 2005 levels by 2030 . Peak emissions around 2030. Non-fossil fuel to be 20% of primary energy consumption by 2030	Absolute emissions 26-28% below 2005 levels by 2025	Absolute emissions 40% below 1990 levels by 2030
Source: uefcc.int			

- **India's INDC:**

To reduce emissions intensity of its GDP by **33 to 35 per cent by 2030** from 2005 level.

To create an additional carbon sink of **2.5 to 3 billion tonnes of CO₂ equivalent** through additional forest and tree cover by 2030. To achieve about **40 per cent cumulative electric power installed capacity from non-fossil fuel based energy resources** by 2030.

Why is Paris Agreement important?

- Paris Agreement deals with what should be done in the decade after 2020 and beyond this time frame.
- Requires developed countries to send **\$100 billion annually** to their developing counterparts beginning in 2020.

UNFCCC: The ultimate objective of the UNFCCC is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system. It states that "such a

level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."

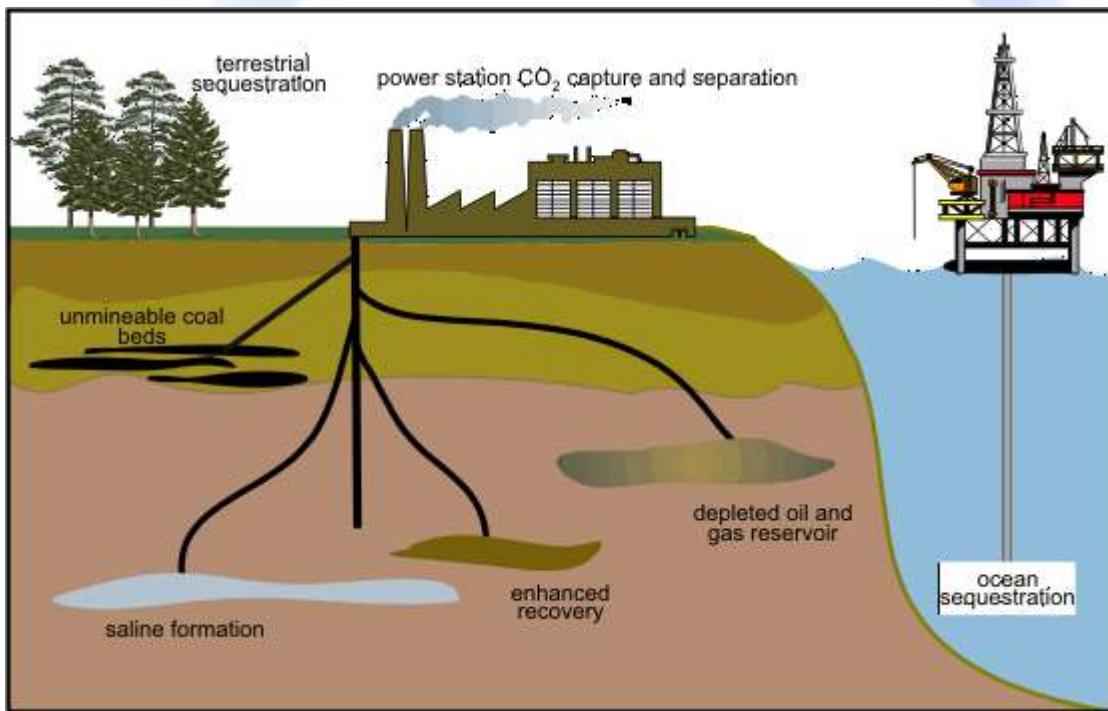
- The UNFCCC was adopted on 9 May 1992
- The UNFCCC has 197 parties as of December 2015. The convention enjoys broad legitimacy, largely due to its nearly universal membership.
- **Industrialized countries (Annex I)** have to **report regularly** on their climate change policies and measures, including issues governed by the Kyoto Protocol (for countries which have ratified it).
- They must also submit an annual inventory of their greenhouse gas emissions, including data for their base year (1990) and all the years since.
- **Developing countries (Non-Annex I Parties)** report in more general terms on their actions both to address climate change and to adapt to its impacts - but less regularly than Annex I Parties do, and their reporting is contingent on their getting funding for the preparation of the reports, particularly in the case of the Least Developed Countries
- The framework sets non-binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms.
- The Protocol was amended in 2012 to encompass the period 2013–2020 in the **Doha Amendment**, which as of December 2015 had not entered into force.

Carbon Sources & Sequestration

- Forests, soils, oceans and the atmosphere all store carbon and this carbon moves between them in a continuous cycle. This constant movement of carbon means that forests act as sources or sinks at different times.
 - **Natural sinks** → Oceans (Largest on earth) + Photosynthesis by plants
 - **Artificial sinks** → Landfills + Carbon capture and storage proposals
- Oceans are the largest active carbon sink on Earth, absorbing more than a quarter of the carbon dioxide that humans put into the air

Carbon Sequestration

- long-term storage of carbon dioxide to mitigate global warming & avoid dangerous climate change
- proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases
- includes **carbon capture and storage**, which refers to large-scale, permanent artificial capture & sequestration of industrially produced CO₂ using
 - Subsurface saline aquifers
 - Reservoirs
 - Ocean water
 - Aging oil fields or other carbon sinks



Geological sequestration / storage (Carbon Sink)

The method of *geo-sequestration* or *geological storage* involves **injecting carbon dioxide directly into underground geological formations** for ex :

- Declining oil fields
- Saline aquifers
- Unminable coal seams

- CO₂ has been injected into declining oil fields for more than 40 years, **to increase oil recovery**
- CO₂ is soluble in oil hence lowers viscosity of the oil & reduces its interfacial tension which increases the oil's mobility.
- Salty water contained in deep saline aquifers is not suitable for drinking or agriculture, making saline aquifers an ideal large-scale storage solution for large stationary industrial CO₂ emitters.
- Unminable coal seams can be used to store CO₂, because CO₂ absorbs to the coal surface, ensuring safe long-term storage.
- In this process it releases methane that was previously adsorbed to the coal surface and that may be recovered, & Again the sale of the methane can be used to offset the cost of the CO₂ storage

	Formula	Concentration in atmosphere (ppm)	Contribution (%)
Water vapour and clouds	H ₂ O	10–50,000*	36–72%
Carbon dioxide	CO ₂	~400	9–26%
Methane	CH ₄	~1.8	4–9%
Ozone	O ₃	2–8**	3–7%
Nitrous oxide	N ₂ O	0.23–0.33	0.2–1%

*Water vapour is subject to large local variation owing to variation in local weather systems.
** The concentration in stratosphere in which about 90% of the ozone in Earth's atmosphere is contained.

Gas	Chemical formula	Half-Life (years)	Global warming potential for given time horizon		
			20-yr	100-yr	500-yr
Carbon dioxide	CO ₂	30–95	1	1	1
Methane	CH ₄	12	72	25	7.6
Nitrous oxide	N ₂ O	114	289	298	153

Carbon credit

- Any tradable **certificate representing the right to emit** one tonne of carbon dioxide or the mass of another greenhouse gas equivalent to one tonne of carbon dioxide
- Carbon credits and carbon markets are a component of national and international attempts to mitigate the growth in concentrations of greenhouse gases (GHGs)
- **One carbon credit is equal to one tonne of carbon dioxide**, or in some markets, carbon dioxide equivalent gases.
- Carbon offsetters purchase the credits from an investment fund or a carbon development company that has aggregated the credits from individual projects
- **Buyers and sellers can also use an exchange platform to trade**, such as the Carbon Trade Exchange, which is like a stock exchange for carbon credits
- **China is currently the largest seller of carbon credits** controlling about 70% of the market share with India at second place with 20% market share
- MCX has become the first exchange in Asia to trade carbon credits

Carbon offset

- A carbon offset is a **reduction in emissions of carbon dioxide or greenhouse gases** made in order to compensate for or to offset an emission made elsewhere
- Carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO₂e) and may represent six primary categories of greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF₆)
- One carbon offset represents reduction of **one metric ton of carbon dioxide or its equivalent in other greenhouse gases**

Carbon tax

- a **tax based on greenhouse gas emissions** (GHG) generated from burning fuels
- Basically a tax on fossil fuels, especially those used by motor vehicles, intended to reduce the emission of carbon dioxide

- puts a price on each tonne of GHG emitted, sending a price signal
- India Doesn't like it & is against carbon tax from goods imported from India to other countries

5. Agroforestry

Agroforestry is a sustainable management mechanism for land that: increases overall production, **combines agricultural crops, tree crops, forest plants and animals simultaneously, and applies management practices that are compatible with cultural practices of the local population.**

It is a type of social forestry in which an individual farmer undertakes tree farming and grows **fodder plants, grasses and legumes on his own land. In agroforestry trees are considered a crop and become a part of crop combinations.**

The main advantage of agroforestry is considered to be its positive impact on the soil.

1. Litter or Mulch:

During the lifetime of a tree, leaves, twigs and branches die and fall to the ground as litter. **Litter contributes to the organic-matter content of the soil** after it decomposes. A soil that is rich in organic matter has a better capacity to absorb and retain water and thus is also more resistant to erosion. A good cover of litter or mulch can also be very **effective in suppressing weeds.**

2. Increase nutrient content of soil:

Nutrient Uptake from deeper layers of soil: Tree roots normally penetrate deeper into the soil than the roots of crops. Though not experimentally verified, trees are generally considered more efficient than crops in taking up nutrients released by weathering deep in the soil.

Nitrogen Fixation: Many leguminous trees and a few non-leguminous ones have the ability to fix atmospheric nitrogen through symbiosis with bacteria or fungi in root nodules. (**Leguminous plants** belong to the family Fabaceae (or Leguminosae). The fruits of this **plant** are called **legumes**. Well-known examples of **legumes** include **alfalfa, clover, peas, beans, lentils, lupins, mesquite, carob, soy, and peanuts.** **Legume plants** are notable for their ability to fix atmospheric nitrogen). Nitrogen fixation occurs in the root nodules

that contain bacteria (Bradyrhizobium for soybean, Rhizobium for most other legumes). Almost all legumes can fix nitrogen

3. Protection from soil erosion

Tree roots and stems reduce surface run-off, nutrient leaching and soil erosion.

4. Environmental Benefits:

Reduction of pressure on natural forests. It is also recognized that Agroforestry is perhaps the only alternative to meeting the target of **increasing forest or tree cover to 33 percent from the present level of less than 25 per cent, as envisaged in the National Forest Policy (1988).**

Agroforestry is known to have the potential to mitigate the climate change effects through: **microclimate moderation and natural resources conservation** in the short run, and **carbon sequestration** in the long run. When strategically applied on a large scale, with an appropriate mix of species, agro-forestry **enables agricultural land to withstand extreme weather events**, such as floods and droughts, and climate change.

5. Economic benefits:

A greater output of food, fuel wood, fodder and timber. Increase in levels of farm income due to improved and sustained productivity. Agroforestry leads to reduction in the incidence of total crop failure, which is common to single cropping or monoculture systems. This is because such systems are structurally and functionally more complex than monoculture. Current estimates show that about 65 % of the country's timber requirement is met from the trees grown on farms.

6. Social benefits :

Improvement in rural living standards from sustained employment and higher income. Makes the villagers self-dependent at the village-level.

Despite the numerous material and geo-climatic benefits, agroforestry if not carefully planned can have some **adverse effects** on agricultural land. Some of these are:

- i) productivity per unit area decreases, as in at least about two meters from the trees the moisture content in the soil is significantly reduced
- ii) the combination of trees and crops must be so chosen so as to minimise the competition between their roots for moisture

Mixtures of trees and crops make a more diverse environment than monocropping. A diverse environment enables a greater variety of species of all kinds of organisms — both desirable and less desirable — to thrive. Thus, for an agroforestry system to be successful, a careful and scientific approach is required which incorporates knowledge from both agriculture and forestry.

Apart from these, certain shortcomings have been observed in the case of agroforestry programs in India:

- i) The tendency of farmers to opt for market-oriented trees rather than the trees which are more ecologically suited or are locally needed (fuelwood/fodder).
- ii) Agroforestry has benefitted the big farmers more than the marginal and small farmers. Many of the absentee landlords plant commercial trees in their agricultural landholdings to save their land from dispossession. This programme is said to have encouraged absentee landlordship.
- iii) The diversion of good agricultural land from cereal and commercial crops may create the scarcity of food and industrial raw material.

Thus, while the potential benefits of agroforestry are well documented, particular aspects of these systems need to be adapted to suit the areas where they are introduced. These adaptations primarily involve the selection of the ideal combinations of trees, shrubs and crops that will benefit each other, the environment and the income of the small-scale farmers.

National Agroforestry Policy 2014:

In February 2014, India became the first nation in the world to adopt an agroforestry policy. Agroforestry was earlier covered as a part of other policies e.g. the National Forest Policy, the Green India Mission etc.

The Policy aims to improve coordination, convergence and synergy between various elements of agroforestry, scattered across various existing missions, programme and schemes under different ministries—agriculture, rural development and environment.

Objectives of the National Agroforestry Policy 2014:

- Promote agroforestry to increase farm income and livelihoods of rural households, especially the small and marginal farmers.

- Protect and stabilise ecosystems, and promote resilient cropping and farming systems to minimise the risk during extreme climatic events.
- Simultaneously provide raw material to wood based industries. Thus create new avenues for rural employment, and reduce pressure on the forests.
- To develop capacity and strengthen research in agroforestry and create a massive people's movement for achieving these objectives.

6. Asiatic Lion Conservation Project

Context: The Centre and the Gujarat government have announced a Rs. 97.85 crore **Asiatic Lion Conservation Project**.

Key features of the project:

- **Key aspects of the conservation project include** undertaking “habitat improvement” measures, making more sources of water available, creating a wildlife crime cell, and a task force for the **Greater Gir region**. **'Greater Gir' that includes, other than the existing Gir National Park, sanctuaries in Girnar, Pania and Mitiyala.**
- It would also **involve having in place a GPS-based tracking system**, which would look at surveillance tracking, animal and vehicle tracking. There would also be an automated sensor grid that would have magnetic sensors, movement sensors and infra-red heat sensors.
- **A key outcome of the project is to have a dedicated veterinary institute, lion ambulances and back-up stocks of vaccines** that may be required.

The **Maldharis** have lived in the **Gir National Park, in the Banni Grasslands Reserve** area, for the past thousand years. They have co-existed with the lions, which the Gir National Park was created to preserve, for these thousand years. The lions have been periodically hunting the Maldhari cattle for food, but the Maldharis understand the cycle of life. They consider the *taken* cows an offering to the lions, whose territory they share

Banni grasslands of Gujarat is the **largest natural grassland** in the Indian subcontinent, twenty two ethnic communities that comprise the “maldhari” pastoralists whose livestock have grazed this landscape

The land here was formed from the sediments that were deposited by the Indus and other rivers over thousands of years. It is home to mammals such as the nilgaichinkara (blackbuck), wild boar,golden jackal, Indian hare (Indian wolf), caracal Asiatic wildcat and desert fox etc. among others.

The last Indian wild ass (*Equus hemionus khur*.NT,IUCN) population, which had become confined to nearby Little Rann of Kutch. thousands of flamingos, migratory cranes and also support large numbers of over 150 species of migratory and resident birds.

Reintroduction of cheetah

Banni Grasslands Reserve and Narayan Sarovar Sanctuary, both in Kutch, have been classified by Wildlife Institute of India (WII) as the last remaining habitats of the cheetah (*Acinonyx jubatus*) in India

Chir Batti, Chhir Batti or Cheer batti is a ghost light reported in the Banni grasslands, a seasonal marshy wetlands and adjoining desert of the marshy salt flats of the Rann of Kutch near the India–Pakistan border in Kutch district, Gujarat State, India. Local villagers refer to the light as Chir Batti in their Kutchhi-Sindhi language, with Chir meaning ghost and Batti meaning light.

Relocation of lions:

- The ***Kuno-Palpur Wildlife Sanctuary in Madhya Pradesh was identified to be the most suitable for reintroducing the species***, according to a Supreme Court-appointed technical expert committee, but there has been no progress on the proposal.
- ***The SC in April 2013 had ordered the translocation of some lions from Gujarat to Madhya Pradesh within six months***, but this hasn't happened. This was ordered after several recommendations by expert groups, including the Wildlife Institute of India.

- It emphasised that the long-term survival of the lion as a species was best served if they could be present outside Gujarat, too, so that they are protected against, say, a forest fire, a disease, or calamities.

Facts for Prelims:

- Asiatic Lions are listed as '**Endangered**' under the IUCN Red List.
- Its population is restricted to the state of Gujarat in India.
- With serious conservation efforts of the State and the Union Government, the population of Asiatic lions have increased to over 500 which used to be around 50 by late 1890s.
- As per the 2015 census, there were a total of 523 Asiatic Lions in Gir Protected Area Network.

7. Global Assessment Report

- It is compiled by 145 expert authors from 50 countries and is a cornerstone of an emerging body of research the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).
- Known as the Global Assessment, the report found that up to one million of Earth's estimated eight million plants, insect and animal species is at risk of extinction, many within decades.
- It suggests the world may need to embrace a new "post-growth" form of economics if it is to avert the existential risks posed by the mutually-reinforcing consequences of pollution, habitat destruction and carbon emissions.

About IPBES

FAO+UNEP

- It is an independent intergovernmental body, established by member States in **2012 under the auspices of UNEP**.
- The objective of IPBES is to **strengthen the science-policy interface for biodiversity and ecosystem services** for the conservation and

sustainable use of biodiversity, long-term human well-being and sustainable development.

- The IPBES secretariat is based in Bonn, Germany.

Findings of the report

- Agricultural production dependent on animal pollination has increased by 300% over the past 50 years, but pollinator dependent crops show lower growth and stability in yield than crops that do not depend on pollinators.
- Nearly 90% of all wild flowering plants depend to some extent on animal pollination.
- 16% of vertebrate pollinators are threatened with global extinction - increasing to 30 per cent for island species - with a trend towards more extinctions.
- Pesticides, including neonicotinoid insecticides, threaten pollinators worldwide, although the long-term effects are still unknown.

NEONICOTINOID- Neonicotinoids are a class of neuro-active insecticides chemically similar to nicotine. The neonicotinoid family includes acetamiprid, clothianidin, imidacloprid, nitenpyram, nithiazine, thiacloprid and thiamethoxam.

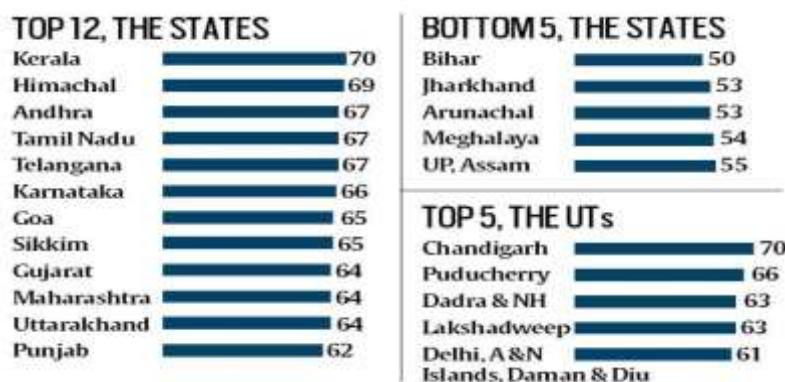
Around three years after the **Anupam Verma Committee** submitted its recommendations, the Ministry of Agriculture and Farmers' Welfare has finally issued the Pesticides (Prohibition) Order, 2018, **banning 18 pesticides**

This order bans seven of the 18 Class I pesticides allowed in India, many of which are heavily used. However, there is scope for improvement, the list leaves out two heavily used **Class I pesticides: Monocrotophos and Carbofuran.**

8. Sustainable Development Goals

NITI Aayog has released the **second edition of the Sustainable Development Goals (SDG) India Index (SDG Index 2.0)**. NITI Aayog has the twin mandate to oversee the implementation of SDGs in the country and promote competitive and cooperative federalism among States and UTs. The *SDG India Index* acts as a bridge between these mandates

- The index documents the **progress made by India's States and Union Territories** towards achieving the **2030 SDG targets**.
- The Index spans 16 out of 17 SDGs which marks an **improvement over the 2018 Index**, which covered only 13 goals.
- The SDG India Index has been developed in **collaboration** with the **Ministry of Statistics and Programme Implementation (MoSPI), the United Nations, and the Global Green Growth Institute**.
- The year **2020 will be the 5th anniversary** of the adoption of SDGs by 193 countries at the UN General Assembly.



Methodology Followed

- A **composite score** for SDG Index (2019) was computed in the **range of 0-100** for each State/UT based on its aggregate performance across 16 SDGs. The **higher the score** of a State/UT, the **closer** it is towards **achieving the 2030 national targets**.
- States /UTs are classified based on the SDG India Index Score as follows:

- **Aspirant:** 0–49
- **Performer:** 50–64
- **Front Runner:** 65–99
- **Achiever:** 100

India's composite **score improved** from 57 in 2018 to 60 in 2019-20 **with major success in water and sanitation, power and industry.** However, **nutrition and gender equality continue to be problem areas** for India, requiring a more focused approach from the government. The ranks of **14 states have dropped** in the index **compared to 2018.**

State/UT Wise Analysis

- **Uttar Pradesh** has shown **maximum improvement** followed by Odisha and Sikkim.

UNSDG



SUSTAINABLE DEVELOPMENT GOALS



- The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future
- The SDGs build on decades of work by countries and the UN, including the UN Department of Economic and Social Affairs
- In June 1992, at the Earth Summit in Rio de Janeiro, Brazil, more than 178 countries adopted **Agenda 21**, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.
- Member States unanimously adopted the **Millennium Declaration at the Millennium Summit in September 2000** at UN Headquarters in New York.
- The Summit led to the elaboration of **eight Millennium Development Goals (MDGs) to reduce extreme poverty by 2015**.
- The **Johannesburg Declaration on Sustainable Development** and the Plan of Implementation, adopted at the **World Summit on Sustainable Development in South Africa in 2002**, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.
- At the **United Nations Conference on Sustainable Development (Rio+20)** in Rio de Janeiro, Brazil, in June 2012, Member States adopted the outcome document "**The Future We Want**" in which they decided, *inter alia*, to launch a process to develop a set of SDGs to

build upon the MDGs and to establish the UN High-level Political Forum on Sustainable Development.

- In January 2015, the General Assembly began the negotiation process on the post-2015 development agenda. The process culminated in the subsequent adoption of the 2030 Agenda for Sustainable Development, with 17 SDGs at its core, at the UN Sustainable Development Summit in September 2015.
- 2015 was a landmark year for multilateralism and international policy shaping, with the adoption of several major agreements:
 - **Sendai Framework for Disaster Risk Reduction (March 2015)**
 - **Addis Ababa Action Agenda on Financing for Development (July 2015)**
 - **Transforming our world: the 2030 Agenda for Sustainable Development with its 17 SDGs was adopted**
 - **Paris Agreement on Climate Change (December 2015)**
- Now, the annual High-level Political Forum on Sustainable Development serves as the central UN platform for the follow-up and review of the SDGs. It is voluntary both developing and developed countries participate

Today, the **Division for Sustainable Development Goals (DSDG)** in the United Nations Department of Economic and Social Affairs (UNDESA) provides substantive support and capacity-building for the SDGs and their related thematic issues, including water, energy, climate, oceans, urbanization, transport, science and technology, the Global Sustainable Development Report (GSDR), partnerships and Small Island Developing States.

Global sustainable development report:

The Global Sustainable Development Report (GSDR) originated in the Rio + 20 outcome report to strengthen the science-policy interface.

In 2016, Member States decided that the report should be produced once every four years, to inform the quadrennial SDG review deliberations at the General Assembly.

They mandated that the Group would consist of 15 experts representing a variety of backgrounds, scientific disciplines and institutions, ensuring geographical and gender balance.

The Future is Now: Science for Achieving Sustainable Development, is the first Global Sustainable Development Report prepared by the Independent Group of Scientists appointed by the United Nations Secretary-General.

SAMOA Pathway is the outcome of the Third International Conference on SIDS(small island developing states), which took place in Apia, Samoa from 1-4 September 2014. The document covers the period 2015-2025, and promotes international assistance to address challenges faced by small islands.

UN Decade of Ocean Science for Sustainable Development 2021 - 2030

This Decade will provide a common framework to ensure that ocean science can fully support countries' actions to sustainably manage the Oceans and more particularly to achieve the 2030 Agenda for Sustainable Development.

9. UNCCD

- Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management.
- 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.
- It is the only convention stemming from a direct recommendation of the Rio Conference's Agenda 21.
- 2006 was declared "International Year of Deserts and Desertification".
- **2010-2020 : UN decade for Deserts and Desertification**

The new **UNCCD 2018-2030 Strategic Framework** is the most comprehensive global commitment to achieve **Land Degradation Neutrality (LDN)** in order to *restore the productivity* of vast expanses of degraded land, improve the livelihoods of more than 1.3 billion people, and *reduce the impacts of drought* on vulnerable populations

The Convention's 197 parties work together to improve the living conditions for people in drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought. The UNCCD is *particularly committed to a bottom-up approach, encouraging the participation of local people in combating desertification and land degradation.*

India hosted **14th edition of the Conference of Parties (COP-14)** to the UN Convention to Combat Desertification (UNCCD).

- The **theme** of the Conference was '**Restore land, Sustain future**'.
- **India is among the select few countries to have hosted the COP of all three Rio conventions on climate change, biodiversity and land.**

10. GEAC

- It is **statutory body under the Environment Protection Act 1986** of the Ministry of Environment, Forests and climate change (MoEFCC)
- As per Rules, 1989, it is responsible for **appraisal of activities** involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
- GEAC is **chaired by the Special Secretary/Additional Secretary of MoEF&CC** and co-chaired by a representative from the Department of Biotechnology (DBT).
- Presently, it has 24 members and meets **every month to review the applications** in the areas indicated above. One third members of the GEAC will constitute the quorum for convening the meeting. There is a well established regulatory framework for approval of GM Crops as per "Rules for the Manufacture/Use/Import/Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells, 1989" under the Environment (Protection) Act, 1986 in the Country.

Functions

The functions of GEAC as prescribed in the Rules 1989 are as follows:

To appraise activities involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.

To appraise proposals relating to release of genetically engineered organisms and products into the environment including experimental field trials.

The committee or any persons authorized by it **has powers to take punitive action** under the Environment Protection Act.

Bt cotton is the only commercially approved crops in India.

Genetically Engineered Organisms (GMOs):

India is one of the earliest countries to establish a biosafety system for regulation of GMOs.

The Genetic Engineering Appraisal Committee (GEAC) is also responsible for giving technical approval of proposals relating to the release of GMOs and products including experimental field trials.

However, Environment Minister gives final approval for GMOs.

Genetically Modified Crops in India

	Global Area of Biotech Crops			(In million hectares)
	2010	2011	2012	
US	66.8	69	69.5	Crops Maize, Soyabean, Cotton, Sugarbeet, Papaya, Squash
Brazil	25.4	30.3	36.6	Soyabean, Maize, Cotton
Argentina	22.9	23.7	23.9	Soyabean, Maize, Cotton
Canada	8.8	10.4	11.6	Canola, Maize, Soyabean, Sugarbeet
India	9.4	10.6	10.8	Cotton
China	3.5	3.9	4	Cotton, Papaya, Poplar, Tomato, Sweet pepper
Total*	148	160	170.3	

*Includes 22 other countries such as Paraguay, South Africa, Pakistan and Uruguay.

Source: Clive James.

The country has yet to approve commercial cultivation of a GM food crop. The only genetically modified cash crop under commercial cultivation in India is cotton.

Bt Brinjal

The GEAC in 2007, recommended the commercial release of Bt Brinjal, which was developed by Mahyco (Maharashtra Hybrid Seeds Company) in

collaboration with the Dharward University of Agricultural sciences and the Tamil Nadu Agricultural University. But the initiative was blocked in 2010

GM-mustard

Dhara Mustard Hybrid-11 or DMH-11 is a genetically modified variety of mustard developed by the Delhi University's Centre for Genetic Manipulation of Crop Plants. The researchers at Delhi University have created hybridised mustard DMH-11 using "barnase / barstar" technology for genetic modification. It is Herbicide Tolerant (HT) crop. If approved by the Centre, this will be the second GM crop, after Bt Cotton, and the first transgenic food crop to be allowed for cultivation in the country.

11. EU Green deal

After the **failure at Madrid**, the European Union has come up with an announcement on additional measures it would take on climate change, called the European Green Deal. Two major decisions are at the heart of the European Green Deal. The Green Deal includes sectoral plans to achieve these two overall targets and proposals for the policy changes that would be required. They are:

1) Climate neutrality

- The EU has promised to bring a law, binding on all member countries, to ensure it becomes "climate neutral" by 2050.
- **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**.
- The EU is now the first major emitter to agree to the 2050 climate neutrality target.

2) Emission reduction

- The second decision pertains to an increase in its 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**.

Why such move by EU?

- The 28 EU member countries are together the third-largest emitter of greenhouse gases in the world after China and the United States,
- 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.

Note: Bhutan and Suriname are the only carbon neutral countries in the world.

12. Wetlands

According to the Ramsar Convention, wetlands are “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide **does not exceed six metres**”

Five major wetland types are generally recognized:

- marine (coastal wetlands including coastal lagoons, rocky shores, and coral reefs);
- estuarine (including deltas, tidal marshes, and mangrove swamps);
- lacustrine (wetlands associated with lakes);
- riverine (wetlands along rivers and streams);
- palustrine (meaning “marshy” - marshes, swamps and bogs).

Importance:

Wetlands are among the world’s **most productive environments**. They are **cradles of biological diversity**, providing the water and primary productivity upon which countless species of plants and animals depend for survival. They support high concentrations of birds, mammals, reptiles, amphibians, fish and invertebrate species. **Wetlands are also important storehouses of plant genetic material.**

Ramsar Convention

- It is an international treaty for conservation and sustainable use of wetlands was signed at Ramsar.
- The Convention came into force in 1975.
- The Convention's mission is “the **conservation and wise use of all wetlands** through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world”.
- **Three pillars of the Convention are:**
 - Work towards the wise use of all their wetlands.
 - Designate suitable wetlands for the list of Wetlands of International Importance (the “Ramsar List”) and ensure their effective management.
 - Cooperate internationally on transboundary wetlands, shared wetland systems and shared species.

India has **37 Ramsar Sites** which are the Wetlands of International importance. Last ten were added in January 2020.

Montreux Record

- It is maintained as part of the Ramsar List.
- Montreux Record 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.
- **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.
- The **2nd of February** each year is **World Wetlands Day**, marking the date of the adoption of the Convention on Wetlands on 2 February 1971.

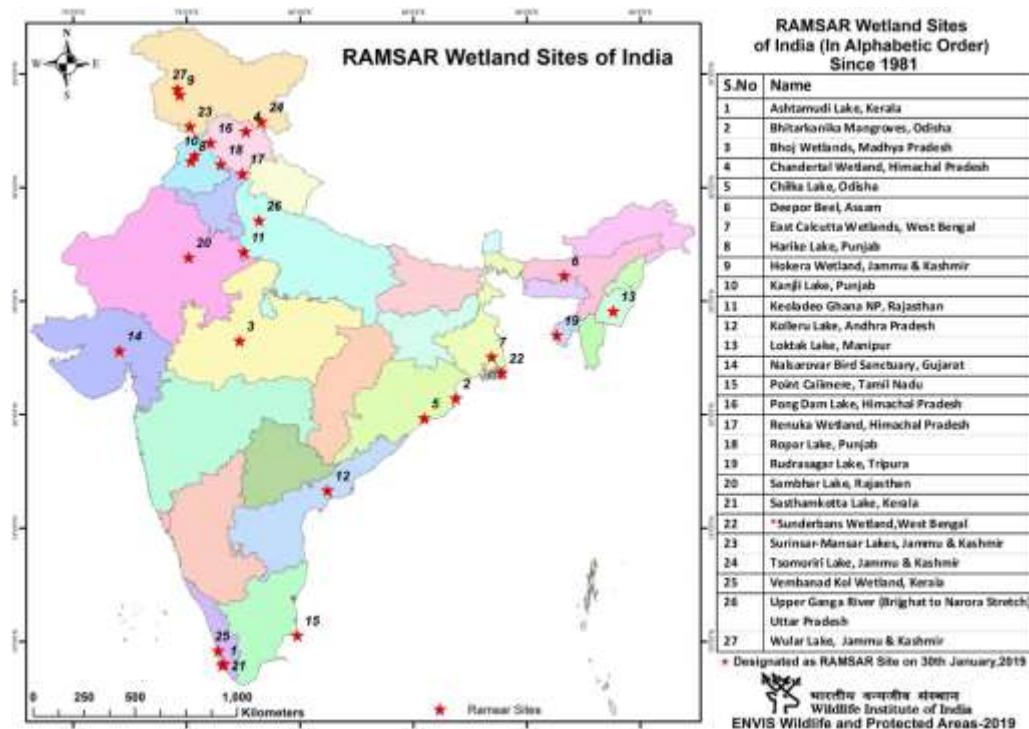
Vembanad Lake also known as Vembanad Kayal or Vembanad Kol **wetland** is the **largest wetland in India**.

New ramsar sites:

The 10 new ones are **Nandur Madhameshwar**, a first for Maharashtra; **Keshopur-Miani, Beas Conservation Reserve and Nangal** in Punjab; and

Nawabganj, Parvati Agra, Saman, Samaspur, Sandi and Sarsai Nawar in Uttar Pradesh. The other Ramsar sites are in Rajasthan, Kerala, Odisha, Madhya Pradesh, Himachal Pradesh, Assam, West Bengal, Jammu and Kashmir, Andhra Pradesh, Manipur, Gujarat, Tamil Nadu and Tripura.

There are 115 identified wetlands in India. **Maximum number of identified wetlands are in Uttar Pradesh (16 wetlands).** Madhya Pradesh comes at 2nd place with 13 identified wetlands.



13. Bengal florican

The Bengal florican (*Houbaropsis bengalensis*), also called **Bengal bustard**, is a bustardspecies native to the Indian subcontinent, Cambodia, and Vietnam

- **Critically Endangered - IUCN**
- **CITES Appendix I.**
- rare bustard species that is very well known for its **mating dance**
- Habitat:**Grasslands** occasionally interspersed with scrublands

- Range — Cambodia, India and Nepal. In India — Uttar Pradesh, Assam and Arunachal Pradesh

Threats:

- extensive loss and modification of grasslands through drainage, conversion to agriculture and plantations, overgrazing, inappropriate cutting, burning and ploughing regimes
- heavy flooding
- invasion of alien species
- scrub expansion

Protected areas

- Dibru-Saikhowa national park- Assam
- Kaziranga National Park- Assam
- Dudhwa Tiger Reserve - UP
- Chitwan National Park, — Nepal



14. Zero budget natural farming

- It is a method of **chemical-free agriculture** drawing from traditional Indian practices.
- It was originally promoted by **agriculturist Subhash Palekar**, who developed it in the mid-1990s as an **alternative to the Green Revolution's methods** that are driven by chemical fertilizers and

pesticides and intensive irrigation. It is a unique model that relies on **Agro-ecology**.

- It aims to bring down the **cost of production to nearly zero** and return to a **pre-green revolution style of farming**. It claims that there is **no need** for expensive inputs such as fertilisers, pesticides and intensive irrigation.
- ZBNF is based on **4 pillars**:

Jeevamrutha: It is a mixture of fresh cow dung and aged cow urine (both from India's indigenous cow breed), jaggery, pulse flour, water and soil; to be applied on farmland.

Bijamrita: It is a concoction of neem leaves & pulp, tobacco and green chilies prepared for insect and pest management, that can be used to treat seeds.

Accadana (Mulching): It protects topsoil during cultivation and does not destroy it by tilling.

Whapasa: It is the condition where there are both air molecules and water molecules present in the soil. Thereby helping in reducing irrigation requirement.

- It suits all crops in all agro-climatic zones.
- Citing the benefits of ZBNF, in June 2018, **Andhra Pradesh** rolled out an ambitious plan to become **India's first State to practise 100% natural farming by 2024**.

15. Endosulfan

- **Endosulfan** is an off-patent organochlorine insecticide and acaricide that **is being phased out globally**.
- Endosulfan became a highly **controversial agrichemical due to its acute toxicity, potential for bioaccumulation, and role as an endocrine disruptor**.
- Because of its threats to human health and the environment, **a global ban on the manufacture and use of endosulfan was negotiated** under the **Stockholm Convention** in April 2011. The ban has taken effect in **mid-2012, with certain uses exempted for five additional years**
- **It is still used extensively in India.** Although, the Supreme Court had, by an order dated 13.05.2011, **put a ban on the production and sale of endosulfan in India till further orders**.

Uses: Endosulfan has been used in agriculture around the world to control insect pests including whiteflies, aphids, leafhoppers, Colorado potato beetles and cabbage worms. Due to its unique mode of action, it is useful in resistance management; however, as it is not specific, it can negatively impact populations of beneficial insects. It is, however, considered to be moderately toxic to honey bees and it is less toxic to bees than organophosphate insecticides.

Impact of Endosulfan

Environment

- o Endosulfan in the environment gets accumulated in food chains leading to higher doses causing problems.
- o If Endosulfan is released to water, it is expected to absorb to the sediment and may bioconcentrate in aquatic organisms.

Humans And Animals

- o The endosulfan ingestion results in diseases ranging from physical deformities, cancer, birth disorders and damage to the brain and nervous system.

Endosulfan is listed under both **Rotterdam Convention on the Prior Informed Consent** and the **Stockholm Convention on Persistent Organic Pollutants**.

Stockholm convention 2001

The convention aims to reduce the concentration of persistent organic pollutants (POPs) which are chemical substances that not only remain in the atmosphere for longer periods but also possess the ability to bio-accumulate.

The convention listed 12 POPs as 'dirty dozen': aldrin, chlordane, DDT, dieldrin, dioxins, endrin, furans, heptachlor, hexachlorobenzene, mirex, PCBs, and toxaphene.

Persistent organic pollutants (POPs) are a group of chemicals possessing the following characteristics:

- they are highly toxic to humans and wildlife (**harmfulness**);

- they can last for many years in the environment before degrading into less dangerous forms (**persistence**);
 - they bio-accumulate in the food chain (**bio-accumulation**);
 - they are transported over large distances through air and water and can be found worldwide (**long-range transport**)
 - They have been **widely used in agricultural and industrial practices and** unintentionally produced and released from many anthropogenic activities around the globe.
-
- Because of the threat they pose to human health and the environment, POPs are regulated under the Stockholm Convention that was adopted in 2001. Starting with 12 initial POPs, this treaty is a living process and new POPs have regularly been listed into its annexes. Presently, **there are 26 POPs listed**

16. NDMA

- It is the apex **statutory body** for disaster management in India.
- The NDMA was formally constituted on 27th September 2006, in accordance with the **Disaster Management Act, 2005 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice-Chairperson.**
- **Mandate:** Its primary purpose is to **coordinate response to natural or man-made disasters and for capacity-building** in disaster resiliency and crisis response. It is also the apex body to lay down policies, plans and guidelines for Disaster Management to ensure timely and effective response to disasters.
- **Vision:** To build a safer and disaster resilient India by a holistic, proactive, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation.

NDRF

- It comes under **Ministry of Home Affairs**
- It is the only dedicated disaster response force in the world
- Established in **2006**
- **HQ: New Delhi**
- It works under National Disaster Management Authority (NDMA) which lays down policies, plans and guidelines for disaster management.

Role and Mandate of NDRF:

- Specialized response during disasters.
- Proactive deployment during impending disaster situations.
- Acquire and continually upgrade its own training and skills.
- Liaison, Reconnaissance, Rehearsals and Mock Drills.
- Impart basic and operational level training to State Response Forces (Police, Civil Defence and Home Guards).
- Community Capacity Building Programme.
- Organize Public Awareness Campaigns.

Why it is said to be UNIQUE?

- It is the **only dedicated disaster response force of the world**.
- The only agency with comprehensive response capabilities having multi-disciplinary and multi-skilled, high-tech, standalone nature.
- Experienced paramilitary personnel specially trained and equipped for disaster response.
- Capabilities for undertaking disaster response, prevention, mitigation and capacity building

Background:

- The Disaster Management Act, 2005 has made the statutory provisions for constitution of National Disaster Response Force (NDRF) for the purpose of specialized response to natural and man-made disasters.
- Two national calamities in quick succession in the form of Orissa Super Cyclone (1999) and Gujarat Earthquake (2001) brought about the realization of the need of having a specialist response mechanism at National Level to effectively respond to disasters. This realization led to the enactment of the DM Act on 26 Dec 2005.

17. CORAL REEFS

- **Andaman and Nicobar Islands**

Situated in the Bay of Bengal, exclusively **fringing reefs** of about 572 islands, most of these islands have a healthy biodiversity.

- **Gulf of Kutch**

Exclusively consists of fringing reefs. The reefs are relatively less developed due to large range of temperature and high salinity. The harbours have less biodiversity. The entire Gulf of Kutch is also known as a marine national park.

- **Gulf of Mannar**

Fringing reefs with a chain of 21 islands from Rameswaram in the north to Thoothukudi (Tuticorin) in the south. This part of the gulf forms part of the Gulf of Mannar biosphere reserve.

- **Lakshadweep**

Exclusively coral atolls with 36 islands, of which 10 are inhabited. The islands range from less than 1 km (0.62 mi) to about 9 km (5.6 mi) in length, and do not exceed 2 km (1.2 mi) in width.^[4]

- **Others**

Tarkarli in Malwan, Maharashtra is a smaller reef. There are some coral reefs around small inlets in the western part of the Gulf of Khambat. Angria Bank is a coral reef off Vijaydurg in Maharashtra. There is a coral reef in Netrani Island in Karnataka. Shell reef in Gulf of Kutch is a shell shaped reef made from bio rock and decorated with coral in the deep waters of Gulf of Kutch,

off the coast of Gujarat. It helps Coral Polyps to get healed 20% faster than



usual.

- **Carijoa Riisei** also known as **snowflake coral** is an invasive species discovered recently by the scientists off the coast of **Thiruvananthapuram and Kanyakumari**.
- **Kappaphycus alvarezii**, an invasive seaweed which smothers and kills coral reefs, has spread its wings to coral reef areas in Valai island in the Gulf of Mannar (GoM) and is set to invade new coral colonies in the Marine National Park.
- The Gulf of Mannar Marine National Park has proposed to cover one sq km of area in **Kariyachalli and Vaan islands in Thoothukudi group** in Gulf of Mannar for **rehabilitation of coral reefs**.
- 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**. A biorock structure was installed one nautical mile off the Mithapur coast in the Gulf of Kachchh

18. FORMALIN

- A 37% aqueous (water) solution of formaldehyde, a pungent gas, with the chemical formula HCHO, used as an **antiseptic, disinfectant, and as a fixative** for histology (the study of tissues under the microscope).
- Formaldehyde (systematic name methanal) is a naturally occurring organic compound .In view of its widespread use, toxicity, and volatility,

formaldehyde poses a significant danger to human health. In 2011, the US National Toxicology Program described formaldehyde as known to be a **human carcinogen**.

- Processes in the upper atmosphere contribute up to 90% of the total formaldehyde in the environment. Formaldehyde is an intermediate in the oxidation (or combustion) of methane, as well as of other carbon compounds, e.g. in forest fires, automobile exhaust, and tobacco smoke. When produced in the atmosphere by the action of sunlight and oxygen on atmospheric methane and other hydrocarbons, it **becomes part of smog**. Formaldehyde has also been detected in outer space
- Formaldehyde **does not accumulate in the environment, because it is broken down within a few hours by sunlight or by bacteria present in soil or water**. Humans metabolize formaldehyde quickly, converting it to formic acid, so it does not accumulate in the body
- The textile industry uses formaldehyde-based resins as finishers to make fabrics crease-resistant. Formaldehyde-based materials are key to the manufacture of automobiles, Disinfectant and biocide, Tissue fixative and embalming agent, Drug testing, Photography, **addition of formaldehyde to foods to extend shelf life**
- Formaldehyde is a highly toxic systemic poison that is absorbed well by inhalation. The vapor is a severe respiratory tract and skin irritant and may cause dizziness or suffocation. Contact with formaldehyde solution may cause severe burns to the eyes
- The use of this chemical is **banned in fresh foods, like fish, by the Food Safety and Standards Authority of India**. But unscrupulous vendors sometimes use it to preserve fish for longer. It occurs naturally not only in fish, but other foods like mushrooms as well. However, levels vary widely. The fact that most naturally occurring formaldehyde is bound to fish tissue, while added formaldehyde is classified as a carcinogen by the International Agency for Research on Cancer (IARC), this refers to the chemical's cancer-causing potential when it is inhaled, and not when it is ingested

19. GREEN BUILDING

A **green building** is one which **uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and**

provides healthier spaces for occupants, as compared to a conventional building.

a) Green Rating for Integrated Habitat Assessment (GRIHA) is India's own rating system jointly developed by TERI and the Ministry of New and Renewable Energy, Government of India.

- It is a green building design evaluation system where buildings are rated in a three-tier process.
- **The GRIHA Rating System contains 34 evaluation criteria with 100 points.**
- These criteria have been categorized into
 - (i) Site Planning including conservation and efficient utilization of resources, health and wellbeing during building planning and construction stage
 - (ii) Water Conservation
 - (iii) Energy Efficiency including energy embodied & construction and renewable energy
 - (iv) Waste Management including waste minimization, segregation, storage, disposal and recovery of energy from waste and
 - (v) Environment for good health and wellbeing.

b) Leadership in Energy & Environmental Design India (LEED) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: Energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality and stewardship of resources and sensitivity to their impacts.

- LEED is a set of rating systems for the design, construction, operation, and maintenance of green buildings which was developed by **the U.S. Green Building Council. The Indian Green Building Council has adapted LEED** system and has launched LEED India version for rating of new constructions

c) Bureau of Energy Efficiency (BEE) developed its own rating system for the buildings based on a 1 to 5 star scale. More stars mean more energy efficiency

- BEE has developed the **Energy Performance Index (EPI)**. The unit of Kilo watt hours per square meter per year is considered for rating the building and especially targets air conditioned and non-air conditioned office buildings.

d) EDGE is a green building certification system that empowers the Indian real estate market to build sustainably. An **innovation of IFC, a member of the World Bank Group**, EDGE makes it faster, easier and more affordable than ever before to build and brand green. GBCI is the **exclusive provider** of EDGE certification services in India, providing opportunities to increase the marketability of buildings at the design stage.

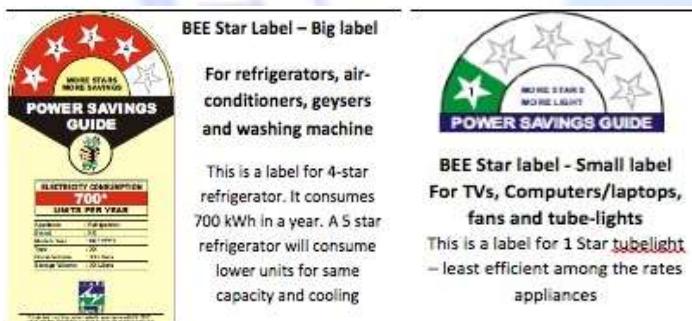
e) The Indian Green Building Council (IGBC) has come out with **Net Zero Energy Buildings rating system** in collaboration with the World Green Building Council and the United States Agency for International Development (USAID).

20. STAR RATING PROGRAM

- Government of India has expanded its ambitious Standards & Labelling (Star Rating) program for Energy Efficient for Appliances **to cover the Microwave Ovens and Washing Machines** (with revised parameters) in the country.
- The Star Labelling Programs has been **formulated by the Bureau of Energy Efficiency (BEE) for improving energy efficiency and lowering energy cost** of appliances/equipment for the consumers. Initially, the program for the above two appliances will be implemented on a voluntary basis and will be valid up to 31st December 2020
- The scheme is **invoked for 19 equipment/appliances**, i.e. Room Air Conditioners, Fluorescent Tube Lights, Frost Free Refrigerators, Distribution Transformers, Induction Motors, Direct Cool Refrigerator, electric storage type geyser, Ceiling fans, Color TVs, Agricultural pump sets, **LPG stoves**, Washing machine, Laptops, ballast, floor standing ACs,

office automation products, Diesel Generating sets & Diesel operating pumpsets

- Mandatory ratings needed for: Frost Free Refrigerator, Tubular Fluorescent Lamps, room air conditioners, Distribution Transformers, color TV, Direct Cool Refrigerator, electric storage type geyser
2. ***There are two variants of these labels, a big one and a smaller version:*** 1. Big label: The big energy rating label is aimed at appliances which have a constant usage and consume more electricity. These labels show additional information such as the yearly energy consumption of the product, brand name, product category and much more. For consumers, this big label is helpful as it allows you to calculate the actual money you would spend in electricity bills for that particular product. ***Products with a big label:*** Refrigerators, air-conditioners, geysers and washing machines.
2. Small Label: Small labels can be found in appliances which usually don't consume more energy. These labels just give you a visual representation of the energy consumption levels by showing star ratings. ***Products with a small label:*** Ceiling fans, tube lights, computers/laptops and televisions.

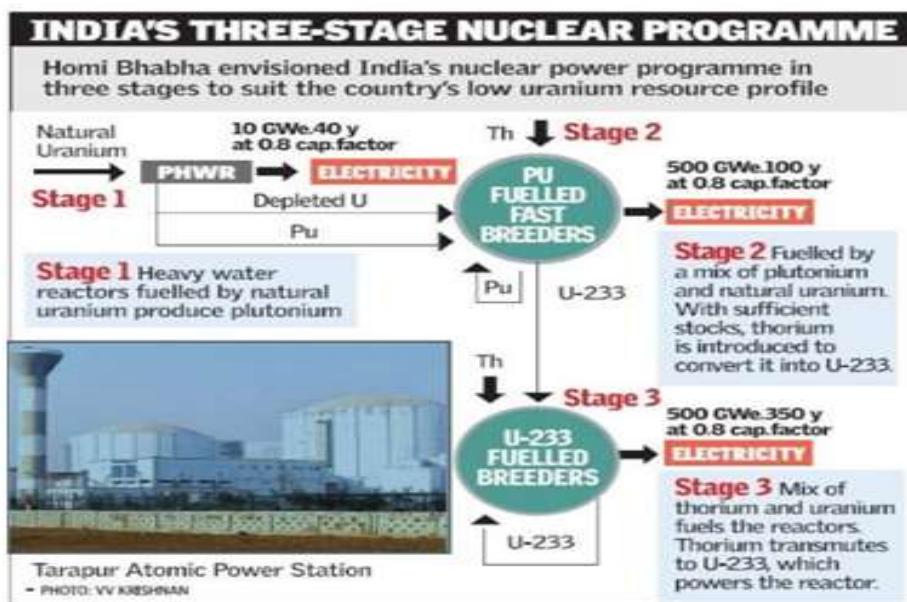


Bureau of Energy Efficiency (BEE)

- The BEE is a **statutory body** under the Ministry of Power, Government of India.
- The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 **Energy Conservation Act**

- It assists in developing policies and strategies with the primary objective of reducing the energy intensity of the Indian economy.

21. INDIA'S NUCLEAR PROGRAMME:



The ultimate focus of the programme is on **enabling the thorium reserves of India to be utilized** in meeting the country's energy requirements. Thorium is particularly attractive for India, as it has only around 1-2% of the global uranium reserves, but one of the **largest shares of global thorium reserves**.

Thorium itself is not a fissile material, and thus cannot undergo fission to produce energy. Instead, it must be transmuted to uranium-233 in a reactor fueled by other fissile materials [plutonium-239 or uranium-235].

STAGE I: $U-238 \rightarrow Plutonium-239 + Heat$ Natural uranium contains only 0.7% of the fissile isotope uranium-235. Most of the remaining 99.3% is uranium-238 which is not fissile but can be converted in a reactor to the fissile isotope plutonium-239]. Heavy water (deuterium oxide, D₂O) is used as moderator and coolant in PHWR.

Stage II – Fast Breeder Reactor In the second stage, fast breeder reactors (FBRs)[**moderators not required**] would use plutonium-239, recovered by reprocessing spent fuel from the first stage, and natural uranium. In FBRs, plutonium-239 undergoes fission to produce energy,

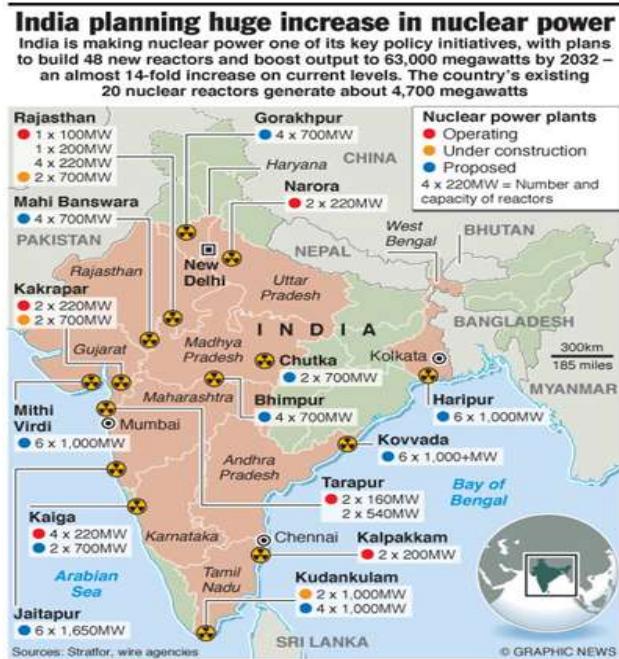
while the uranium-238 present in the fuel transmutes to additional plutonium-239.

- **Why fast?** The neutrons are not slowed down. There is **no need of a moderator**
- **Why breeder?** More fissionable material(Plutonium) will be present after the reaction than what was present before the reaction. It breeds fissile material.
- In FBR, **the fission chain reaction is sustained by fast moving neutrons.**
- **India and Russia** are the only two countries that are constructing commercial scale breeder reactors.
- **Solves 5 problems** — safety, competitiveness, shortage of fuel, reprocessing and refabricating the used nuclear fuel and radioactive waste. Enforcing non-proliferation of fission materials and weapon technologies
- As of August 2014, India's first **Prototype Fast Breeder Reactor at Kalpakkam** had been delayed

STAGE 3: THORIUM BASED REACTORS

- It is based on **the Thorium Uranium-233 Cycle.**
- Naturally occurring Thorium-232 is **not a fissile material**. It needs to be converted to a fissile material, **U-233, by transmutation in a FBR**
- In the second stage, once sufficient Pu-239 is built up, Thorium-232 is introduced as a blanket material **to be converted to Uranium-233.**

KAMINI (Kalpakkam Mini reactor) in Kalpakkam is the **world's only thorium-based experimental reactor**. It achieved criticality on 1996. **Designed and built jointly by the Bhabha Atomic Research Centre (BARC) and Indira Gandhi Centre for Atomic Research (IGCAR)**, it produces 30 KW of thermal energy at full power.



As of 2017, India has **22 nuclear reactors in operation in 7 nuclear power plants**. Tarapur is the largest nuclear power station in India

Department of Atomic Energy(DAE) : It is under the **direct charge of the Prime Minister**. Engaged in the development of nuclear power technology and applications of radiation technology.

Atomic Energy Commission(AEC): It is the governing body of the DAE. It organizes and promotes atomic research and train atomic researcher in the country. It is the main policy making body.

International Thermonuclear Experimental Reactor (ITER)

- It is an international **nuclear fusion research** and engineering mega project which will be the world's largest magnetic confinement plasma physics experiment
- What is Plasma Physics? It is the study of charged particles and fluids with interacting with self-consistent electric and magnetic fields
- **India is a part of ITER.**

Convention on Supplementary Compensation (CSC)

- It seeks to establish a uniform global regime for **compensation to victims in the unlikely event of a nuclear accident.**
- **India has ratified the convention.**

22. PROJECT ELEPHANT

- Project Elephant (PE), a **centrally sponsored scheme**, was launched in February 1992 to provide financial and technical support to major elephant bearing States in the country for protection of elephants, their habitats and corridors
- It also seeks to address the issues of human-elephant conflict and welfare of domesticated elephants. The Project is being **implemented in 13 States / UTs**, viz. Andhra pradesh , Arunachal Pradesh, Assam, Jharkhand , Karnataka , Kerala , Meghalaya , Nagaland , Orissa , Tamil Nadu , Uttranchal , Uttar Pradesh and West Bengal.
- There are **only 17 states in which elephants exist** in the wild state. Project Elephant has declared 24 elephant reserves in 12 states to protect elephant populations in the wild and develop their habitat.
- ASIAN ELEPHANT: ENDANGERED. Asian elephants inhabit grasslands, tropical evergreen forests, semi-evergreen forests, moist deciduous forests, dry deciduous forests and dry thorn forests, in addition to cultivated and secondary forests and scrublands.
- Elephant census, is conducted **once in 5 years** under the aegis of **Project elephant**. Elephant Counting Methods Employed in Census: i) **The direct counting method** is based on sightings of elephants. ii) **The indirect counting method** uses the elephant elephant '**dung decay**' formula, in which the analysis of dung is used to estimate the population of the elephant.

Mammoth count
Table lists State-wise population estimates of elephants as per census conducted during 2017



State	Count	State	Count
Karnataka	6,049	Uttar Pradesh	232
Assam	5,719	Tripura	102
Kerala	5,706	Andhra Pradesh	65
Tamil Nadu	2,761	Andaman & Nicobar Islands	25
Odisha	1,976	Bihar	25
Uttarakhand	1,839	Manipur	9
Meghalaya	1,754	Mizoram	7
Arunachal Pradesh	1,614	Madhya Pradesh	7
W.B. (north+south)	682	Haryana	7
Jharkhand	679	Himachal Pradesh	7
Nagaland	446	Maharashtra	6
Chhattisgarh	247		

23. Protected areas



1. PERIYAR National Park

- Periyar National Park and Wildlife Sanctuary (PNP) is a protected area located in the districts of Idukki and Pathanamthitta in Kerala, India.

The Periyar Tiger Reserve, named after the Periyar river, is one of Kerala's prestigious possessions on the High Ranges of the Western Ghats.

- It is notable as an **elephant reserve and a tiger reserve**. Two important rivers of Kerala, the Periyar and the Pamba. The park is located high in the Cardamom Hills and Pandalam Hills of the south Western Ghats . The Periyar and Pamba Rivers originate in the forests of the reserve
- The park is made up of **tropical evergreen and moist deciduous forests, grasslands, stands of eucalyptus, and lake and river ecosystems**.
- Tribes such as Mannans, Paliyans, Malayarayans, Mala Pandarams, Uralis and Ulladans live in these areas. Nellikkampetty sanctuary is located here.

2.DAMPA TIGER RESERVE

- Dampa Tiger Reserve or Dampha Tiger Reserve is a tiger reserve of **western Mizoram**, India. It covers an area of about 500 km² (190 sq mi) in the Lushai Hills.The word Dampa means "lonely men".
- Dampa Tiger Reserve hosts Indian leopard, sloth bear, gaur, serow, barking deer, wild boar, hoolock gibbon, Phayre's leaf monkey, gray langur, Rhesus macaque and slow lorises.
- Dampa Tiger Reserve has **one of the highest clouded leopard populations** in South and South East Asia.
- The National Tiger Conservation Authority recommended that tigers from Assam's Kaziranga National Park be introduced to Dampa Tiger Reserve

Clouded leopard : Vulnerable on the IUCN Red List. It is the State animal of Meghalaya. It has been added to India's Recovery Programme for Critically Endangered Species. In India, it occurs in Sikkim, northern West Bengal, Meghalaya subtropical forests, Tripura, Mizoram, Manipur, Assam, Nagaland and Arunachal Pradesh.

3. RAJAJI National park

- Rajaji National Park is an Indian national park and tiger reserve that encompasses the Shivaliks, near the foothills of the Himalayas. The park is spread over 820 km² and three districts of Uttarakhand: Haridwar, Dehradun and Pauri Garhwal.
- In 1983, three wildlife sanctuaries in the area namely, Chilla, Motichur and Rajaji sanctuaries were merged into one. The Ganga and Song rivers flow through the park.
- Distribution for both elephants and tigers in India. sloth bears, leopard cat,The two government prestigious wildlife conservation projects - The Project Elephant and The Project Tiger has now approved.

4.SATYAMANGALAM Tiger reserve

- The Sathyamangalam Tiger Reserve is the **confluence of two distinct geographical regions** of bio diversity landscape; Western Ghats and Eastern Ghats.
- Sathyamangalam forest range is a **significant wildlife corridor in the Nilgiri Biosphere Reserve** between the Western Ghats and the rest of the Eastern Ghats and a genetic link between the four other protected areas which it adjoins, including the Billigiriranga Swamy Temple Wildlife Sanctuary, Sigur Plateau, Mudumalai National Park and Bandipur National Park.

5. Nauradehi Wildlife Sanctuary-

- largest wildlife sanctuary of Madhya Pradesh state in India.
- The protected area sits astride two major river basins of India, namely the **Narmada**, flowing west to the Arabian Sea and the **Ganges**, flowing east to the Bay of Bengal.
- The flora consists of central Indian Monsoon forests, which include **tropical dry deciduous forest**. Major trees found are teak, saja, dhawda, sal, tendu (Coromandel ebony), bhirra (East Indian satinwood) and mahua.
- **Indian wolf is the keystone species** of Nauradehi Wildlife Sanctuary

- **Madhya Pradesh forest department has written to the National Tiger Conservation Authority to revive the plan to reintroduce cheetahs in the State's Nauradehi sanctuary.** The ambitious project, conceived in 2009, had hit a roadblock for want of funds.
- The country's last spotted feline died in Chhattisgarh in 1947. Later, the **cheetah — which is the fastest land animal — was declared extinct in India in 1952.** According to the earlier action plan, around 20 cheetahs were to be translocated to Nauradehi from Namibia in Africa.

6. Pench Tiger Reserve

- Pench Tiger Reserve or Pench National Park is one of the premier tiger reserves of India and the **first one to straddle across two states - Madhya Pradesh and Maharashtra.**
- Pench Tiger Reserve comprises the Indira Priyadarshini Pench National Park, the Pench Mowgli Sanctuary and a buffer. Pench Tiger reserve recorded highest number of tigers in India.
- It derives its name from its life line—the River Pench. Inside the park, the river flows from North to South before going on to join the Kanhan River
- **Madhya Pradesh's Pench sanctuary and Kerala's Periyar sanctuary** emerged as the best managed tiger reserves in the country, according to an evaluation of India's 50 tiger sanctuaries released along with the **4th National Tiger Estimation (Tiger census)** on Monday.

7. Kaziranga National Park

- In Assam which hosts **two-thirds of the world's great one-horned rhinoceroses (vulnerable on IUCN red-list)**, is a World Heritage Site
- The park is the breeding ground of **elephants, wild water buffalo, and swamp deer.**
- Declared a **Tiger Reserve** in 2006 (now the highest tiger density is in Orang National Park, Assam)
- Recognized as an **Important Bird Area by BirdLife International** for conservation of avifaunal species Located on the **edge of the Eastern Himalaya biodiversity hotspot**
- Vast expanse of **tall elephant grass, marshland, and dense tropical moist broadleaf forests.**
- The park area is circumscribed by the **Brahmaputra River**, which forms the northern and eastern boundaries, and the **Mora Diphlu,**

which forms the southern boundary. Other notable rivers within the park are the **Diphlu** and **Mora Dhansiri**.

8. Eravikulam National Park

- Located **along the Western Ghats** in the **Idukki district of Kerala** in India
- **first national park in Kerala.**
- Runs the nearby Mathikettan Shola National Park, Anamudi Shola National Park, Pambadum Shola National Park, Chinnar Wildlife Sanctuary and the Kurinjimala Sanctuary.
- Many perennial streams criss-cross the park. They merge to **form tributaries of the Periyar river in the west and of the Cauvery River in the east.** **Lakkom Water falls** is in this region.
- The largest surviving population of **Nilgiri tahr**, an endangered goat species.
- A new bright reddish-orange-coloured frog with multiple glands and extremely short limbs has been discovered in the Eravikulam National Park
- Three major types of plant communities are found in the Park – **grasslands, shrublands and forests.** **Neelakurunji**, a plant endemic to the Western Ghats, **blooms once every 12 years** is found in this national park.
- The catchment area of three important rivers, **Periyar, Chalakudy and Pambar** is located in this area.
- **The Muthuvans** are the indigenous people, who have traditionally been associated with the management of the park.

9. Parambikulam Tiger Reserve

- The protected area in Chittur taluk in **Palakkad district of Kerala** state
- The Western Ghats, Anamalai Sub-Cluster, including all of Parambikulam Wildlife Sanctuary, is under consideration by the **UNESCO World Heritage Committee** for selection as a World Heritage Site.
- The sanctuary is the home of four different tribes of indigenous peoples including the **Kadar, Malasar, Muduvar and Mala Malasar** settled in six colonies
- Parambikulam Tiger Reserve implements the **Participatory Forest Management Scheme (PFMS)**

- The sanctuary has **three man-made reservoirs- Parambikulam, Thunacadavu (Thunakkadavu) and Peruvaripallam**. The **Thuvaiar water falls** empty into one of the reservoirs.
- This sanctuary is also referred to as the "**state capital for the massive gaur**" by wildlife experts
- A recent survey held in the reserve spotted **221 varieties of butterflies, 11 of which were endemic** to the area.
 - **Buddha Peacock or Buddha Mayoori**, is the State butterfly of Kerala.

Integrated Development of Wildlife Habitat (IDWH)

- It is a centrally sponsored scheme launched to provide technical and financial assistance to States/UTs for protection of wildlife habitat.
- The activities covered under the scheme include: Staff development and capacity building, Wildlife research and evaluation, Anti-poaching activities, Wildlife veterinary care, Addressing man-animal conflict, Promoting eco-tourism.
- Financial assistance is also provided to States for the relocation of communities from within protected areas to other areas.
- The scheme includes three components:
 - a) **Support to Protected Areas** (National Parks, Wildlife Sanctuaries, 1. Conservation Reserves & Community Reserves) All Protected Areas (PAs) in different states are eligible for assistance, except those areas which receive assistance under Project Tiger.
 - b) **Protection of Wildlife outside Protected Areas** Many wildlife habitats fall outside the network of protected areas. Under this component, funds are granted against Biodiversity Plans prepared by Chief Wildlife Wardens of the respective States. Priority is given to regions contiguous to the Protected Areas.
 - c) **Recovery Program for critically endangered habitats and species** 16 species have been identified for recovery under this component. These are snow leopard, bastard, dolphin, hangul, Nilgiri Tahr, marine turtles, dugongs, edible nest swiftlet, Asian wild buffalo, Nicobar Megapode, vultures, Malabar Civet, Indian rhino, Asiatic lions, Swamp

deer, Jerdon's Courser and Brown antlered deer. A scientific Recovery Plan has to be prepared by the Chief Wildlife Warden in each state.

24. National Green Tribunal (NGT)

- It is a specialised body set up under the **National Green Tribunal Act (2010)** for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources.
- With the establishment of the NGT, India became the **third country in the world to set up a specialised environmental tribunal**, only after Australia and New Zealand, and the first developing country to do so.
- NGT is mandated to make disposal of applications or appeals finally **within 6 months of filing of the same**.
- The NGT has five places of sittings, New Delhi is the Principal place of sitting and Bhopal, Pune, Kolkata and Chennai are the other four.
- Structure of NGT

The Tribunal comprises of the **Chairperson, the Judicial Members and Expert Members**. They shall hold office for term of five years and are not eligible for reappointment. The Chairperson is appointed by the Central Government in consultation with Chief Justice of India (CJI)

- Powers & Jurisdiction

The Tribunal **has jurisdiction over all civil cases involving substantial question relating to environment**. Being a statutory adjudicatory body like Courts, apart from original jurisdiction side on filing of an application, NGT also has appellate jurisdiction to hear appeal as a Court (Tribunal).

The Tribunal is **not bound by the procedure laid down under the Code of Civil Procedure 1908**, but shall be guided by principles of 'natural justice'.

While passing any order/decision/ award, it shall apply the principles of sustainable development, the precautionary principle and the polluter pays principle.

NGT by an order, can provide relief and compensation to the victims of pollution and other environmental damage (including accident occurring while handling any hazardous substance), for restitution of property damaged, and for restitution of the environment for such area or areas, as the Tribunal may think fit.

An appeal against order/decision/ award of the NGT lies to the Supreme Court, generally within ninety days from the date of communication.

The NGT deals with **civil cases under the seven laws** related to the environment, these include:

The Water (Prevention and Control of Pollution) Act, 1974,
The Water (Prevention and Control of Pollution) Cess Act, 1977,
The Forest (Conservation) Act, 1980,
The Air (Prevention and Control of Pollution) Act, 1981,
The Environment (Protection) Act, 1986,
The Public Liability Insurance Act, 1991 and
The Biological Diversity Act, 2002.

Any violation pertaining to these laws or any decision taken by the Government under these laws can be challenged before the NGT.

The NGT has been instrumental in ensuring that the Environment Impact Assessment process is strictly observed.

Two important acts - **Wildlife (Protection) Act, 1972 and Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** have been kept out of NGT's jurisdiction.

25. RAT HOLE MINING

A coal mine in Meghalaya's East Jaintia Hills collapsed recently, trapping at least 15 workers who are feared dead.

Rat hole mining involves digging of very small tunnels, usually only 3-4 feet high, which workers (often children) enter and extract coal. The rat-hole mining is broadly of two types - side-cutting and box-cutting.

Why is it very prevalent?

In Jharkhand, the coal layer is extremely thick, where open-cast mining can be done. But no other method would be economically viable in Meghalaya, where the **coal seam is extremely thin**. Rat-hole mining is the locally developed technique and the most commonly used one.

It is **not regulated by any law**, and coal extraction has been made by unscrupulous elements in a most illegal and unscientific manner.

What are the impacts?

Ecology - Rat-hole mining in Meghalaya had caused the **water in the Kopili river (flows through Meghalaya and Assam) to turn acidic**.

This is getting to be a major source of **air, water and soil pollution**.

What are the shortcomings?

Ban - The National Green Tribunal (NGT) has banned rat-hole mining in 2014, and retained the ban in 2015.

The state has in place the Meghalaya Mines and Mineral Policy, 2012; but the NGT finds it inadequate.

Protection - Constitution's 6th Schedule intends to protect the community's ownership over its land and autonomy and consent over its nature of use. Despite the presence of coal reserves, commercial mining is not practiced in the North-Eastern regions because of terrain's unsuitability as well as nature of coal deposits. Open mining cannot be practiced due to the added difficulties. Further, the coal found in North-East contains lots of sulfur. This overall reduces the energy efficiency and therefore this type of coal is categorized as bad quality of coal.

26. Asiatic cheetah

- It was locally extinct in India and elsewhere, except a very small critically endangered and fragmented population of last few, places in Iran
- One of the largest of these seasonal wetlands in the Banni is Chari-Dhand Wetland Conservation Reserve which has been accorded special protected status as a protected or reserve forest to conserve its wildlife and visiting migratory birds
- The Banni grasslands are under pressure due to man-made factors which are overgrazing, invasion by Prosopis juliflora(locally called ganda bowl), an exotic thorny tree, and natural factors which are recurring droughts and salinity ingress

27. Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD), a legally binding treaty to conserve biodiversity has been in force since 1993. It has 3 main objectives:

The **conservation** of biological diversity.

The **sustainable use** of the components of biological diversity.

The **fair and equitable sharing** of the benefits arising out of the utilization of genetic resources.

- Nearly all countries have ratified it (notably, the US has signed but not ratified).
- The CBD Secretariat is based in Montreal, Canada and it operates under the United Nations Environment Programme.
- The Parties (Countries) under Convention of Biodiversity (CBD), meet at regular interval and these meetings are called Conference of Parties (COP).
- On 29 January 2000, the Conference of the Parties to the Convention on Biological Diversity (COP5) adopted a supplementary agreement to the Convention known as the **Cartagena Protocol on Bio safety**. It came into force on 11 September 2003. The Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology.
- The **Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization**

(ABS) to the Convention on Biological Diversity was adopted on 29 October 2010 in Nagoya, Japan at COP10. It entered into force on 12 October 2014.

It provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. It not only applies to genetic resources that are covered by the CBD, and to the benefits arising from their utilization but also covers traditional knowledge (TK) associated with genetic resources that are covered by the CBD and the benefits arising from its utilization.

- Along with Nagoya Protocol on Genetic Resources, the COP-10 also adopted a ten-year framework for action by all countries to save biodiversity.
- Officially known as “Strategic Plan for Biodiversity 2011-2020”, provide a set of 20 ambitious yet achievable targets (divided into 5 sections: A to E), collectively known as the **Aichi Targets for biodiversity**.
- India enacted **Biological Diversity Act in 2002** for giving effect to the provisions of the CBD. The **National Biodiversity Authority is a statutory body**, which was established by the Central Government in 2003 to implement India’s Biological Diversity Act (2002).

It performs facilitative, regulatory and advisory functions for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.

- International Biological Diversity Day is observed on 22 May. Theme for 2018: "Celebrating 25 Years of Action for Biodiversity".
- United Nations General Assembly had declared the period 2011-2020 to be the “United Nations Decade on Biodiversity”.
- **India submitted its sixth national report (NR6)** to the Convention on Biological Diversity (CBD). The submission of national reports is a mandatory obligation on parties to international treaties, including the CBD. India developed 12 National Biodiversity Targets in line with 20 global Aichi biodiversity targets.

28. Shale gas

- Shale gas is natural gas produced from **shale, a type of sedimentary rock.**
- In a 2013 report, the US Energy Information Administration estimated the quantity of technically recoverable shale gas for 41 countries. North America leads the worldwide production of shale gas, with the **US and Canada** having significant levels. Beyond the US and Canada, shale gas is so far produced at a commercial scale only **in Argentina and China**.
- **Hydraulic Fracturing**- also called fracking, fracing, hydrofracking, fracing, frac'ing, and hydrofracturing is a **well stimulation technique in which rock is fractured by a pressurized liquid**. The process involves the high-pressure injection of 'fracking fluid' (primarily water, containing sand or other proppants suspended with the aid of thickening agents) into a wellbore to create cracks in the deep-rock formations through which natural gas, petroleum, and brine will flow more freely.
- Methane leakage is also a problem directly associated with hydraulic fracturing, as an Environmental Defense Fund (EDF) report in the US highlights.
- As per the US EIA 2015 report, **India has got technically recoverable shale gas** of 96 trillion cubic feet.
- The recoverable reserves are identified in **Cambay, Krishna - Godavari, Cauvery, Damodar Valley, Upper Assam, Pranahita - Godavari, Rajasthan and Vindhya Basins**.
- "The US has permian shale while India has much younger, tertiary shale. The US shale rocks are brittle and so easier to hydrofrack while those in India are elastic with more clay content, resulting in little yield from fracking"
- Conventional reservoirs of oil and natural gas are found in permeable sandstone.Unconventional Gas Reservoirs occur in relatively impermeable sandstones, in joints and fractures or absorbed into the matrix of shales [Shale is a Sedimentary Rock], and in coal.Given current economic conditions and state of technology, they are more expensive to exploit.Example: Tight gas, shale gas, and coalbed methane.

29. Convention on the Conservation of Migratory Species of Wild Animals

- Also called **Bonn Convention**, is an international agreement that aims to conserve migratory species within their migratory ranges. The Agreement was signed under the auspices of the **United Nations Environment Programme (UNEP)**
- Signed in 1979 in Bonn, Germany, the Convention entered into force in 1983. As of September 2019, there were 129 Member States to the Convention.
- The CMS is the **only global, and United Nations-based, intergovernmental organization** established exclusively for the conservation and management of **terrestrial, aquatic and avian migratory species**. The CMS, and its daughter Agreements, determine policy and provide further guidance on specific issues through their Strategic Plans, Action Plans, resolutions, decisions and guidelines.
- The **Conference of the Parties** of the CMS acts as its **principal decision-making body**. It is composed of all States Parties to the Convention, as well as any observers that wish to participate in the proceedings of the Conference. COPs are held at least every three years.
- The Government of India is Signatory to the Convention on Conservation of Migratory wild Animals (CMS) since 1983. It has hosted COP 13 in Gandhinagar, Gujarat
- The theme of CMS COP13 in India is, "**Migratory species connect the planet and we welcome them home**." The CMS COP 13 logo is inspired by '**Kolam**', a traditional artform from southern India. In the logo of CMS COP-13, Kolam art form is used to depict key migratory species in India like **Amur falcon, humpback whale and marine turtles**.
- The mascot for CMS COP13, "**Gibi - The Great Indian Bustard**" is a critically endangered species which has been accorded the highest protection status under the Wildlife Protection Act, 1972.



"Gibi" the enchanting Great Indian Bustard, representing all the endangered species that need our love, care, and protection.



- The Indian sub-continent is also part of the major bird flyway network, i.e, **the Central Asian Flyway (CAF)** that covers areas between the Arctic and Indian Oceans, and covers at least 279 populations of 182 migratory water bird species, including 29 globally threatened species.
- India is home to several migratory species of wildlife including snow leopard, Amur falcons, bar headed Geese, black necked cranes, marine turtles, dugongs, humpbacked whales, etc. and has signed non legally binding MOU with CMS on the conservation and management of Siberian Cranes (1998), Marine Turtles (2007), Dugongs (2008) and Raptors (2016).

30. **Dugong**

- IUCN Status- **Vulnerable**.
- The dugong is a species of sea cow found throughout the **warm latitudes of the Indian and western Pacific Oceans**.
- The dugong, like all sea cows, is herbivorous. It primarily grazes on sea grasses and therefore spends most of its time in sea grass beds.
- Maximum Population of Dugong is **found in Red Sea**, followed by the Persian Gulf. Largest Dugong was as long as 13.5 ft and was found in

Gulf of Kutch in India. In India, they are found in **Gulf of Kutch**, the only population remaining in western India and **Gulf of Mannar**.

- Dugong, a vulnerable marine mammal is the flagship mammal of the gulf of mannar marine national park



Whale Shark

- World's largest known extant fish species.
- IUCN:Endangered.
- Kerala,Lakshadweep, Gulf of Kutch and Saurashtra coast of Gujarat in India.



- It was added to Schedule I of India's Wild Life (Protection) Act, 1972 in May 2001, thereby according it the highest level of protection in the country.

Marine Turtle

- Sea turtles can be found in all oceans except for the polar regions.
- Five species of sea turtles are known to inhabit Indian coastal waters and islands.

- These are the **Olive Ridley** (*Lepidochelys olivacea*), **Green** (*Chelonia mydas*), **Hawksbill** (*Eretmochelys imbricata*), **Loggerhead** (*Caretta caretta*) and the **Leatherback** (*Dermochelys coriacea*) turtles.
- Except the Loggerhead, the remaining four species nest along the Indian coast. The coastal state of Odisha on the eastern coast of India experiences one of the world's largest mass nestings or arribada of the Olive Ridley turtle during the months of October to April. Three of the world's major mass nesting beaches for this species are located in Odisha.
- The olive ridley sea turtle has been listed on Schedule – I of the Indian Wildlife (Protection) Act, 1972 (amended 1991). The species is **listed as vulnerable under IUCN**. The sea turtles are protected under the 'Migratory Species Convention' and Convention of International Trade on Wildlife Flora and Fauna (CITES). The olive ridley sea turtle nests at several sites in the western Indian Ocean, Indian subcontinent and Southeast Asia.
- An average of 1,000 leatherback nests is found across the Andaman and Nicobar islands over the years, making this a significant nesting population in the South Asian region — and the only one in India.
- The leatherback is the largest sea turtle in the world and is considered a vulnerable species by the International Union for Conservation of Nature (IUCN).
- Green Turtle- Endangered
Hawksbill- Critically Endangered
Leatherback Sea Turtle- Vulnerable
Loggerhead-Endangered

Black Necked Crane

- State bird of Jammu and Kashmir.
- In Arunachal, the bird winters in three areas: the Sangti valley in West Kameng district, and Zemithang and the Chug valley in Tawang district.



- The people in Sangti, Zemithang and Chug are mostly Monpas, who follow Tibetan Buddhism, which considers the black-necked crane as an embodiment of the sixth Dalai Lama. They thus revere the bird.
- The black-necked crane is currently listed in Schedule I of Wildlife (Protection) Act 1972 .
- Endangered on the IUCN Red List.

Amur Falcon

- IUCN status: Least Concern.
- They are protected under the Wildlife (Protection) Act, 1972.
- The Nagaland government hosted the first Amur Falcon Conservation Week in 2018.
- Amur Falcon festival- Manipur(2018), Assam(2019)

31. Global Snow Leopard and Ecosystem Programme

The Global Snow Leopard & Ecosystem Protection Plan (GSLEP) is a joint initiative of range country governments, international agencies, civil society, and the private sector.

- It is a high-level intergovernmental alliance of 12 snow leopard range countries:Russia, China, Mongolia, Kazakhstan ,Kyrgyzstan ,Uzbekistan, Tajikistan, India, Nepal, Bhutan, Afghanistan, Pakistan.
- “National-level estimation processes are done for tigers, rhinos and elephants. With this protocol, the same can be done for snow leopards.

- With the adoption of the **Bishkek Declaration**, the snow leopard range countries have pledged to **secure 20 snow leopard landscapes by 2020.**
- Snow Leopard Population Assessment- prepared by the Wildlife Institute of India, Nature Conservation Foundation, GSLEP technical committee, Global Tiger Initiative council, World Wide Fund for Nature, World Bank, Global Tiger Forum, and Wildlife Conservation Trust.
- IUCN- Vulnerable. Schedule 1 of WPA, 1972.

32. Bar-headed Goose

- It has been spotted in the wetlands of Karingali Puncha in Pathanamthitta District of Kerala.
- IUCN: Least concern
- The Bar-headed geese (*Anser Indicus*) are found in central China and Mongolia and they breed there.
- They start migration to the Indian sub-continent during the winter and stay here till the end of the season.
- They return to their homes by crossing the Himalayan ranges. Their migration has been a fascination for birders as they cross the Himalayas on one of the most high-altitude migrations in the world.
- In general, large flocks visit the Koothanthurai bird sanctuary at Tirunelveli in Tamil Nadu. It is very rare that the bird is spotted in Kerala.
- The wetlands of Karingali Puncha is a major birding spot in the district. It reported the highest bird count in the Asian Waterbird Census of 2015.

Hump-backed mahseer

- Found in the waters of the Cauvery, has been added to the Red List as **Critically Endangered**
- This tiger does not have stripes. But the hump-backed mahseer—a large freshwater fish also called the tiger of the water and found only in the Cauvery river basin

- More threatened than the tiger is, as per the International Union for Conservation of Nature's Red List of Threatened Species.
- Shoal (an international organisation working to conserve freshwater species) initiated 'Project Mahseer'

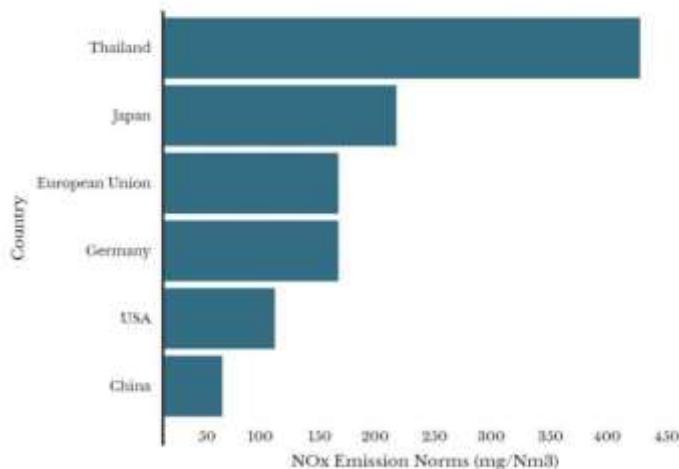
33. Asian Waterbird Census

- Every January, thousands of volunteers across Asia and Australasia visit wetlands in their country and count waterbirds. This citizen science programme is the Asian Waterbird Census (AWC).
- The AWC was initiated in 1987 in the Indian subcontinent. The census covers the entire East Asian – Australasian Flyway and a large part of the Central Asian Flyway.
- The main objective is to obtain annual information of waterbird populations at wetlands in the region, the status of wetlands, and encourage interest in waterbirds and wetlands among the public and thereby promote conservation.
- The AWC is an integral part of the global waterbird monitoring programme, the International Waterbird Census (IWC), coordinated by Wetlands international.

34. Power Plant Emission Standards

- NOx is a toxic gas that can cause respiratory infections and sicken or kill people after it takes the form of PM 2.5 – airborne particles 30 times finer than a human hair that enter the lungs. Power plants are one of the chief polluters of India's air pollution.
- The NTPC pilot included two technologies: **Selective Catalytic Reduction** or SCR and **Selective Non-catalytic Reduction** or SNCR.
- These methods have been employed globally for more than 40 years to reduce NOx emissions by using ammonia or urea to break NOx into nitrogen and water. Called secondary methods, they cut NOx from the smoke duct, known as the flue, post combustion.

Global Scenario Of Emission Standard



- NOx is produced from the reaction of nitrogen and oxygen gases in the air during combustion, especially at high temperatures. Primary Pollutant
- NOx is also **responsible for smog and the typical brown cloud** that covers larger cities and produces poor air quality. NOx emissions contribute to acid rain and formation of ground-level ozone that can damage ecosystems, animal and plant life.
- NOx reacts with ammonium (NH_4^+), water vapor and other compounds and forms nitric acid (HNO_3) and small particles.
- NOx reacts with volatile organic compounds in the presence of sunlight and **forms ground-level ozone**. Ozone can be transported with wind over longer distances.

35. IUCN

International organization working in the field of nature conservation and sustainable use of natural resources. It is involved in data gathering and analysis, research, field projects, advocacy, and education.

Over the past decades, IUCN has widened its focus beyond conservation ecology and now incorporates issues related to sustainable development in its projects.

IUCN does not itself aim to mobilize the public in support of nature conservation. It **tries to influence the actions of governments, business and other stakeholders by providing information and advice, and through building partnerships.**

The organization is best known to the wider public for compiling and publishing the **IUCN Red List of Threatened Species**, which assesses the conservation status of species worldwide. HQ- Gland, Switzerland

IUCN has **observer and consultative status at the United Nations** and plays a role in the implementation of several international conventions on nature conservation and biodiversity. It was involved in establishing the World Wide Fund for Nature and the World Conservation Monitoring Centre

IUCN was one of the few environmental organisations formally involved in the preparations of the United Nations Conference on the Human Environment (Stockholm, 1972). The Stockholm Conference eventually led to three new international conventions, with IUCN involved in their drafting and implementation:

- i) **Convention Concerning the Protection of World Cultural and Natural Heritage** (1972). IUCN co-drafted the World Heritage Convention with UNESCO and has been involved as the official Advisory Body on nature from the onset.
- ii) **CITES- the Convention on International Trade in Endangered Species of Wild Fauna and Flora** (1974) IUCN is a signatory party and the CITES secretariat was originally lodged with IUCN.
- iii) **Ramsar Convention – Convention on Wetlands of International Importance** (1975). The secretariat is still administered from IUCN's headquarters.

In 1991, IUCN (together with UNEP and WWF) published **Caring for the Earth**, a successor to the World Conservation Strategy.

The increased attention on sustainable development as a means to protect nature brought IUCN closer to the corporate sector. The members decided against this, but IUCN did forge a partnership with the World Business Council for Sustainable Development. IUCN renewed a multi-year MOU with them with WBCSD in December 2015.

The **IUCN Global Business and Biodiversity Program (BBP)** was established in 2003 to influence and support private partners in addressing environmental and social issues

Red list- The (IUCN) Red List of Threatened Species (also known as the (IUCN) Red List or Red Data List), founded in **1964, is the world's most comprehensive inventory of the global conservation status of biological species.** It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies.

36. Blue Flag Certification

- The Blue Flag is one of the world's most recognised voluntary eco-labels awarded to beaches, marinas, and sustainable boating tourism operators.
- In order to qualify for the Blue Flag, a series of stringent environmental, educational, safety, and accessibility criteria must be met and maintained.
- There are nearly 33 criteria that must be met to qualify for a Blue Flag certification, such as the water meets certain quality standards, having waste disposal facilities, being disabled-friendly, have first aid equipment etc.
- The Blue Flag Programme for beaches and marinas is run by the international, non-governmental, non-profit organisation FEE (the Foundation for Environmental Education).

- The MoEFCC has embarked upon a programme for 'Blue Flag' Certification for select beaches in the country. 13 pilot beaches have been identified for the certification.
- These include Ghoghala Beach (Diu), Shivrajpur beach (Gujarat), Bhogave (Maharashtra), Padubidri and Kasarkod (Karnataka), Kappad beach (Kerala) etc.
- **Chandrabhaga beach of Odisha's Konark coast** was the first to complete the tag certification process will be the first in Asia to get the Blue Flag certification.
- Society for Integrated Coastal Management (SICOM), an Environment Ministry's body working for the management of coastal areas, in accordance with the Blue Flag standards.

37. CRZ

- Under the **Environment Protection Act, 1986** of India, notification was issued in 1991, for **regulation of activities in the coastal area** by the Ministry of Environment and Forests (MoEF).
- As per the notification, the coastal land up to 500m from the High Tide Line (HTL) and a stage of 100m along banks of creeks, estuaries, backwater and rivers subject to tidal fluctuations, is called the Coastal Regulation Zone(CRZ).
- CRZ along the country has been placed in four categories depending on their land use and regulated developmental activities in the areas:
 - **CRZ-1:** It is the **ecologically sensitive area** that is essential for maintaining the ecosystem of the coast. It lies **between low and high tide line** and includes the areas like mangroves, coral reefs and sand dunes. It was off-limits for tourism activities and infrastructure development, except for defence, strategic and rare public utility projects.
 - **CRZ-2:** These areas form up to the shoreline of the coast. Unauthorised structures are not allowed to construct in this zone.
 - **CRZ-3:** Rural and urban localities which fall outside the 1 and 2. Only certain activities related to agriculture even some public facilities are allowed in this zone.

- **CRZ-4:** It includes the shallow belt of coastal waters extending up to 12 nautical miles. It is a crucial fishing zone for small fishers.
- CRZ Notification 2018 is based on the recommendations of **Shailesh Nayak committee**.
- The Union **Ministry of Environment, Forest and Climate Change notifies** the 2019 Coastal Regulation Zone (CRZ) norms, replacing the existing CRZ norms of 2011.



- CRZ limits on land along the tidal influenced water bodies has been proposed to be reduced from 100 meters or the width of the creek, whichever is less, to 50 meters or the width of the creek, whichever is less.
- A No Development Zone (NDZ) of 20 meters has been proposed to be stipulated for all Islands close to the main land coast and for all Backwater Islands in the main land.
- The procedure for **CRZ clearances has been simplified and delegations** have been made at various levels for recommending/according CRZ clearances to the projects/activities. Only such projects/activities, which are

- located in the CRZ-I & IV areas, shall be dealt with for CRZ clearance by the MoEF&CC
- For CRZ-III areas, two separate categories have been proposed viz.:
 - a) **CRZ-III A** – Densely populated rural areas with a population density of 2161 per square kilometre as per 2011 Census. Such areas shall have an NDZ of 50 meters from the HTL as against 200 meters from the HTL stipulated in the CRZ Notification, 2011.
 - b) **CRZ-III B** – Rural areas with population density of below 2161 per square kilometre as per 2011 Census. Such areas shall continue to have an NDZ of 200 meters from the HTL.

38. Locust attack

- Over the past several weeks, locust attacks emanating from the desert area in Pakistan have struck parts of Rajasthan and Gujarat, causing heavy damage to standing crop.
- Locusts are a group of **short-horned grasshoppers** that multiply in numbers as they migrate long distances in destructive swarms.
- India has a locust control and research scheme that is being implemented through the **Locust Warning Organisation (LWO)**, established in 1939 and **amalgamated in 1946 with the Directorate of Plant Protection Quarantine and Storage (PPQS)** of the Ministry of Agriculture, according to the PPQS.
- The LWO's responsibility is monitoring and control of the locust situation in Scheduled Desert Areas, mainly in Rajasthan and Gujarat, and partly in Punjab and Haryana
- Although **no locust plague cycles have been observed after 1962**, during 1978 and 1993, largescale attacks were reported. India is most at risk of a swarm invasion just before the onset of the monsoon. The swarms usually originate in the **Arabian Peninsula and the Horn of Africa**.
- They live for 90 days and eat voraciously — the equivalent to their bodyweight every day. They feed on green, leafy plants. **The**

favourable conditions for breeding include moist sandy or sand / clay soil to a depth of 10-15 cm below the surface, or some bare areas for egg-laying, and green vegetation for hopper development.

- In the current case, climate change-induced unseasonal rain or frequent cyclones have been considered to be the main reasons for the infestations.
- Ten types of chemicals divided into three categories are recommended to be used for controlling locusts by the United Nations Food and Agriculture Organization (FAO).
 - a) The first category is mycoinsecticide (for instance, Metarhizium acridum). This is of low risk to non-target organisms including birds and reptiles which ingest the treated locusts.
 - b) The second category is insect growth regulators (like diflubenzuron, teflubenzuron and triflumuron). It is very low human toxicity and is less hazardous in comparison to neurotoxic insecticides although there are some adverse effects on certain non-target organisms, especially aquatic arthropods.
 - c) The Organophosphate s should be the last resort, according to the FAO. Organophosphates are a group of chemicals that were initially developed as human nerve agents during the 1930s and 1940s to be used by Nazi Germany during World War II.

39. Great Indian Bustard

- Historically, the great Indian bustard was **distributed throughout Western India, spanning 11 states, as well as parts of Pakistan.**
- Its stronghold was once the Thar desert in the north-west and the Deccan plateau of the peninsula. Today, its population is confined mostly to Rajasthan and Gujarat. Small population occur in Maharashtra, Karnataka and Andhra Pradesh.
- Bustards generally favour flat open landscapes with minimal visual obstruction and disturbance, therefore **adapt well in grasslands.**

- Listed in **Schedule I** of the Indian Wildlife (Protection)Act, 1972, in the CMS Convention and in Appendix I of CITES, as **Critically Endangered on the IUCN Red List**. It has also been identified as one of the species for the **recovery programme** under the Integrated Development of Wildlife Habitats .
- **Protected areas**

1. Desert National Park Sanctuary — Rajasthan
2. Rollapadu Wildlife Sanctuary – Andhra Pradesh
3. Karera Wildlife Sanctuary– Madhya Pradesh



40. Papikonda National Park

The Forest Department and experts from Kerala and northeastern States will begin the maiden survey of butterfly species in the Papikonda National Park (PNP).The PNP spreads over 1012.86 square kilometres in East and West Godavari districts of Andhra Pradesh.

- It has historically experienced varying levels of protection, beginning as a reserved forest in 1882, a wildlife sanctuary in 1978, and as a national park from 2008.
- The park lies on the left and right **banks of the river Godavari** and cuts through the Papikonda hill range of Eastern Ghats. The River Godavari enriches the Papikonda Park with its natural beauty.

- The majority of the area of the park is covered with **moist deciduous forest and includes animal species such as tigers, mouse deer, gaur etc.**
- It is an**Important Bird and Biodiversity Area (in 2016)**
- **Indian golden gecko, endemic to the Eastern Ghats** was reported from this national park.

41. **Keystone Species**

A keystone species is a species which has a **disproportionately large effect on its natural environment** relative to its abundance, a concept introduced in 1969 by the zoologist Robert T. Paine.

Such species are described as playing a **critical role in maintaining the structure of an ecological community**, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community.

Without keystone species, the ecosystem would be dramatically different or cease to exist altogether. **Example- Otter, bees , butterfly, hummingbird, Arjuna tree in Kar**

42. **Biomedical Waste Management**

- Bio-Medical Waste Management Rules, 2016 Rules have been amended to improve compliance and strengthen the implementation of environmentally sound management of biomedical waste in India.
- Salient features of Bio-Medical Waste Management (Amendment) Rules, 2018 are as follows:
 1. Bio-medical waste generators including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, health care facilities, and clinical establishments will have **to phase out chlorinated plastic bags** (excluding blood bags) and gloves by March 27, 2019.

2. All healthcare facilities shall make available the **annual report** on its website within a period of two years from the date of publication of the Bio-Medical Waste Management (Amendment) Rules, 2018.
 3. Operators of **common bio-medical waste treatment and disposal facilities** shall establish **bar coding and global positioning system** for handling of bio-medical waste in accordance with guidelines issued by the Central Pollution Control Board by March 27, 2019.
 5. **The State Pollution Control Boards/ Pollution Control Committees** have to compile, review and analyze the information received and send this information to the Central Pollution Control Board
- **CPCB**- Statutory organisation under the Ministry of Environment, Forest and Climate Change. It was established in 1974 **under the Water (Prevention and Control of pollution) Act, 1974**. The CPCB is also entrusted with the powers and functions under the **Air (Prevention and Control of Pollution) Act, 1981**. It serves as a field formation and also provides technical services to the Ministry of Environment and Forests under the provisions of the Environment (Protection) Act, 1986.
 - The board is **led by its Chairperson, who is generally a career civil servant** from the Indian Administrative Service **appointed by the Appointments Committee of the Cabinet** of the Government of India.
 - Runs **National Air Quality Monitoring Programme**
 - Under N.A.M.P four air pollutants viz ., Sulphur Dioxide (SO₂), Oxides of Nitrogen as NO₂, Respirable Suspended Particulate Matter (RSPM / PM10) and Fine Particulate Matter (PM2.5) have been identified for regular monitoring at all the locations.
 - objectives of the N.A.M.P. are to determine status and trends of ambient air quality; to ascertain whether the prescribed ambient air quality standards are violated; to Identify Non-attainment Cities; to obtain the knowledge and understanding necessary for developing preventive and corrective measures
 - CPCB has the **responsibility to regulate and control noise** producing and generating sources with the objective of maintaining the ambient air quality standards.
 - Urban area programme (**EcoCity Programme**)

43. Food fortification

- Food fortification or enrichment is the process of adding micronutrients like vitamins and minerals (Iron, Zinc, Vitamin A and D) to food
 - Micronutrient requirements differ between organisms
 - For human nutrition, micronutrient requirements are in amounts generally less than 100 milligrams per day
- As outlined by the FAO, the most commonly fortified foods are cereals and cereal-based products; milk and dairy products; fats and oils; accessory food items; tea and other beverages; and infant formulas.
- deficiency of micronutrients or micronutrient malnutrition, also known as “hidden hunger”, is a serious health risk.
- **FSSAI** has formulated a comprehensive regulation on fortification of foods namely '**Food Safety and Standards (Fortification of Foods) Regulations, 2016**'. These regulations set the standards for food fortification and encourage the production, manufacture, distribution, sale and consumption of fortified foods.
- **Biofortification** is the idea of breeding crops to increase their nutritional value. This can be done either through conventional selective breeding, or through genetic engineering.
- Biofortification differs from ordinary fortification because it focuses on making plant foods more nutritious as the plants are growing, rather than having nutrients added to the foods when they are being processed

44. UN Clean Air Initiative

- The UN, the World Health Organization (WHO), the UN Environment Programme (UNEP) and the Climate and Clean Air Coalition (CCAC) have announced the ‘Clean Air Initiative,’ which calls on **national and subnational governments to commit to achieving air quality** that is safe for citizens, and to align climate change and air pollution policies by 2030.
- The Initiative seeks to simultaneously mitigate climate change, reduce air pollution and promote health, in a comprehensive manner.
- According to WHO, **air pollution causes seven million premature deaths every year**, 600,000 of which are children. The World Bank found that air pollution costs the global economy an estimated USD 5.11 trillion in welfare losses, and in the 15 highest-emitting countries, the

health impacts of air pollution **cost more than 4% of gross domestic product (GDP)**.

- The Initiative involves commitments to:
 - ✓ implement air quality and climate change policies that will achieve the WHO Ambient Air Quality Guideline values;
 - ✓ implement e-mobility and sustainable mobility policies and actions to contribute to the reduction of road transport emissions;
 - ✓ assess the number of saved lives, health gains in children and other vulnerable groups, and avoided financial costs to health systems from implementing policies; and
 - ✓ track progress and share experiences and best practices through an international network supported by the **Breathelife** campaign.
- Note - **The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC)** was launched by the United Nations Environment Programme (**UNEP**) and six countries — **Bangladesh, Canada, Ghana, Mexico, Sweden, and the United States** — on 16 February 2012. The CCAC aims to catalyze **rapid reductions in short-lived climate pollutants** to protect human health, agriculture and the environment. **India** has formally **joined** the Climate & Clean Air Coalition (CCAC), becoming the 65th country to join the partnership.

Climate Action Summit,2019: The UN is calling all the states to participate in Climate Action Summit with concrete, realistic plans to **enhance their nationally determined contributions by 2020**, in line with **reducing greenhouse gas emissions by 45 per cent** over the next decade, and **net zero emissions by 2050**.

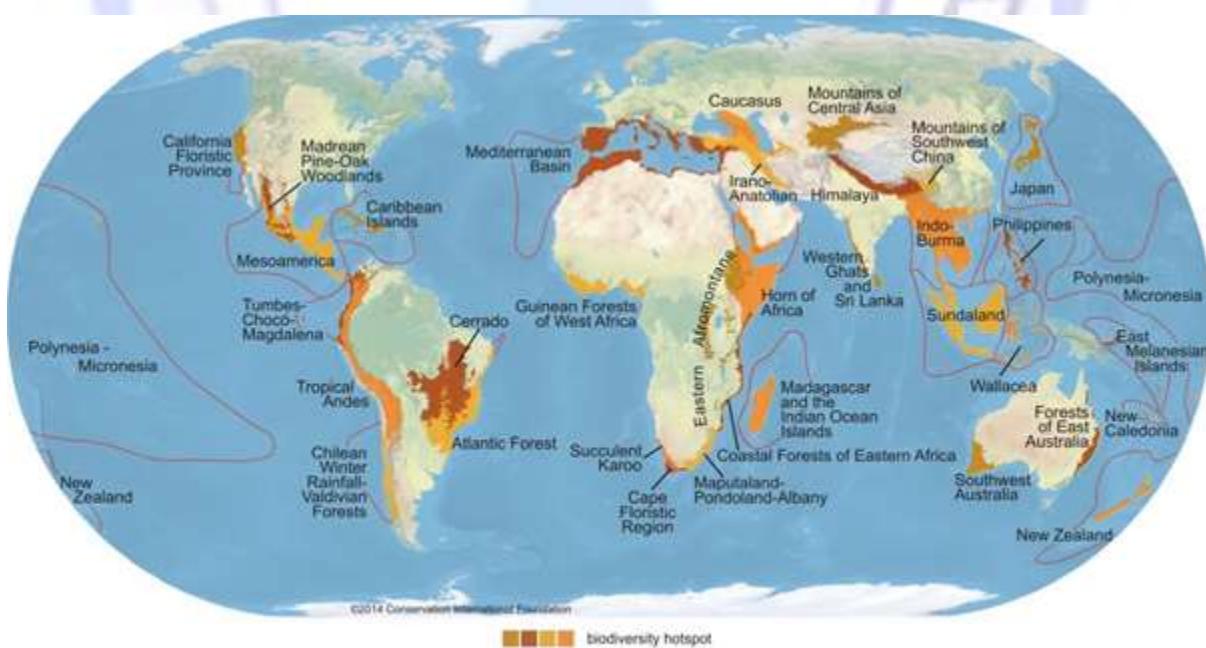
WHO ambient air quality guideline values: The 2005 WHO Air quality guidelines offer global guidance on **thresholds and limits** for **key air pollutants** that pose health risks. The Guidelines indicate that by reducing particulate matter (PM10) pollution from 70 to 20 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$), we can cut air pollution-related deaths by around 15%.

45. National Clean Air Programme

- Goal of NCAP is to **meet the prescribed annual average ambient air quality standards** at all locations in the country in a stipulated timeframe.
- The tentative national level target of **20%-30% reduction of PM_{2.5} and PM₁₀ concentration by 2024** is proposed under the NCAP taking **2017 as the base year** for the comparison of concentration.
- The NCAP will be a **mid-term, five-year action plan** with **2019 as the first year** in **102 non-attainment cities** with respect to **Ambient Air Quality India (2011-2015)** and **WHO report 2014/2018**

46. Biodiversity Hotspots

- Biodiversity hotspots are regions with **high species richness** and a **high degree of endemism**.
- The British biologist **Norman Myers** coined the term “biodiversity hotspot” in 1988 as a bio-geographic region characterized both by **exceptional levels of plant endemism** and **by serious levels of habitat loss**.
- **Conservation International (CI)** adopted Myers’ hotspots and in 1996, the organization made the decision to undertake a reassessment of the hotspots concept.



Conservation International (conservation.org) defines 35 biodiversity hotspots — extraordinary places that harbor vast numbers of plant and animal species found nowhere else. All are heavily threatened by habitat loss and degradation, making their conservation crucial to protecting nature for the benefit of all life on Earth.

According to CI, to qualify as a hotspot a region must meet two strict criteria:

must contain at least 1,500 species of vascular plants (> 0.5% of the world's total) as endemics – which is to say, it must have a high percentage of plant life found nowhere else on the planet. A hotspot, in other words, is irreplaceable.

has to have lost at least 70% of its original habitat. (It must have 30% or less of its original natural vegetation). In other words, it must be threatened.

- The **35 biodiversity hotspots** cover 2.3% of the Earth's land surface, yet more than 50% of the world's plant species and 42% of all terrestrial vertebrate species are endemic to these areas.
- In **2011, the Forests of East Australia** region was identified as the 35th biodiversity hotspot.
- Biodiversity hotspots in India

o**Himalaya:** Includes the entire Indian Himalayan region (and that falling in Pakistan, Tibet, Nepal, Bhutan, China and Myanmar).

o**Indo-Burma:** Includes entire North-eastern India, except Assam and Andaman group of Islands (and Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China)

o**Western Ghats and Sri Lanka:** Includes entire Western Ghats (and Sri Lanka).

o**Sundalands:** Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines)

o In 2004, a hotspot reappraisal classified the region as part of two hotspots: **Indo-Burma** and the newly distinguished **Himalaya**.

47. E-Waste

- e-waste describes **discarded electrical or electronic devices**.
- contain potentially harmful materials such as **lead, cadmium, beryllium, or brominated flame retardants**. Recycling and **disposal** of e-waste may involve **significant risk** to health of workers and their communities.

India's first e-waste clinic for **segregating, processing and disposal** of waste from household and commercial units will soon be set-up in **Bhopal, Madhya Pradesh**.

- The CPCB will provide **technical support** at the unit and the collected **hazardous waste** will then be sent to **Bengaluru** for **recycling**.
- The clinic is being conceived in compliance with the **Solid Waste Management Rules, 2016**. These rules also focus on **segregation of waste at source** and charge user fees for collection, disposal, and processing from the bulk generator.

➤ International Initiatives –

- **Basel Convention on the control of transboundary movement of hazardous waste, 1992** – originally it did not mention e-waste. Included only in 2006 (COP8).
- COP9 of the Basel convention adopted the **Nairobi declaration** which seeks to create innovative solutions for the environmentally sound management of e-waste.
- **Rotterdam Convention, 2004** - It seeks to promote information exchange among parties over a range of potentially hazardous chemicals (including pesticides & industrial chemicals) that may be imported or exported.

● India –

- Until 2011, E-waste was dealt with under the **Hazardous Waste Management (HWM) Rules**.
- The Government has comprehensively revised **E-waste (Management & Handling) Rules, 2011**, and **notified E-Waste (Management) Rules** in March, 2016.
- The provisions of these Rules include **extended producers' responsibility**, setting up of producer responsibility organizations and e-waste exchange to facilitate collection and recycling, assigning specific responsibility to bulk consumers of electronic products for safe disposal, providing for economic incentives for collection of electronic waste, and other measures which include responsibility of producers of electronic and electrical products for collection and channelizing of electronic waste.

- The Rules provide for simplified permission process for setting up of dismantling and recycling facilities through single authorization based on Standard Operating Procedures (SoP) prescribed by Central Pollution Control Board (CPCB).
- State Governments have been entrusted with the responsibility for earmarking industrial space for e-waste dismantling and recycling facilities, and to undertake industrial skill development and establish measures for safety and health of workers engaged in dismantling and recycling facilities of e-waste.

Extended producer responsibility

- EPR is a **policy approach** under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products
- Assigning such responsibility could in principle provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals.
- Plastic waste management (PWM) rules, 2016 - earlier, EPR was left to the discretion of the local bodies. First time, the producers and brand owners have been made responsible for collecting waste generated from their products.
- It is a **legislative strategy used by most industrialised nations** to promote reuse, recycling, and eco-friendly disposal of polymer waste.
- At the centre of EPR lies a **closed loop approach** to manage products, whereby **waste** generated from a product is **used to produce another product**.
 - This approach ensures the **price of the product includes the cost of its safe disposal**.
- Therefore, this approach significantly **reduces the environmental impact of the waste** as well as leads to **lower cost of production for the new product**.

EPR is applicable in India from 2018 (for plastics). Each company submitting its EPR plan must now recover 20% of the Multilayered Plastic (MLP) it produces within a year, and 100% within three.



PET bottles

- PET is a **highly valued packaging material** because it is **strong yet lightweight, non-reactive, economical**, and shatterproof.
- PET is a **polymer of ethylene glycol and terephthalic acid**.
- PET was **first synthesized in the U.S.** during the **mid-1940s** by DuPont chemists searching for polymers that could be used to make new textile fibers.
- Till now, it was a common perception that PET (Polyethylene Terephthalate) bottles leach harmful chemicals when exposed to high temperatures.
- When PET is used for fiber or fabric applications, it is usually referred to as "**polyester**." When used for container and packaging applications, it is typically called "**PET**" or "**PET resin**."
- PET is a **stable, inert material** that **doesn't biologically or chemically degrade** with use, and is **resistant to attack by micro-organisms**.

In order to ascertain the **chemical effect of PET**, CFTRI conducted a **detailed analysis of PET Bottles**.

·The CFRTI analysis concluded that **antimony, arsenic, barium, cadmium, chromium, cobalt, lead, mercury, selenium and zinc** "were below" their **detection limits (BDL)** of 0.001 mg/kg.

·**BPA (bis-phenol A)** was **below its detection limit of 0.02 mg/kg**.

- BPA is a **synthetic organic compound** and used in the manufacture of PET bottles.
- But it is **now phased out** after research found a **link between the presence of BPA and the disruption of hormone regulation**, as well as breast cancer.

They were also below the EU (European Union) regulation norms of the “**specific migration limit**”, which is the **maximum amount of a substance that can migrate from a food packaging material or food container into food**.

The study was commissioned by the industry body named **Pet Packaging Association for Clean Environment (PACE)**.

CSIR-Central Food Technological Research Institute (CFTRI)

- It is a constituent **laboratory of Council of Scientific and Industrial Research**, New Delhi, which came into existence in 1950.
- It is **located in Mysore, Karnataka**.
- It comes **under the Ministry of Science & Technology**.
- The institute develops technologies to increase efficiency and reduce **post-harvest losses**, add convenience, **increase export**, find **new sources of food products**, integrate human resources in food industries and reduce costs to farmers.

48. River linking projects in India



The Inter-link project has been split into three parts: a **northern Himalayan rivers inter-link component**, a **southern Peninsular component** and starting 2005, an **intrastate rivers linking component**.

The project is being managed by India's **National Water Development Agency (NWDA)**, under its **Ministry of Water Resources**.

NWDA has studied and prepared reports on **14 inter-link projects for Himalayan component**, **16 inter-link projects for Peninsular component** and **37 intrastate river linking projects**

Ken-Betwa Inter-river linking project

- central government has announced **90 : 10 funding pattern** for Ken Betwa Interlinking Project where 90% of the total estimated cost is to be borne by the centre.
- The Ken-Betwa Link Project (KBLP) is the River interlinking project that aims to **transfer surplus water from the Ken river in MP to Betwa in UP to irrigate the drought-prone Bundelkhand region.**
- Note –
 - 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.**

Constitutional Provisions Involved

- **Article 262(1)** of the constitution deals with the adjudication of interstate water disputes.
- **Article 262(2)** holds that neither Supreme Court nor any other court shall exercise jurisdiction in respect of interstate water disputes.
- **Water being a state subject** requires a mutual water sharing arrangement between two riparian states.

49. Invasive and Exotic Species

- Exotic and invasive species are two types of **non-native species.**
- An **exotic species**, known also as **introduced, alien, non-native or non-indigenous** species, is that **foreign species that have been introduced** in a zone out of its natural distribution. This introduction usually happens for human causes, **either voluntarily or involuntarily**. The opposite concept is **indigenous species**. They are **not harmful** to the ecosystem.
- When an **exotic species becomes harmful** to the ecosystem, it is called an **invasive species**. Despite most of the invasive species are **exotic**, there are also some cases in which can be **indigenous**.
- Invasive alien species **occur in all taxonomic groups**, including animals, plants, fungi and microorganisms, and can affect all types of ecosystems.

For an alien species to become invasive, it must **arrive, survive and thrive.**

- Common characteristics of IAS include **rapid reproduction** and growth, **high dispersal ability**, **phenotypic plasticity** (ability to adapt physiologically to new conditions), and ability to **survive on various food types** and in a wide range of environmental conditions.
- Invasive plant species **transform the soil structure** and micro environment to their advantage by producing **allele chemicals** which cause the destruction of native species and local biodiversity.
- **Islands are especially vulnerable** to IAS because they are naturally isolated from strong competitors and predators.

Notable examples of invasive plant species include the **kudzu vine, Andean pampas grass, and yellow starthistle.**

Animal examples include the **New Zealand mud snail, feral pigs, European rabbits, grey squirrels, domestic cats, carp and ferrets.**

In news – **Floods and landslides in Kerala** have brought **several alien invasive species** of plants into the State's water bodies, posing a threat to native biodiversity and the aquatic environment.

- The physical routes and paths formed due to landslides and the overflow of rivers had paved the way for the establishment of primary colonies of invasive species like **Nilagrass** (*Mimosa diplotricha*), **Mikania** (*Mikania micrantha*), **Lantana** (*Lantana camara*) and **Siam weed** (*Chromolaena odorata*).

50. **GADGIL AND KASTURIRANGAN COMMITTEE**

Western Ghats contains 13 national parks and rivers including Godavari, Krishna and Cauvery etc. Western Ghats is a hotspot.

Ministry of Environment and Forests of India set up in 2010 an expert panel (Gadgil commission also called Western Ghats Ecology Expert Panel (WGEEP)) to find a strategy for conserving these Ghats.

- 1) It designated the **entire hill range as an Ecologically Sensitive Area (ESA)**.

2) Classified the 142 taluks in the Western Ghats boundary into Ecologically Sensitive Zones (ESZ) 1(high priority), 2 and 3.

Athirappilly of Kerala and Gundia of Karnataka hydel project fall under ESZ1

3) Recommended decentralization and more powers to local authorities.

4) The commission recommended constitution of a **Western Ghats Ecology Authority (WGEA)**, as a statutory authority under the Ministry of Environment and Forests, with the powers under Section 3 of the Environment (Protection) Act, 1986.

The Kasturirangan committee was constituted to examine the WGEEP report. The committee is often called HLWG – it denotes the 10 member high-level working group (HLWG), headed by Kasturirangan.

1)Instead of the total area of **Western Ghats**, only 37% (i.e. 60,000 sq. km.) of the total area be brought under ESA under Kasturirangan report.

2)A ban on mining, quarrying and sand mining.

3)No new thermal power projects, but hydro power projects allowed with restrictions.A ban on new polluting industries.

4)Building and construction projects up to 20,000 sq m was to be allowed but townships were to be banned.

5)Forest diversion could be allowed with extra safeguards

51. ECO-SENSITIVE ZONES

- The basic aim is to regulate certain activities around National Parks and Wildlife Sanctuaries so as to minimise the negative impacts of such activities on the fragile ecosystem encompassing the protected areas.
- **The Environment Protection Act, 1986 does not mention the word “Eco-sensitive Zones”.**
- The section 3(2)(v) of the Act, says that **Central Government can restrict areas in which any industries, operations or processes**

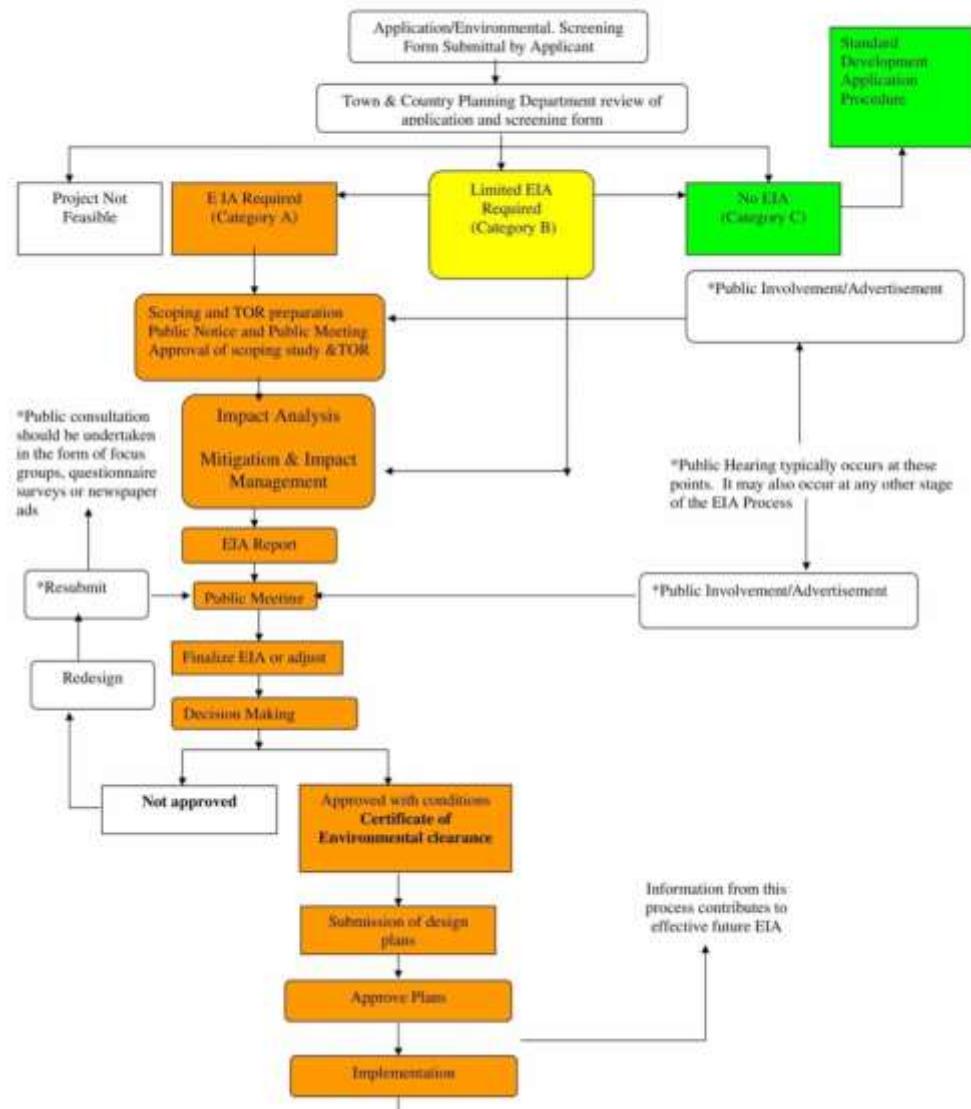
shall not be carried out or shall be carried out subject to certain safeguards

- 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.
- Eco-Sensitive Zones (ESZs) or Ecologically Fragile Areas (EFAs) are areas **notified by central government** through Ministry of Environment, Forests and Climate Change (MoEFCC).

52. Environment impact assessment

- EIA is a tool to **anticipate the likely environmental impacts** that may arise out of the proposed developmental activities and **suggest mitigation measures and strategies**.
- EIA was introduced in India in **1978**, with respect to river valley projects.
- EIA comes under Notification on Environmental Impact Assessment (EIA) of developmental projects 1994 under the provisions of **Environment (Protection) Act, 1986**.
- The Ministry of Environment, Forests and Climate Change (MoEFCC) notified **new EIA legislation in September 2006**. The notification makes it **mandatory for various projects** such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units **to get environment clearance**.
- However, unlike the EIA Notification of 1994, the new legislation has **put the onus of clearing projects on the state government** depending on the size/capacity of the project.

Generalized EIA Process Flowchart



- Category A (national level appraisal) projects require mandatory environmental clearance and thus they do not undergo the screening process.
- Category B (state level appraisal) projects undergo screening process and they are classified into two types.
 - Category B1 projects (Mandatorily requires EIA).
 - Category B2 projects (Do not require EIA)

Environment Management Plan

- Delineation of mitigation measures including prevention and control for each environmental component and rehabilitation and resettlement plan.

54. Traditional water Harvesting Model

- History tells us that both floods and droughts were regular occurrence in ancient India.
- Perhaps this is why every region in the country has its own traditional water harvesting techniques that reflect the geographical peculiarities and cultural uniqueness of the regions.
- The basic concept underlying all these techniques is that rain should be harvested whenever and wherever it falls.

Refer: <https://www.thebetterindia.com/61757/traditional-water-conservation-systems-india/>

55. Rainwater Harvesting

- Prime Minister has written a letter to all Sarpanchs regarding the **importance of water conservation and rain harvesting** and exhorted them to adopt all appropriate measures to make water conservation a mass movement.
- Rainwater Harvesting is a process **involving collection and storage of rain water with the help of artificially designed system** that runs off natural or man-made catchment areas e.g. roof top, compounds, rock surface or hill slopes or artificially repaired impervious/semi-pervious land surface.
- There are two main techniques of rain water harvesting: Storage of rainwater on surface for future use and Recharge to ground water.

56. Shola Forest

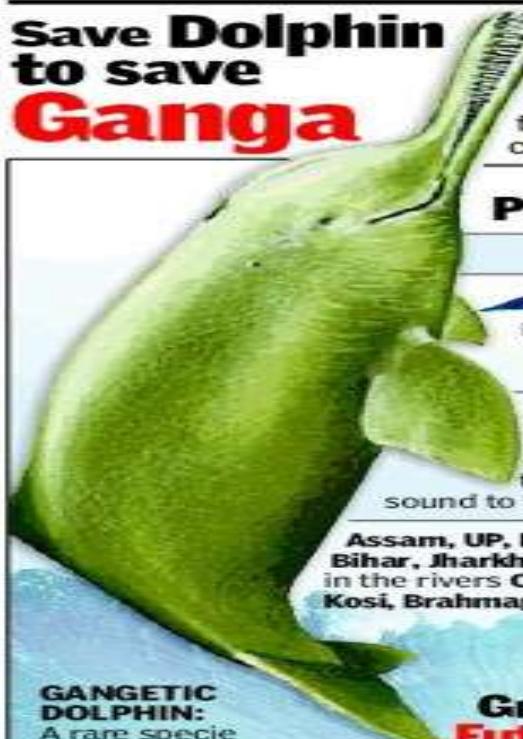
- The Shola forests of South India derive their name from the Tamil word *solai*, which means a '**tropical rain forest**'. Classified as '**Southern Montane Wet Temperate Forest**' by experts Harry George

Champion and SK Seth, the Sholas are found in the upper reaches of the Nilgiris, Anamalais, Palni hills, Kalakadu, Mundanthurai and Kanyakumari in the states of **Tamil Nadu and Kerala**.

- The **upper reaches are covered with grasslands**, known as Shola grasslands. The vegetation that grows in Shola forests is evergreen. The trees are stunted and have many branches. Their **rounded and dense canopies** appear in different colours.
- The Shola-grassland ecosystem acts as the Nilgiris' **overhead water tank** and the water source for the Cauvery Delta.
- Unfortunately, the Sholas have begun to gradually shrink due to the **introduction of alien plant species and annual fire occurrences**. Alien species like Sticky Snakeroot, Gorse and Scotch Broom introduced during British rule, have encroached upon the grasslands.
- In addition, **unscientific agricultural practices like growing tea on the slopes, cattle grazing and fuel wood collection** have become serious causes for degradation. Unregulated tourism has created concrete jungles, traffic congestion and caused the generation of garbage.
- Under the Hill Area Development Programme since the mid-1980s, seedlings have been planted in degraded patches and protected with chain-link fences to restore the forests.
- Special Shola forest protection committees were formed involving teachers, nature lovers, ecologists, environmentalists, students and villagers in the Nilgiris.

57. Project Dolphin

Save Dolphin to save Ganga



The Centre has declared the dolphin a national aquatic animal to save the rare freshwater species from disappearing from the country's aqua map

Know about **Platanista gangetica**

	1.67 m
	Females grow up to 2.67 m
	Males grow up to 2.12 m
Females give birth to only one calf, once in 2-3 yrs	
Generally blind, they catch their prey by emitting ultrasonic sound to gauge distance, mass etc	

Assam, UP, MP, Rajasthan, Bihar, Jharkhand & W Bengal in the rivers Chambal, Sone, Kosi, Brahmaputra Prefer deep waters, in & around Indian river confluences

GANGETIC DOLPHIN: A rare specie almost extinct

Lost cousin: The Yangtze dolphin, Baiji, of China

Dwindling number due to killing, habitat fragmentation

Grim Future

Once counted in 10's of 1000's, the amount has reduced in last century to **1,500**

"Endangered" & placed in Schedule-I of Wildlife (Protection) Act, 1972



- The Ganges River Dolphin was once present in tens of thousands of numbers which has dwindled abysmally to **less than 2000** during the last century owing to direct killing, habitat fragmentation by dams and barrages, indiscriminate fishing and pollution of the rivers.
- 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
- Listed by IUCN as '**endangered**' and placed in Schedule-I of the Wildlife (Protection) Act, 1972, the Ganges River Dolphin enjoys high levels of legal protection, both nationally and internationally.
- Some of the efforts made to preserve and increase the numbers of these dolphins include the 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.

- They are also one among the 21 species identified under the centrally sponsored scheme, “**Development of Wildlife Habitat**”.

58. Orchids

- The **Botanical Survey of India** has come up with the first comprehensive **census of orchids of India** putting the total number of orchid species or taxa to 1,256.
- The 1,256 species or taxa of orchids belong to 155 genera and **388 species are endemic to 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).
- A State-wise distribution of orchid species point out that the **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.
- While north-east India rank at the top in species concentration, the Western Ghats have high endemism of orchids.
- A year-long project to assess the **status of orchids in Arunachal Pradesh** was initiated with the government signing a Memorandum of Understanding with International Union for Conservation of Nature (IUCN) India **to create a Red Listing of orchids at the state level**.

59. Bio-diesel

- Biodiesel is an alternative clean-burning renewable fuel similar to conventional diesel. It is **produced using animal fats, vegetable oils, and waste cooking oil**. Due to its biodegradable nature, it is used as a replacement for fossil diesel fuel. It can also be mixed with petroleum diesel fuel in any proportion.
- 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.

60. Single Use Plastics

- India would phase out single-use plastics by 2022

- Single use plastics 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.
 - Single-use plastics slowly and gradually break down into smaller pieces of plastic known as microplastics.
 - It can take thousands of years for plastic bags to decompose, thus contaminating our soil and water in the process.
 - The noxious chemicals used to produce plastic gets transmitted to animal tissue, and finally, enter the human food chain.
- The Nodal Ministry for the scheme is the **Ministry of Environment, Forests and Climate Change** (MoEF&CC) ensured with the task of: **Enforcing** the ban on single-use plastics, &**Finalizing** the pending policy for **Extended Producer Responsibility**.

61. Zooloogical Survey of India

The Zoological Survey of India (ZSI) was **established on 1st July, 1916** to promote survey, exploration and research leading to the advancement in our knowledge of various aspects of exceptionally rich life of the erstwhile 'British Indian Empire'.

- The headquarters are in Kolkata.
- It has been declared as a designated repository for the National Zoological Collection as per **Section 39 of the National Biodiversity Act, 2002**.

The ZSI has contributed significantly to knowledge and research on the fauna of the country. The **primary objectives of the ZSI** are:

- To promote the survey, exploration, research, and documentation on various aspects of animal taxonomy in the Indian subcontinent. It also seeks the advancement of knowledge on animal taxonomy.

- Make a status survey of the threatened and endemic species.
- Preparation of Red Data Book, Fauna of India and Fauna of States.
- Bio-ecological studies on important communities/species.
- Preparation of database for the recorded species of the country.
- Maintenance and Development of National Zoological Collections.

62. GHG

Gases that trap heat in the atmosphere are called greenhouse gases.

Most abundant GHGs in earth's atmosphere are- **Water Vapour > CO₂ > CH₄ > N₂O > CFCs**

Each gas's effect on climate change depends on three main factors:

1. How much is in the atmosphere?

Concentration, or abundance, is the amount of a particular gas in the air. Larger emissions of greenhouse gases lead to higher concentrations in the atmosphere. Greenhouse gas concentrations are measured in parts per million, parts per billion, and even parts per trillion.

2. How long do they stay in the atmosphere?

Each of these gases can remain in the atmosphere for different amounts of time, ranging from a few years to thousands of years.

3. How strongly do they impact the atmosphere?

Some gases are more effective than others at making the planet warmer and "thickening the Earth's blanket."

For each greenhouse gas, a **Global Warming Potential (GWP)** has been calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. It is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO₂).

Kyoto Protocol of UNFCCC initially vowed to reduce concentration of 6 major GHGs and in 2nd Commitment period another gas was added.

Greenhouse Gas (GHG)	Atmospheric Lifetime (yrs)	Global Warming Potential (GWP)	Primary Current Sources
Carbon dioxide (CO ₂)	50-200	1	Fossil fuel use, land use, cement
Methane (CH ₄)	12±3	21	Fossil fuel use, agriculture
Nitrous oxide (N ₂ O)	120	310	Mostly agriculture, ~1/3 are anthropogenic
Hydrofluorocarbons (HFCs)	1.5 to 209	150 to 11,700	Alternative to ozone depleting substances
Perfluorocarbons (PFCs)	2,600 to 50,000	6,500 to 9,200	Primary aluminum production; semiconductor manufacturing
Sulfur Hexafluoride (SF ₆)	3,200	23,900	Used in electric power transmission, magnesium and semiconductor industries

High GWP gases

63. Schedule Animals in Wildlife Act

It has six schedules which give varying degrees of protection

- Species listed in Schedule I and part II of Schedule II get absolute protection — offences under these are prescribed the highest penalties
- Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower
- Schedule V includes the animals which may be hunted(vermin)
- The plants in Schedule VI are prohibited from cultivation and planting

64. Ecosystem Services

The Millennium Ecosystem Assessment defined Ecosystem Services as “the benefits people derive from ecosystems”.

Provisioning Services are ecosystem services that describe the material or energy outputs from ecosystems. They include food, water and other resources.

Regulating Services are the services that ecosystems provide by acting as regulators eg. regulating the quality of air and soil or by providing flood and disease control.

Habitat and supporting services: Habitats for species and maintenance of genetic diversity

Cultural services: Recreation, tourism

65. Sunderbans

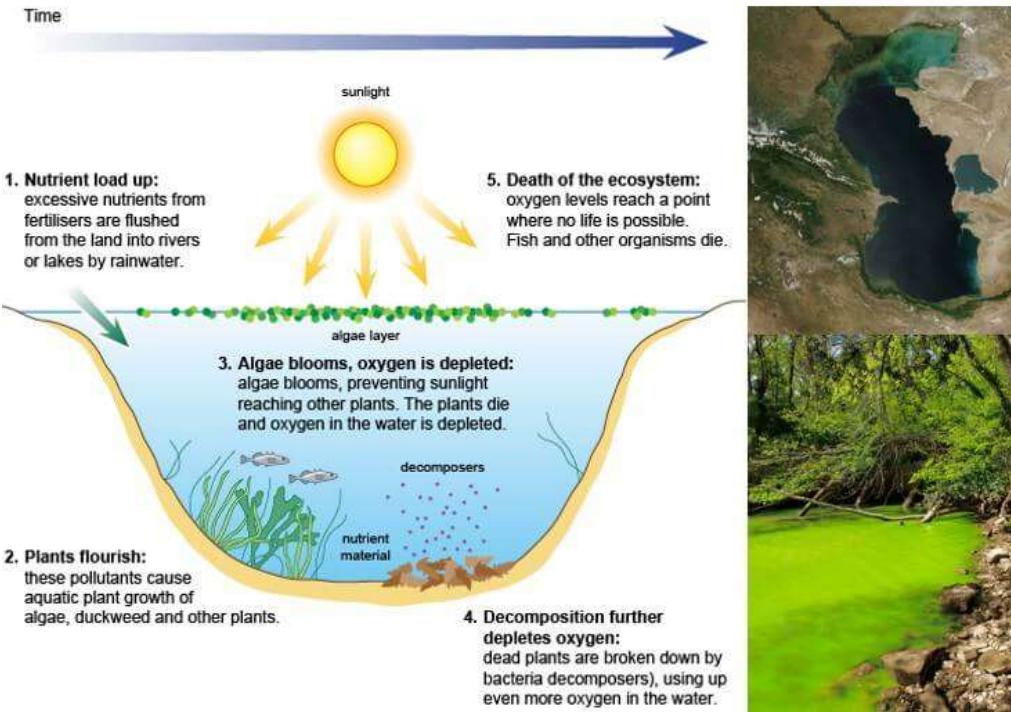
The Sunderbans National Park is a tiger and biosphere reserve located in the Sunderbans delta in the state of West Bengal (India). The Sunderbans is named after the Sundari trees which are found in bulk in this area.

- Located on the southwestern part of the delta, the Indian Sundarban constitutes over **60% of the country's total mangrove forest area**.
- It is the **27th Ramsar Site in India**, and with an area of 4,23,000 hectares is now the largest protected wetland in the country.
- The Indian Sundarban, also a **UNESCO world heritage site**, is home to the Royal Bengal Tiger.
- Indian Sundarban is also home to a large number of “rare and globally threatened species, such as the critically endangered northern river terrapin, the endangered Irrawaddy dolphin, and the vulnerable fishing cat.
- It is vulnerable to climate change and requires better management and conservation practices.

66. Algal Bloom

An algal bloom or marine bloom or water bloom is a **rapid increase in the population of algae** in an aquatic system.

Harmful algal blooms, or HABs, occur when colonies of algae grow out of control and produce toxic or harmful effects on people, fish, shellfish, marine mammals and birds.



Causes: Eutrophication, increased water temperature, long exposure to light

Effects of Algal Bloom

- Loss of fresh water lakes
- New species invasion
- Algal Blooms restrict the penetration of sunlight resulting in death of aquatic plants, and hence restricts the replenishment of oxygen.
- The primary consumers like small fish are killed due to oxygen deprivation caused by algal blooms.
- Death of primary consumers adversely affects the food chain and leads to the destruction of higher life forms.
- HAB events adversely affect commercial and recreational fishing, tourism, and valued habitats, creating a significant impact on local economies and the livelihood of coastal residents

67. Green Crackers

Green crackers 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.

Last October, in a landmark judgment, the **Supreme Court of India mandated the use of green crackers** for Deepavali, prescribing specific norms for the manufacture. For the first time, 'green crackers' have been made available in markets, though the reach has been limited.

The Supreme Court had **banned the use of barium nitrate**, a key pollutant in crackers. The National Environmental Engineering Research Institute (NEERI), a part of the Council of Scientific and Industrial Research (CSIR), was asked to facilitate the development of green crackers.

WHAT ARE 'GREEN CRACKERS'?

Firecrackers that have "less dangerous" and "less harmful" chemicals than conventional ones

Being Developed by CSIR's National Environmental Engineering Research Institute

Production after they are approved by Petroleum and Explosives Safety Organisation (PESO)

Green Because

- They have a chemical formulation that produces water molecules
- This substantially reduces emission level and absorbs dust
- Is basically a light and sound show that produces lower emissions
- Promise **30-35% reduction** in particulate matter, nitrous oxide and sulphur oxide

Expected to hit the market in 4-5 years*

Also In The Works

E-CRACKERS BEING DEVELOPED BY CSIR'S CENTRAL ELECTRONICS ENGINEERING RESEARCH INSTITUTE

OTHER INITIATIVES

- Crackers with lower aluminium to reduce emissions substantially
- 'Anar' or flower pot made using eco-friendly material that can reduce particulate matter by 40%
- Bijli crackers that eliminate use of ash as desiccants
- Firecrackers without antimony, lithium, mercury, arsenic and lead as directed by PESO last year

Council of Scientific and Industrial Research

Green cracker manufacturers claim that **particulate matter pollution will be reduced by 30%** if these crackers are used. However, these numbers have been computed in a laboratory setting and not been verified in real world conditions.

Toxic nature

Conventional firecrackers contain chemicals which produce effects like bright lighting and colours. However, these chemicals can have adverse effects on human health and the environment.



Initial ingredient	Use in crackers	Health hazards
Charcoal, potassium nitrate and sulphur	Black powder which is the primary fuel in the cracker	The dust released is hazardous when inhaled; different compounds formed can be carcinogenic
Strontium and lithium	Colouring agent (Red)	Strontium can replace calcium in the body which can be toxic; Lithium releases harmful fumes
Barium	Colouring agent (Orange)	Fumes can cause respiratory and other health issues
Nitrates, chlorates/ perchlorates	Oxidising agents	The compounds can hamper the growth of small children; they remain airborne for days and can be poisonous

68. Environment Pollution (Prevention and Control) Authority(EPCA)

The Centre has reconstituted the Supreme Court-empowered Environment Pollution (Prevention and Control) Authority, which is tasked with taking various measures to tackle air pollution in the National Capital Region.

EPCA was constituted with the objective of '**protecting and improving the quality of the environment and 'controlling environmental pollution' in the National Capital Region**'. The EPCA also assists the apex court in various environment-related matters in the region. It was **notified in 1998** by Environment Ministry under Environment Protection Act, 1986.

The EPCA is also mandated to enforce **Graded Response Action Plan (GRAP)** in the city as per the pollution levels. EPCA had enforced several measures, including closure of the Badarpur thermal power plant, ban on brick kilns, hot mix plants and stone crushers, and construction activities.

69. Night travel ban

The Kerala government has opposed in the Supreme Court an alternative route proposed by Karnataka to bypass the night-time traffic ban on the National Highway 212 through the Bandipur National Park.

In an affidavit, Kerala submitted that the **alternative route goes through the Nagarhole Tiger Reserve in Karnataka and Tholpetty wildlife sanctuary in Kerala** “where wild animals are wandering freely in heavy numbers and it will take more time for the land acquisition for developing the route.” Further, clearance from the Union Ministry of Environment, Forest and Climate Change is mandatory. The Kerala government indicated that it would be better to open NH 212 (presently NH 766) for night time travel.

The ban on night traffic through NH 212 issued by the District Magistrate was without any study or preparation. **Mudumalai, Bandipur Tiger Reserves and Wayanad Wildlife sanctuary make one contiguous tiger territory** and tigers move freely within this area. It is illogical and inappropriate to impose enhanced level of restriction only in one part of this tiger territory to protect tigers. It will not yield the desired result,” Kerala argued in the Supreme Court. Moreover, the State contended that the ban on night traffic on NH 212 from 9 p.m. to 6 a.m. is not on the basis of any study or sound scientific findings.

70. Indicator Species

An indicator species is a plant or animal that is **very sensitive to environmental changes** in its ecosystem. Indicator Species gets affected almost immediately by damage from external influences such as water pollution, air pollution, or climate change to the ecosystem and gives early warning.

- Lichens are indicators of air pollution, especially sulfur dioxide.
- Adult frogs and toads are good indicator species since the skin of the adults is moist and permeable, allowing numerous pollutants entry into their bodies.
- Salmons are an indicator species for wetland ecosystems.

71. Climate Change Performance Index

India joins the top ten countries(9th position) in this year's Climate Change Performance Index (CCPI) for the first time. This is a result of efforts made to bring down India's carbon emission. On the other hand, the United States included in the worst-performing countries for the first time.

Published annually since 2005, CCPI is an **independent monitoring tool for tracking the climate protection performance** of 57 countries and the EU.

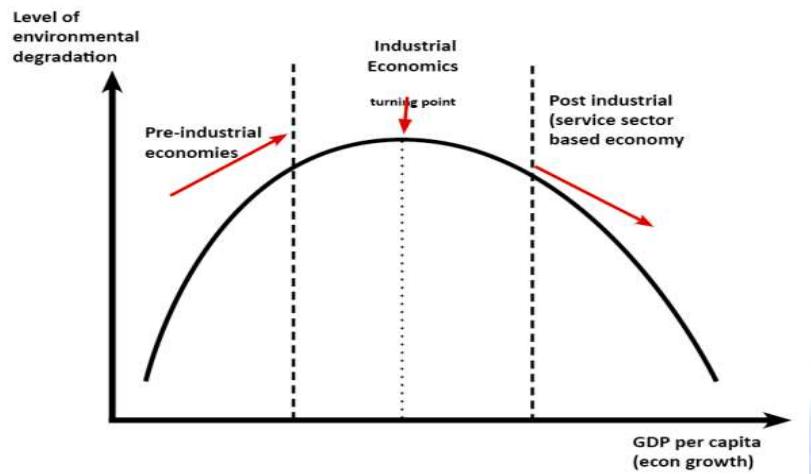
It aims to enhance transparency in international climate politics and **enables comparison of climate protection efforts and progress made by individual countries.**

The CCPI assesses each country's performance in four categories: **GHG Emissions (40% of the overall ranking), Renewable Energy (20%), Energy Use (20%) and Climate Policy (20%).** In addition, the question is answered to what extent the respective country acts adequately in the areas of Emissions, Renewable Energies and Energy Use in order to achieve the Paris climate targets.

The report states that the current level of per capita emissions and energy use in India ranks ninth in the higher category. However, despite high ratings for the performance of its climate policy, experts say the Indian government is yet to draw up a roadmap to reduce subsidies on fossil fuels in a phased manner. In short, more stringent laws and amendments should be made to achieve climate change targets.

72. Environmental Kuznets Curve

The environmental Kuznets curve suggests that **economic development initially leads to deterioration in the environment**, but after a certain level of economic growth, a society begins to improve its relationship with the environment and levels of environmental degradation reduces.



73. AMAZON Forest Fire

- The Amazon rainforest has been on fire with Brazil declaring a state of emergency in the region.
- The number of fires in Brazil this year is the **highest on record since 2013** and is **up by 85% from last year alone**.
- Fires like the current one lead to **wholesale irreversible changes in the structure and composition of forest ecosystems**, impoverishing both their biodiversity capital and capacity to generate critical forest ecosystem services. They also severely degrade the livelihoods of local people who depend on these forests for a number of extractive assets.
- Amazonian forests and other tropical rainforest regions were completely immune to fires because of the high moisture content of the undergrowth beneath the protection of the canopy tree cover.
- But the severe droughts of 1997-98, 2005, 2010, and currently a large number of wildfires across northern Brazil have forever changed this perception.
- These **severe 'mega-droughts' in the Amazon** were most likely driven by interacting large-scale climatic events, with the **warming of the Atlantic** increasingly outweighing the **drying effects of El Niño Southern Oscillation (ENSO) events in the Pacific**.
- Fire is often used to clear out the land for farming or ranching. For that reason, the vast majority of the **fires can be attributed to humans, cattle ranchers and loggers, who want to clear and utilize the land**.

- **Effects of damage to the Amazon go far beyond Brazil and its neighbors.** The area's rainforest generates more than 20% of the world's oxygen and is home to **10% of the world's known biodiversity**. The Amazon is referred to as the "**lungs of the planet**" and plays a major role in regulating the climate. The world would drastically change if the rainforest were to disappear, with impacts on everything from farms to drinking water.

74. Australian Bush Fire

Australia has declared a **state of emergency** for the state of New South Wales (NSW) along with a catastrophic fire warning — the highest level of bush fire danger — in light of widespread bushfires that have left at least three people dead. Bushfires are a routine occurrence in the country, but this **bushfire season is believed to be the worst** and has started even before the beginning of the Southern Hemisphere summer.

Australia, where the summer starts around October, is known to be the most fire-prone of all continents. This is mainly because Australia is also the driest inhabited continent. Almost 70% of its area comprises arid or semi-arid land, with average annual rainfall less than 350 mm.

- **Reasons**

- **Prolonged Drought:** The three years between 2017 and 2019 were the driest 36-month period ever in the New South Wales (a state of Australia).
- **2019 happened to be the warmest and driest year for the country since 1900.**
- **Positive Indian Ocean Dipole (IOD):** In 2019, the problem has been compounded by the presence of one of the strongest-ever **positive Indian Ocean Dipole (IOD) events**. Positive IOD events are often associated with a more severe fire season for South-east Australia.
- **Rare stratospheric warming over Antarctica:** Temperatures were 30°C to 40°C higher than normal in the region 10 to 50 km from Earth's

surface — another extraordinary weather event that could have contributed to the unusual heat and dryness in Australia.

- **Link with climate change:** Experts say **climate change has worsened the scope and impact of natural disasters such as 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.

Impact

- **Economic:** In states like New South Wales, Entire towns have been engulfed in flames and heavy structural damages have occurred. Also, in countryside farmers have occurred immense losses because of burning of their crop fields and animals.

- **Health:** Major cities like Sydney and Melbourne have been under a thick blanket of smoke with air quality dropping by 20 times below the healthy limits.

- **Environment:**

- Experts warn that these fires will release another 350 million tones of CO₂ into atmosphere. The emitted CO₂ will stay in the atmosphere for almost a century.

- The rising heat from the intense bushfires creates massive, powerful clouds called **pyrocumulonimbus, or pyroCb.**

- ✓ These “fire clouds” are created “when fires loft enough heat and moisture into the atmosphere” to produce smoke-infused thunderstorms

- **Wildlife and Biodiversity:** More than one billion mammals, birds, and reptiles across eastern Australia are estimated to have been affected by the current fire catastrophe. Many animals and plants have been incinerated or suffocated by smoke and ash

75. UNITED NATION ENVIRONMENT ASSEMBLY

- The United Nations Environment Assembly is the **world's highest-level decision-making body on the environment.** It addresses the critical environmental challenges facing the world today.

- The Environment Assembly **meets biennially to set priorities for global environmental policies** and develop international environmental law. Through its resolutions and calls to action, the Assembly provides leadership and catalyses intergovernmental action on the environment.
- The United Nations Environment Assembly **was created in June 2012**, when world leaders called for UN Environment to be strengthened and upgraded during the United Nations Conference on Sustainable Development, also referred to as Rio+20.
- The Environment Assembly embodies a new era in which the **environment is at the centre of the international community's focus** and is given the same level of prominence as issues such as peace, poverty, health and security.
- The Fourth Environment Assembly will be held in Nairobi March 2019, focusing on the theme "**Innovative solutions for environmental challenges and sustainable consumption and production**".
- The Assembly is the **governing body of the UN Environment Programme** (UN Environment) and the successor of its Governing Council, which was composed of 58 member States. The UN Environment Assembly, with a universal membership, is now composed of 193 Member States.

76. BONN CHALLENGE

- The Bonn Challenge is a **global effort to bring 150 million hectares** of the world's degraded and deforested lands into **restoration by 2020 and 350 million hectares by 2030**.
- It was launched by the International Union for Conservation of Nature (**IUCN**), which acts as its Secretariat, and the **Government of Germany** in 2011.
- The Bonn Challenge **responds to the urgent issue of land degradation** that currently affects over 3 billion people globally, and, by conservative estimates, close to 30% of arable land.
- Globally, the **financial implications of degradation and deforestation are compelling**. In the last two decades, changes to land cover led to a reduction in the value of the annual flow of ecosystem

services by USD 4-20 trillion per year and the losses of ecosystem services, specifically due to degradation, are estimated between USD 6.3 trillion and 10.26 trillion per year or 10-17 per cent of global GDP.

77. GLOBAL CARBON PROJECT

- It is a **Global Research Project** of Future Earth and a research partner of the World Climate Research Programme.
- It was formed to work with the international science community **to establish a common and mutually agreed knowledge base to support policy debate and action** to slow down and ultimately stop the increase of greenhouse gases in the atmosphere.
- The Global Carbon Project was established in 2001 by a shared partnership between the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP) and Diversitas.
- According to Global Carbon Project Report, global carbon emissions are an all-time high of 37.1 billion tonnes of CO₂ in 2018. India, the third-highest contributor, saw emissions rise by about 6.3% from 2017 in 2018

78. CAMPA fund

- The **Forest (Conservation) Act of 1980** requires that non-forest land, equal to the size of the forest being “diverted”, is afforested.
- But since afforested land does not become a forest overnight, there is still a loss of the goods and services that the diverted forest would have provided in the interim period.
- To compensate for the loss in the interim, the law requires that **the Net Present Value (NPV) of the diverted forest is calculated for a period of 50 years**, and recovered from the “user agency” that is “diverting” the forests.
- Thus, if any user agency wants to divert forest land for non-forest purposes, it has to deposit money for compensatory afforestation as well as pay the NPV, besides a few other charges.
- The national and state compensatory afforestation funds are both non-lapsable and have been established under Public Account of India and

Public Account of each state. They can be utilised for only activities listed under the CAF Act.

- Since forests are being diverted routinely a large sum of money is accruing to the government. Currently, more than Rs 40,000 crore has accumulated from these sources, and the fund is increasing at the rate of about Rs 6,000 crore every year.
- With the initial experience of the States regarding under-utilisation of the money collected towards compensatory afforestation, Supreme Court ordered for establishment of Compensatory Afforestation Fund and Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in 2001.
- CAMPA is proposed to manage this money, and to use it for the designated purposes.
- The rules specify that 80% of compensatory afforestation amount will be utilised by states for plantations, assisted natural regeneration of forests, pest and disease control in forest, forest fire prevention, soil and moisture conservation works and improvement of wildlife habitat, among other things from list of 13 permissible activities. The remaining 20% will be used for 11 listed works to strengthen infrastructure related forest and wildlife protection.

79. 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.

FAQ: What's the difference between REDD+ and the UN-REDD Programme?



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.

80. RENEWABLE ENERGY TARGET

- A target of installing **175 GW of renewable energy capacity by the year 2022** has been set, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power.
- At the recently concluded United Nations Climate Action Summit in New York, committed to increasing India's renewable energy (RE) target to **450 gig watts (GW)** as a part of a stronger climate action plan.
- India committed to increase our share renewable energy to **40 percent of our total power generation capacity by 2030** to mark India's significant contribution towards mitigating climate change challenges.

Installed renewable energy Capacity Crosses **84GW** in 2019 :

Solar Power	32.53GW
Wind Power	37.28GW
Bio Energy	9.94GW
Small Hydro	4.65GW

81. ENVIRONMENT CARRYING CAPACITY

- Carrying capacity is the maximum population size that an ecosystem can sustainably support without degrading the ecosystem.
- Earth Overshoot Day marks the date when humanity's demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year.
- We maintain this deficit by liquidating stocks of ecological resources and accumulating waste, primarily carbon dioxide in the atmosphere.
- Earth Overshoot Day is hosted and calculated by Global Footprint Network, an international research organization that provides decision-makers with a menu of tools to help the human economy operate within Earth's ecological limits.

82. ENVIRONMENTAL FLOW

An environmental flow is **the water provided** within a river, wetland or coastal zone **to maintain ecosystems and their benefits** where there are competing water uses and where flows are regulated.

Environmental flows are the acceptable flow regimes that are required to maintain a river in the desired environmental state or predetermined state.

The Central Government has notified the minimum environmental flows for River Ganga with an aim to maintain the natural pattern of the river flow (**Aviral Dhara**).

83. Indian State of Forest Report

- 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
- Starting 1987, 16 assessments have been completed so far. ISFR 2019 is the 16th report in the series.
- It is biennial report
- The 2019 report for the first time has assessed the qualitative nature of the forest cover, including listing its biodiversity and the type of plants and trees found.
- It also created a **national forest inventory for the first time** on produce from forests.



- **Forest Cover**

- **Forest Cover (Area-wise)** : Madhya Pradesh > Arunachal Pradesh > Chhattisgarh > Odisha > Maharashtra.

- **Forest Cover (Percentage):** Mizoram (85.4%)> Arunachal Pradesh (79.63%)> Meghalaya (76.33%)
- **Increase in Forest Cover**
 - The country's forest cover includes all patches of land with a tree canopy density of more than 10% and more than 1 hectare in area, irrespective of land use, ownership and species of trees.
 - The **top five states** to have shown an increase in forest cover include **Karnataka > Andhra Pradesh > Kerala > J&K > Himachal Pradesh.**
- 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).
- **Carbon Stock**

The total carbon stock of the country was estimated at **7124 million tons**, which is an **increase of 42.6 million tons** from the last assessment. It implies that India is on the right track to achieve its Paris Agreement commitment of 2.5 -3 billion carbon sinks.
- **Decline of Forest Cover in North Eastern Region**

Total forest cover in the North Eastern region is 1,70,541 sq km, which is 65.05% of its geographical area. There has been a decrease of forest cover to the extent of 765 sq km (0.45%) in the region. **Except Assam and Tripura, all the States** in the region show **decrease** in forest cover.

84. Agro-biodiversity

The variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries.

It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals.

It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems.

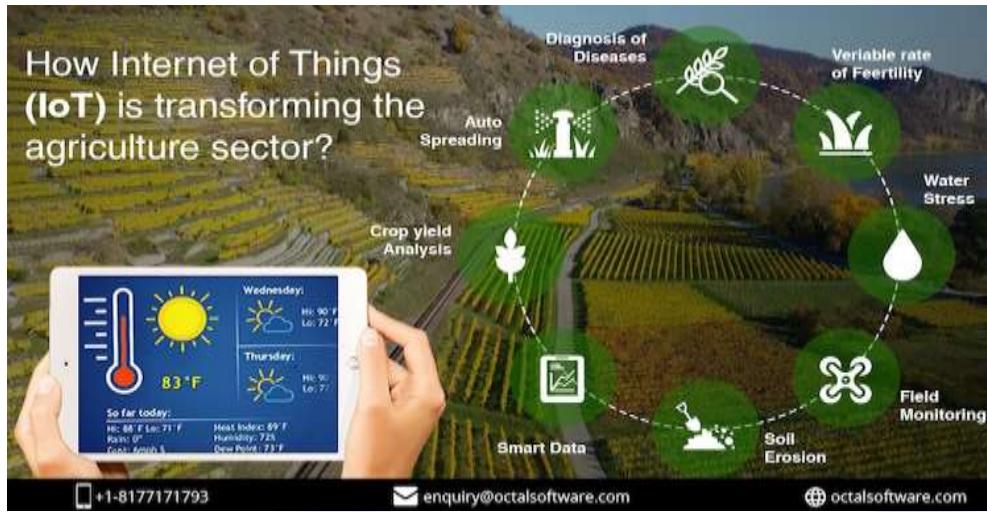
THE ROLE OF AGROBIODIVERSITY

- * Increase productivity, food security, and economic returns
- * Reduce the pressure of agriculture on fragile areas, forests and endangered species
- * Make farming systems more stable, robust, and sustainable
- * Contribute to sound pest and disease management
- * Conserve soil and increase natural soil fertility and health
- * Contribute to sustainable intensification
- * Diversify products and income opportunities
- * Reduce or spread risks to individuals and nations
- * Help maximize effective use of resources and the environment
- * Reduce dependency on external inputs
- * Improve human nutrition and provide sources of medicines and vitamins, and
- * Conserve ecosystem structure and stability of species diversity.

85. Smart Agriculture

Smart Farming is a **farming management concept using modern technology** to increase the quantity and quality of agricultural products.

Farmers in the 21st century have access to **GPS, soil scanning, data management, and Internet of Things technologies.**



By precisely measuring variations within a field and adapting the strategy accordingly, farmers can greatly increase the effectiveness of pesticides and fertilizers, and use them more selectively.

Similarly, using Smart Farming techniques, farmers can better monitor the needs of individual animals and adjust their nutrition correspondingly, thereby preventing disease and enhancing herd health.

86. VULTURE CONSERVATION AND BREEDING CENTRE

In a major step to conserve the **endangered vulture population**, the **Uttar Pradesh government will set up state's first vulture conservation and breeding centre** in Farenda area of Maharajganj district.

There has been a sharp decline in the population of vultures in the country which has come down from 40 million to 19,000 in a span of over three decades.

States' first vulture conservation and breeding centre of its kind will be set up on the lines of Jatayu Conservation Breeding Centre at **Pinjore in Haryana, which is also the first in the country**.

87. Carbon monoxide poisoning

SIGNS OF CARBON MONOXIDE POISONING

BYJU'S
The Learning App



Carbon monoxide is formed when are burned in the presence of oxygen. Exhaust gases from the motor vehicles, engine fumes, fire smoke and non-electric heaters are the most common source of carbon monoxide production.

Breathing in a large amount of carbon monoxide can replace the oxygen in the blood with CO. If this happens, a person will become unconscious and can be life-threatening.

88. Kyoto protocol

- The Kyoto Protocol implemented the objective of the UNFCCC to fight global warming by reducing greenhouse gas concentrations
- The Protocol is based on the principle of common but differentiated responsibilities: it puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere.
- The Protocol's first commitment period started in **2008** and ended in **2012**
- By 2008-2012, Annex 1 countries have to reduce their GHG emissions by an average of **5%** below their 1990 levels .
- A second commitment period was agreed on in 2012, known as the **Doha Amendment** to the protocol.
- The amendment includes new commitments for parties to the Protocol who agreed to take on commitments in a second commitment period and a revised list of GHGs to be reported on by Parties.
- **India has ratified** the second commitment period of Kyoto Protocol.
- Target under this protocol applies to following GHGs:
 - Carbon Dioxide (CO₂)

- Methane (CH₄)
- Nitrous Oxide (NO₂)
- Sulphur Hexafluoride (SF₆)
- Two groups of gases :
 - Hydrofluorocarbons (HFCs)
 - Perfluorocarbons (PFCs)

89. Pangolin

Scientists have radio-tagged the Indian pangolin, an **endangered animal**. Tagging the animal will help understand the habits of the reclusive, nocturnal animal. Radio-tagging is part of a joint project by the forest department and non-profit organisation, the Wildlife Conservation Trust (WCT)

Indian pangolin:

- Has thick scaly skin
- Hunted for meat and used in traditional Chinese medicine.
- Pangolins are among the most trafficked wildlife species in the world.
- Out of the eight species of pangolin, the Indian and the Chinese pangolins are found in India.
- Both these species are listed under Schedule I Part I of the Wildlife (Protection) Act, 1972.

IUCN Red List

- Indian Pangolin: Endangered
- Chinese Pangolin: Critically Endangered

90. KEOLADEO NATIONAL PARK

- Keoladeo National Park, located in the State of Rajasthan, is an important wintering ground of Palaearctic migratory waterfowl and is renowned for its large congregation of non-migratory resident breeding birds
- Due to its strategic location in the middle of Central Asian migratory flyway and presence of water, large congregations of ducks, geese, coots, pelicans and waders arrive in the winter.

- The park was the only known wintering site of the central population of the critically endangered Siberian Crane, and also serves as a wintering area for other globally threatened species such as the Greater Spotted Eagle and Imperial Eagle.
- The Keoladeo National Park is a wetland of international importance for migratory waterfowl, where birds migrating down the Central Asian flyway congregate before dispersing to other regions.

91. NATIONAL ANIMAL DISEASE CONTROL PROGRAM

Recently, the Prime Minister launched the **National Animal Disease Control Programme (NADCP)**, to control and eradicate the **Foot & Mouth Disease (FMD)** and **Brucellosis** amongst the livestock in the country

- The following are the **aims** of NADCP programme:
 - To vaccinate over **600 million cattle** in the country in an effort to mitigate the two diseases namely, **the Foot & Mouth Disease, & brucellosis**.
 - The programme also aims at vaccinating **36 million female bovine calves** annually in its fight against the **brucellosis** disease.
 - To **control** the livestock diseases by 2025, and **eradicate** them by 2030.
 - The livestock that will be covered under the programme includes cattle, buffalo, sheep, goats, and pigs against the **FMD**.
- The project will be **fully funded** by the Central Government.
- The Prime Minister also launched the National Artificial Insemination Programme and a country-wide workshop in all the Krishi Vigyan Kendras (KVKs) throughout the 687 districts of the country on '*vaccination and disease management, Artificial Insemination and Productivity*'.

92. Bt Cotton

- Bt cotton is an insect-resistant transgenic crop designed to combat the bollworm.
- Bt cotton was created by genetically altering the cotton genome to express a microbial protein from the bacterium *Bacillus thuringiensis*.
- In short, the transgene inserted into the plant's genome produces toxin crystals that the plant would not normally produce which, when ingested by a certain population of organisms, dissolves the gut lining, leading to the organism's death.

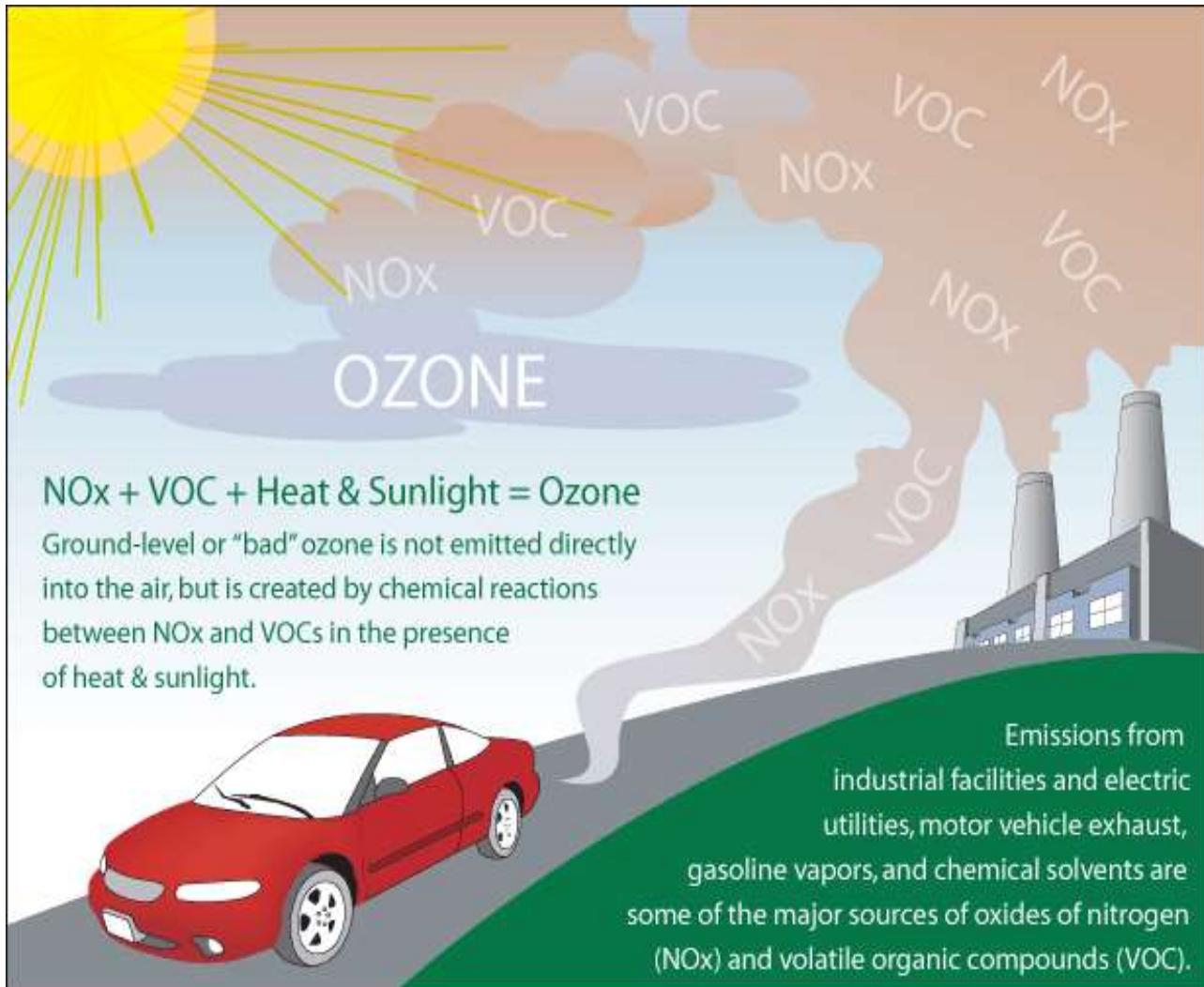


93. Ozone Pollution

Ozone Pollution is formation of ozone molecules at ground level mainly due to reaction between oxides of Nitrogen and volatile organic carbon in presence of sunlight. In other words, Ground level or “bad” ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight.

Impact;

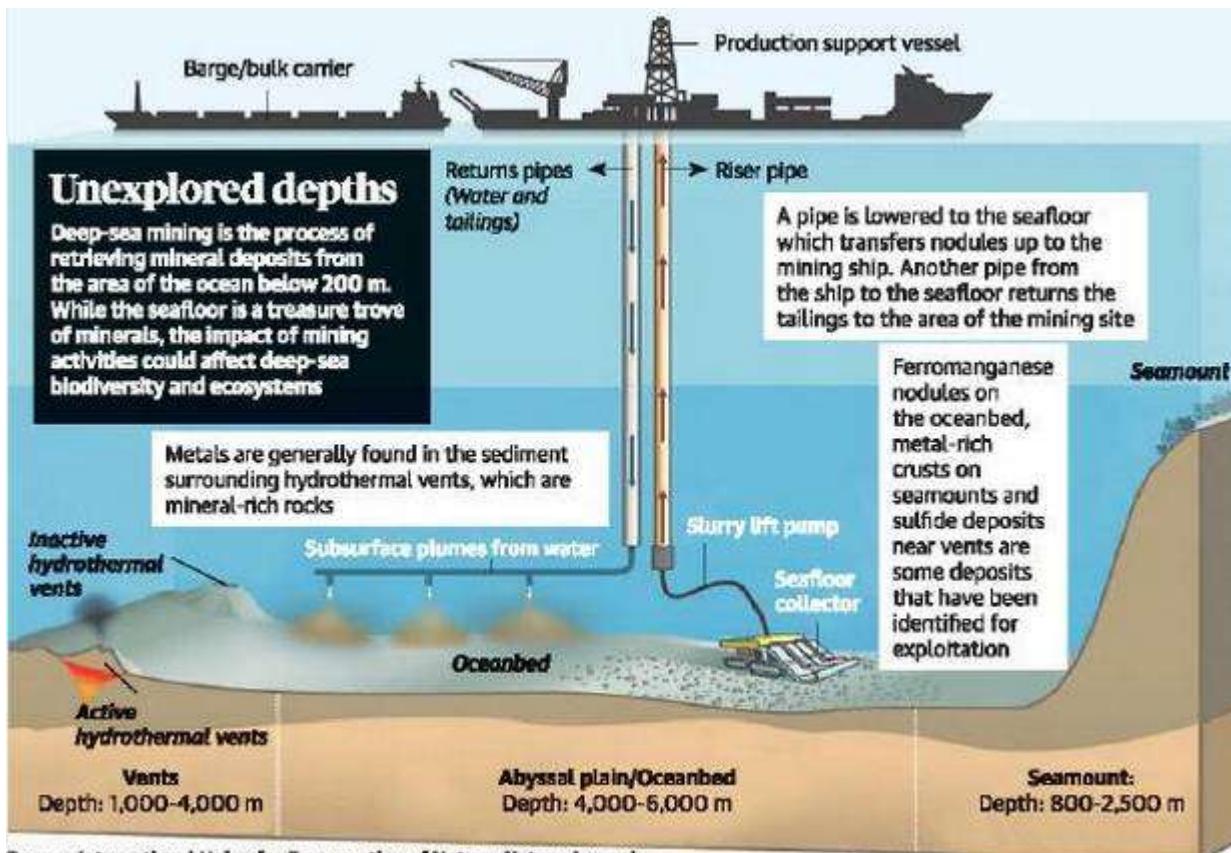
- Breathing ozone can cause chest pain, coughing, throat irritation and airway inflammation.
- Reduced the functioning of lung.
- Ozone worsens bronchitis, emphysema, asthma etc.
- Increases the risk of respiratory infection and susceptibility to pulmonary inflammation (COPD).



94. Deep Ocean Mission

- **Deep Ocean mission** is the Government of India mission to study the various aspects of ocean in an integrated frame work.
- The **focus of the mission** will be on deep-sea mining, ocean climate change advisory services, underwater vehicles and underwater robotics related technologies.

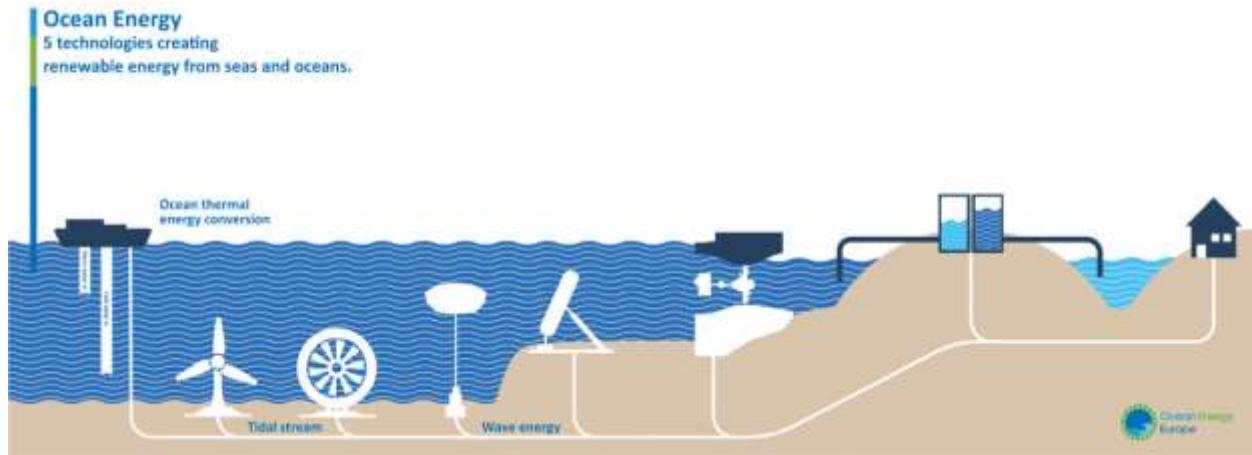
Ministry: - Ministry of Earth Sciences



Source: International Union for Conservation of Nature, Nature Journal

95. Ocean Energy

- Oceans cover 70% of the earth's surface and represent an enormous amount of energy in the form of wave, tidal, marine current and thermal gradient. India has a long coastline with the estuaries and gulfs.
- Ocean energy is used in the form of Tidal, Wave, Current Energy and Ocean Thermal Energy.
- The **Ministry of New and Renewable Energy** has declared Ocean Energy as renewable energy.

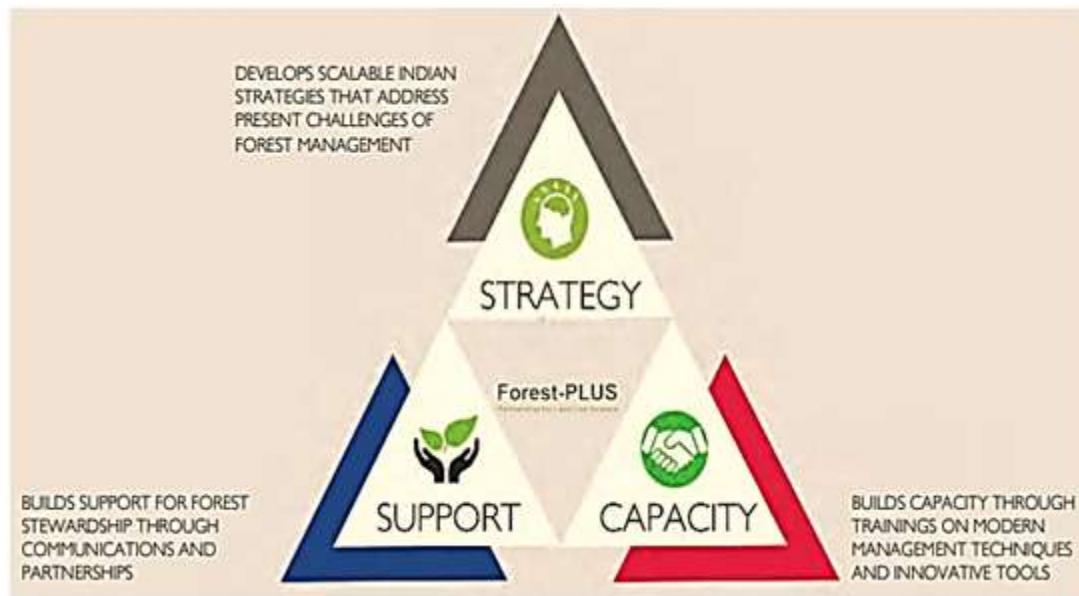


96. Community Reserve

- It is **established under Wildlife (Protection) Act, 1972**.
- It enables any state government to declare community-owned forest area as “community reserve” if locals are willing to participate in conservation efforts for same.
- Under it, community reserve receives same legal protection as National Parks and Wildlife Sanctuaries.

97. Forest Plus-2.0

- It 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, the second set of pilot project is meant to enhance sustainable forest landscape management after Forest-PLUS completed its five years in 2017.
- The programme's first set focused on capacity building to help India participate in Reducing Emissions from Deforestation and forest Degradation (REDD+).
- It included four pilot projects in Sikkim, Rampur, Shivamogga and Hoshangabad.
- US Agency for International Development (USAID) and India's MoEF&CC officially launched Forest-PLUS 2.0 initiative.



98. Bio-mining

Biomining is the process of using microorganisms (microbes) to extract metals of economic interest from rock ores or mine waste. **Biomining** techniques may also be used to clean up sites that have been polluted with metals.

ABOUT THE METHOD



- **Biomining is the technique of extraction and segregation of minerals and useful materials from mounds of waste**

- **It can be used to extract materials like plastic, rubber, metals, textiles, glass and organic compounds**

99. Pricing Carbon

A carbon price is introduced for reducing global-warming emissions. It is a cost applied to carbon pollution to encourage polluters to curtail the amount of greenhouse gas they emit into the atmosphere. It also provides an economically efficient means of reducing greenhouse gas emissions and minimizing the disruptive risks of climate change.

Carbon Pricing Programs Around the World



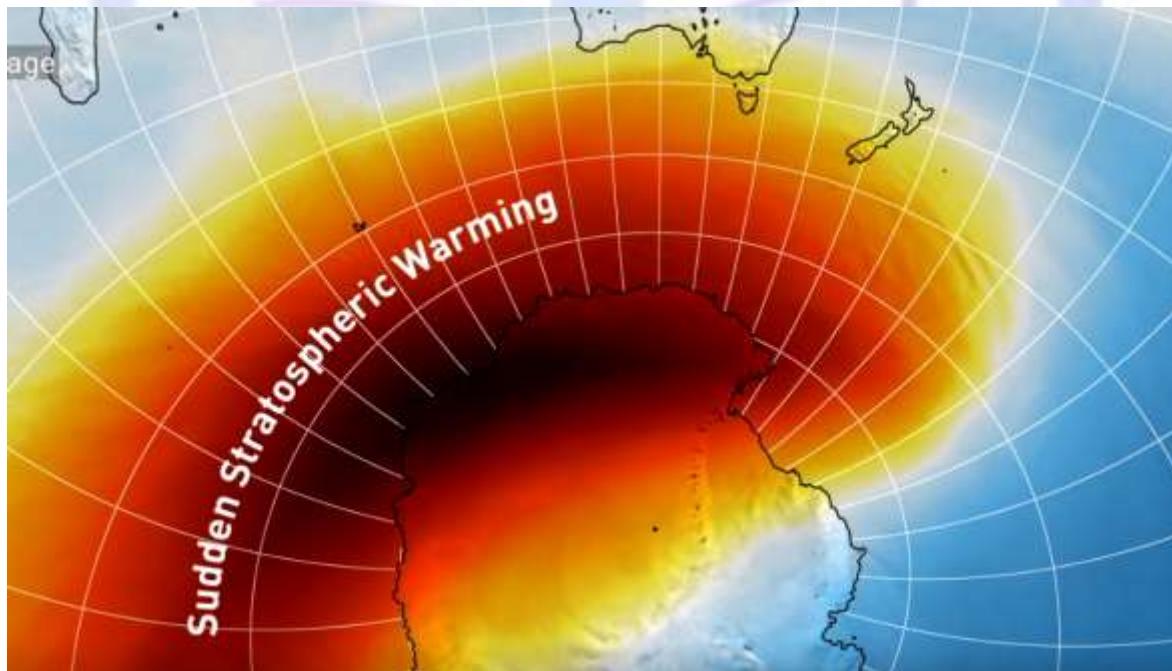
100. Snow Leopard

- It is classified as **Vulnerable** by IUCN and is **under Schedule I** of the Indian Wildlife (Protection) Act 1972.
- They are listed in **Appendix I of the Convention on International Trade in Endangered Species (CITES)** and the **Convention on Migratory Species (CMS)**.



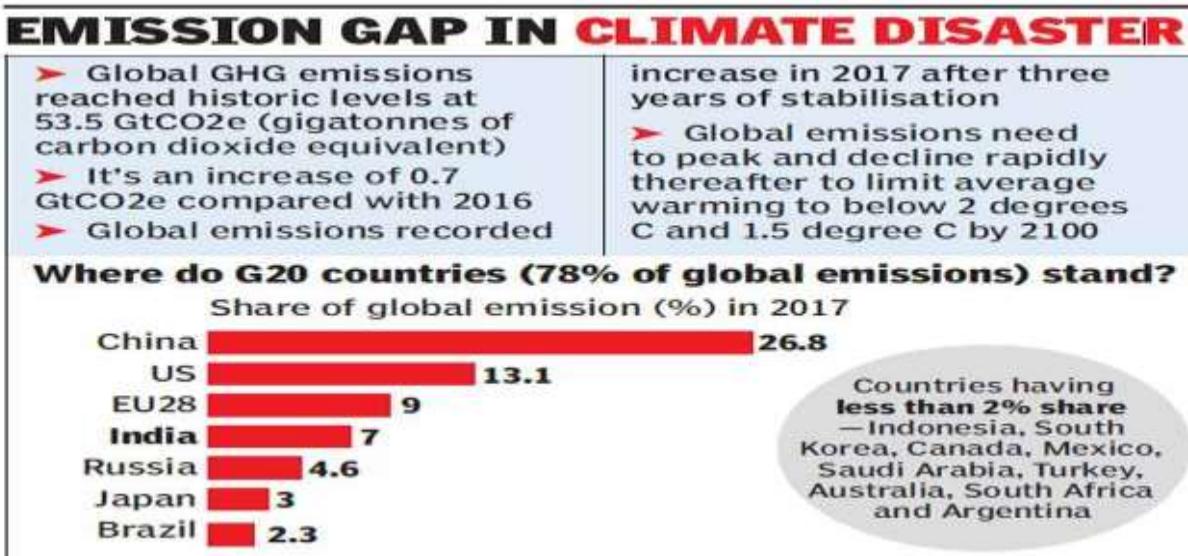
101. Sudden Stratospheric Warming

- The term sudden stratospheric warming refers to what is observed in the stratosphere:- a rapid warming (up to about 50 °C in just a couple of days), between 10 km and 50 km above the earth's surface.
- This is so high up that we don't feel the 'warming' ourselves. However, usually a few weeks later, we can start to see knock-on effects on the jet stream, which in turn affects our weather lower down (in the troposphere).
- The stratospheric sudden warming doesn't happen every year, and it doesn't always affect our weather when it does.



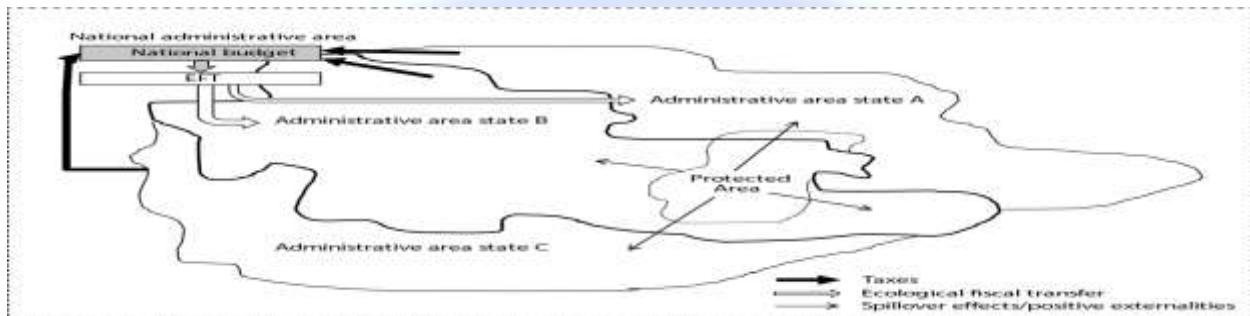
102. Emission Gap Report

- The United Nations Environment Programme (UNEP) released 'Emission Gap Index'.
- It is an annual science-based assessment of the gap between countries, on greenhouse gas emissions reductions and the reduction required to deliver global temperature increase below 2 degree Celsius by the end of this century.
- The report also identifies key opportunities for each country to increase the pace of emission reduction necessary to close the gap.
- The Emissions Gap Report measures and projects three key trendlines:
 - The amount of greenhouse gas **emissions** every year up to 2030.
 - The **commitments** countries are making to **reduce** their **emissions** and the impact these commitments are likely to have on overall emission reduction.
 - The **pace** at which emissions must be **reduced** to reach an emission low that would limit temperature increase to **1.5oC**, affordably.



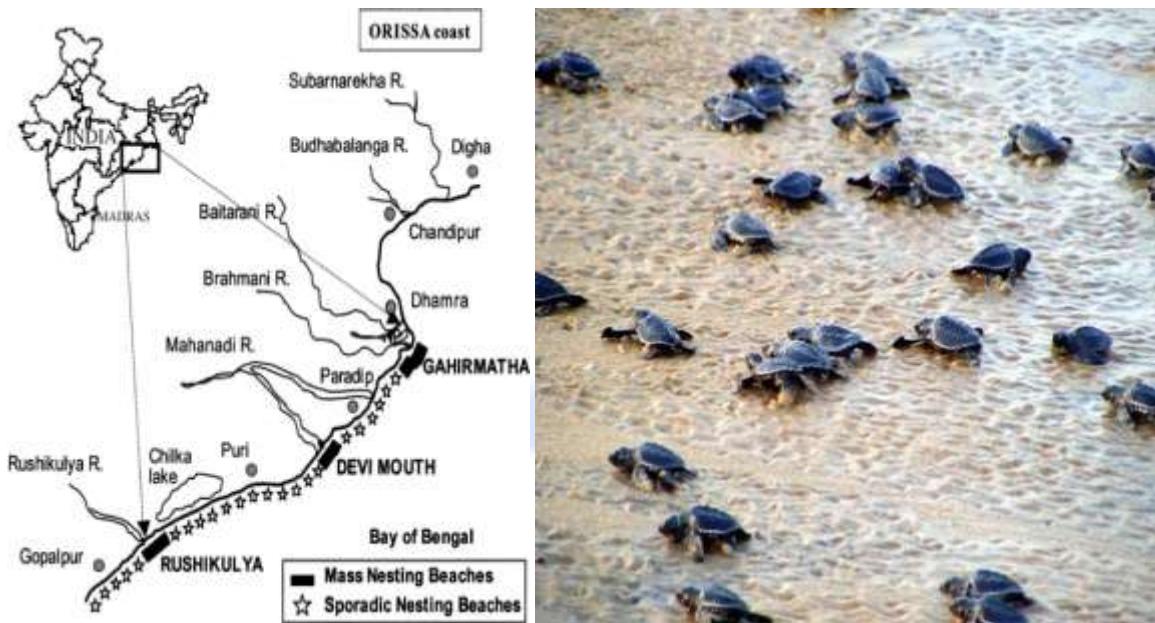
103. Ecological Fiscal Transfer

- Ecological Fiscal Transfer, is a **type of conditional environmental payments which involves conditional payments from higher levels of a country's government (e.g. national) to lower levels (e.g. state or local).**
- EFTs is meant to reward states that protected their forests.
- Ecological Fiscal Transfers (EFTs) distributes a share of intergovernmental fiscal transfers and revenue sharing schemes according to ecological indicators such as protected areas or watershed management areas. These conservation areas thus become a source of income for the receiving governments.



104. Olive Ridley Turtle

- The **Olive ridley turtles** are the **smallest and most abundant of all sea turtles** found in the world, inhabiting warm waters of the Pacific, Atlantic and Indian oceans.
- They are best known for their unique mass nesting called **Arribada**, where thousands of females come together on the same beach to lay eggs.
- The species is listed as **Vulnerable in the IUCN Red List, Appendix 1 in CITES, and Schedule 1 in Wildlife Protection Act, 1972.**
- Olive-ridleys **face serious threats** across their migratory route, habitat and nesting beaches, due to human activities such as **unfriendly turtle fishing practices, development, and exploitation of nesting beaches for ports, and tourist centers.**



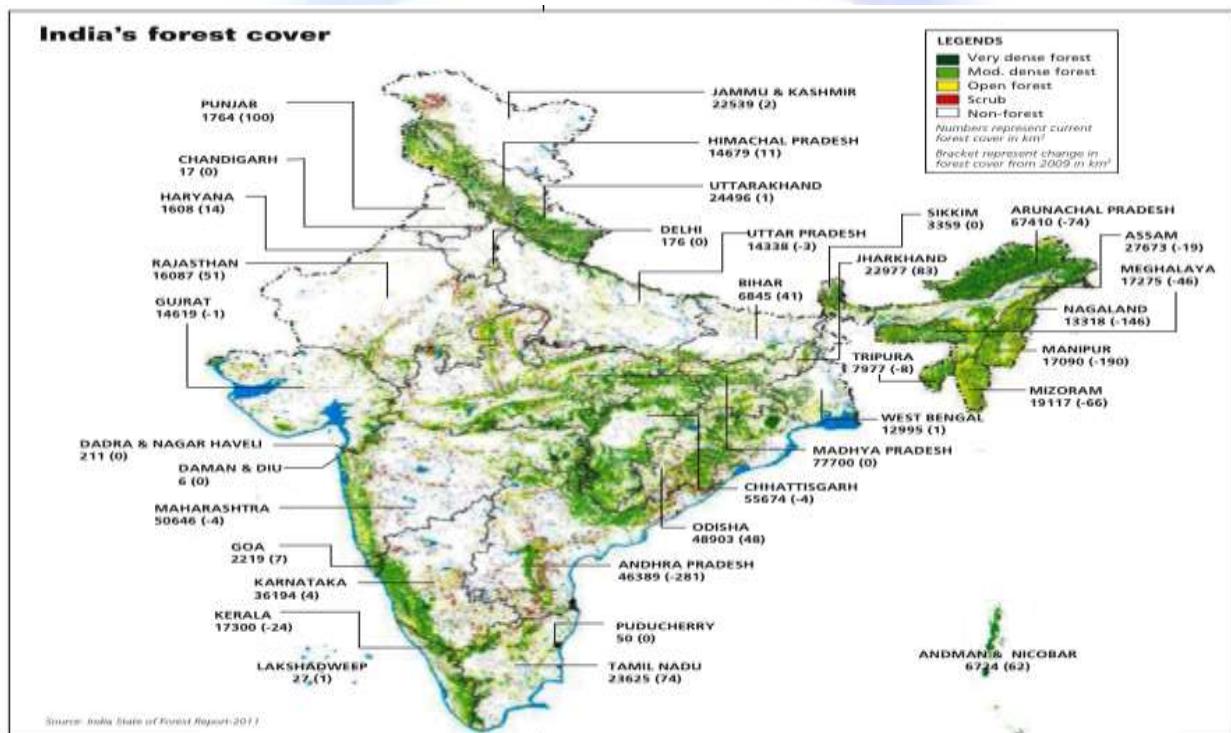
105. Forest Survey of India

- FSI is a national organisation responsible for the assessment and monitoring of the forest resources of India regularly.
- It functions under the **Ministry of Environment and Forests**.
- It is **headquartered in Dehradun**, Uttarakhand.
- FSI is one of the major national survey organisations in India.
- The organisation's precursor was the 'Preinvestment Survey of Forest Resources' (PISFR), a project started in 1965 with aid from UNDP and FAO.

FSI Objectives

- Preparing the **State of Forest Report** biennially (once every two years). The report gives an assessment of the latest forest cover in India, and the changes thereof.
- Conducting inventory in forest and non-forest areas and developing a database on forest tree resources.
- Acting as a nodal agency for collecting, compiling, storing and disseminating spatial database on forest resources.
- Conducting training in the fields of technologies connected with forest survey such as GIS, remote sensing, etc. for forestry personnel.

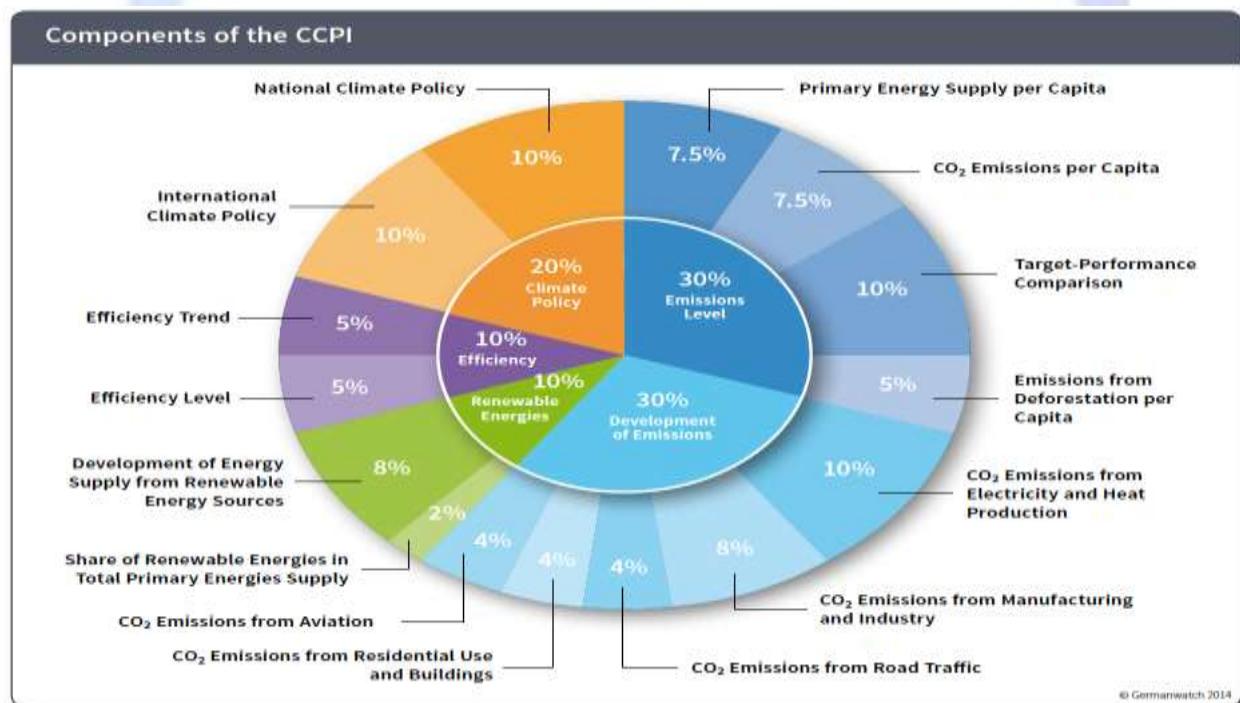
- Strengthening R&D infrastructure in FSI and conducting research on applied forest survey techniques.
- Undertaking forestry-related special studies or consultancies and specialised training courses.
- Supporting the forest departments of states and UTs in survey, mapping as well as inventory.
- Creating the Reports on Inventory and Wood Consumption Studies, which give data on growing stock, status of regeneration, incidence of grazing, incidence of fire, etc. for specific forest and non-forest areas. Such reports are frequently used by the state forest departments.



106. Climate Change Performance Index

- The Climate Change Performance Index (CCPI) is an annual publication by Germanwatch and Climate Action Network Europe.
- It evaluates the climate protection performance of 58 countries, responsible for over 90% of global energy-related CO₂ emissions.

- The Climate Change Performance Index (CCPI) compares countries in the areas of emissions trends and levels, expansion and use of renewable energies, energy efficiency and climate policies.
- The CCPI is a tool designed to enhance **transparency** in international climate politics.
- Its aim is to encourage political and social pressure on those countries which have, up to now, failed to take ambitious actions on climate protection as well as to highlight countries with best-practice climate policies.
- On the basis of standardized criteria, the index evaluates and compares the climate protection performance of 58 countries that are, together, responsible for more than 90 percent of global energy-related CO₂ emissions. 80 percent of the evaluation is based on objective indicators of emissions trend and emissions level. 20 percent of the index results are built upon national and international climate policy assessments by about 300 experts from the respective countries.



107. HYDROCHLOROFLUOROCARBON (HCFC)-141 B

India achieved **complete phase out of HCFC-141 b**, one of the most potent ozone depleting chemical after Chlorofluorocarbons (CFCs).

India has successfully achieved the complete phase out of Hydrochlorofluorocarbon (HCFC)-141 b, which is a chemical used by foam manufacturing enterprises and one of the most potent ozone depleting chemical after Chlorofluorocarbons (CFCs) .(HCFC)-141 b is used mainly as a blowing agent in the production of rigid polyurethane (PU) foams.

India had proactively and successfully taken the challenge of complete phase out of Hydrochlorofluorocarbon (HCFC)-141 b, which is a chemical used by foam manufacturing enterprises by 1.1.2020. On 31 December, 2019, as part of the Government's commitment for moving towards environment friendly technologies, in a significant first, the Ministry of Environment, Forest and Climate Change (MoEFCC) brought out a notification in the Gazette of India through which the issuance of import license for HCFC-141b is prohibited from 1st January, 2020 under Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2019 issued under the Environment (Protection) Act, 1986.

HCFC-141b is not produced in the country and all the domestic requirements are met through imports. With this notification, prohibiting the import of HCFC-141 b, the country has completely phased out the important ozone depleting chemical. Simultaneously, the use of HCFC-141 b by foam manufacturing industry has also been closed as on 1st January, 2020 under the Ozone Depleting Substances (Regulation and Control) Amendment Rules, 2014.

Nearly, 50 % of the consumption of ozone depleting chemicals in the country was attributable to HCFC-141 b in the foam sector.

The phase out of HCFC-141b from the country has twin environmental benefits viz. (i) assisting the healing of the stratospheric ozone layer, and (ii) towards the climate change mitigation due to transitioning of foam manufacturing enterprises at this scale under HPMP to low global warming potential alternative technologies.

The polyurethane foam sector has links with important economic sectors related to buildings, cold storages and cold chain infrastructure, automobiles, commercial refrigeration, domestic appliances such as refrigerators, water geysers, thermo ware, office and domestic furniture applications, specific high value niche applications etc. In India, the foam manufacturing sector is mix of large, medium and small enterprises having varying capacities, with

preponderance of MSMEs. Many of the MSMEs operate largely in the informal sector.

108. World Meteorological Organization (WMO):

Context

- For the first time, global concentration of carbon dioxide in the atmosphere have crossed 415 parts per million (ppm) mark as per Mauna Loa Observatory.

Concept:

- The World Meteorological Organization (WMO) is an **intergovernmental organization** with a membership of 192 Member States and Territories.
- It originated from the International Meteorological Organization (IMO), which was established after the 1873 **Vienna International Meteorological Congress**.
- Established by the ratification of the WMO Convention on 23 March 1950, WMO became the specialized agency of the United Nations for meteorology (weather and climate), operational hydrology and related geophysical sciences.'
- WMO is headquartered in Geneva, Switzerland.

109. Corporate Average Fuel Efficiency/Economy Regulation:

Context:

To curb the vehicular pollution has become a concern amongst the automobile industry.

Concept:

- Corporate Average refers to sales-volume weighted average for every auto manufacturer.
- They aim at lowering fuel consumption (or improving fuel efficiency) of vehicles by lowering carbon dioxide (CO₂) emissions, thus serving the twin purposes of reducing dependence on oil for fuel and controlling pollution.
- **CAFE** norms require cars to be 30% or more fuel efficient from 2022 and 10% or more between 2017 and 2021.
- The norms are applicable for petrol, diesel, LPG and CNG passenger vehicles.

- CAFE regulations in India came into force from April 1, 2017.

CAFE Rules

STRICT CAFE NORMS

- **A bid** to push automakers to incrementally increase EV production
- **Will force** manufacturers to produce 2-3% electric

GOVT'S EARLIER PLAN

To convert 2.5% of Ola and Uber's fleet to EVs starting next years	Increase it to make 40% of their fleet electric by 2026
---------------------------------------------------------------------------	----------------------------------------------------------------

110. National Water Mission Awards:

Context:

NWM, Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti has initiated the 'National Water Mission Awards' to recognize excellence in water conservation, efficient water use and sustainable water management practices.

Concept:

NWM has 5 goals and 39 strategies prescribed in the Mission Document. One of the strategies of NWM under Goal IV is to incentivize the organization/ companies through awards for water conservation and efficient use of water.

Hence, the NWM has initiated the 'National Water Mission Awards' to recognize excellence in water conservation, efficient water use and sustainable water management practices. The awards are given in ten categories defined under five goals of NWM.

The categories are as follow:

1. Comprehensive Water Data Base in Public Domain.
2. Assessment of the impact of Climate Change on Water Resources.
3. Promotion of citizen and state action for water conservation, augmentation
4. Focused attention to vulnerable areas including over-exploited area.
5. Increasing Water use efficiency by 20% (Local Individuals/Farmers/Citizens)
6. Increasing Water use efficiency by 20% (Water Users Associations/ Self Help Groups/ Resident Welfare Associations).
7. Increasing Water use efficiency by 20% (Public Agencies – ULBs/Cities, Govt Organisations).
8. Increasing Water use efficiency by 20% (Industries/Corporate).
9. Increasing Water use efficiency by 20% (Small and Medium Enterprises).
10. Promotion of basin level integrated water resources management.

111. E-Waste Clinic:

Context:

India's first e-waste clinic for segregating, processing and disposal of waste from household and commercial units will soon be set-up in Bhopal, Madhya Pradesh.

Concept:

- It would enable segregation, processing and disposal of waste from both household and commercial units.
- The clinic is a three-month pilot project. If it would be a success, then the same would be replicated throughout the country.
- Electronic waste will be collected door-to-door or could be deposited directly at the clinic in exchange for a fee.
- The CPCB will provide technical support at the unit.
- The clinic is being conceived in compliance with the Solid Waste Management Rules, 2016. E-Waste: - The discarded and end-of-life electronics products ranging from computers, equipment used in Information and Communication Technology (ICT), home appliances,

audio and video products and all of their peripherals are popularly known as Electronic waste (E-waste).



112. M-Hariyali:

Context:

- The app is aimed to encourage Public engagement in planting trees and other such Green drives.
- The App provides for automatic geo-tagging of plants. This app will also enable nodal officers to periodically monitor the plantation.
- The App is user friendly and works on any android mobile phone.

Ministry: Housing and Urban Poverty Alleviation



mHariyali

MOBILE APP



Cleaning and Greening of open space through plantation



Rain Water Harvesting - Awareness and construction



Sensitization on Source Segregation of Household waste and Orientation and Capacity building on Home composting



113. Soil Organic Carbon:

Context:

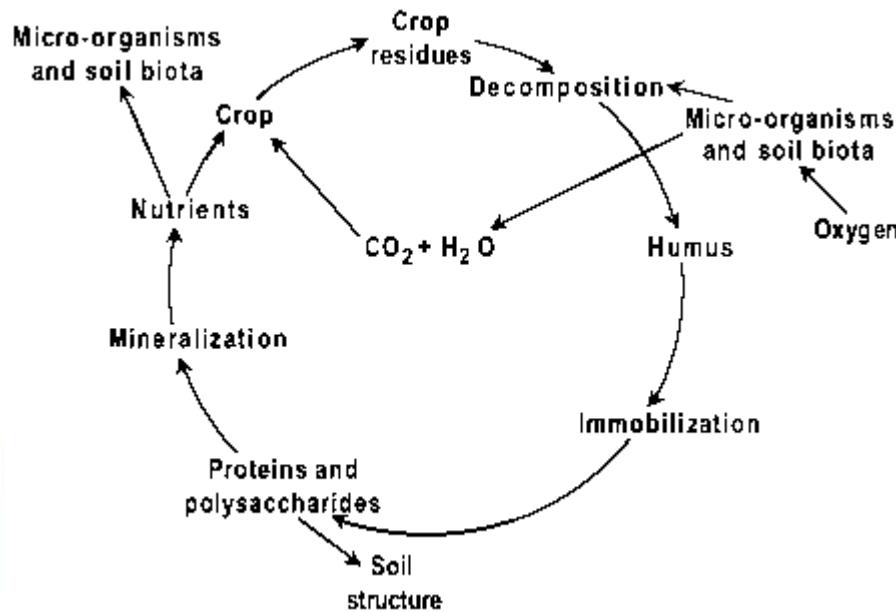
The United Nations Convention to Combat Desertification (UNCCD)'s Committee on Science and Technology (CST) has released its report on Soil Organic Carbon (SOC), in the Context of Land Degradation Neutrality Planning and Monitoring, the report emphasises the importance of SOC in preventing land degradation and desertification.

Concept:

- Soil organic carbon is a measureable component of soil organic matter. Organic matter makes up just 2–10% of most soil's mass and has an

important role in the physical, chemical and biological function of agricultural soils.

- Organic matter contributes to nutrient retention and turnover, soil structure, moisture retention and availability, degradation of pollutants, carbon sequestration and soil resilience.



114. International Energy Agency

Context:

International Energy Agency (IEA) has released WEO 2019. WEO provides critical analysis and insights on trends in energy demand and supply.

Concept:

- It is an autonomous intergovernmental organization established in the framework of Organization for Economic Cooperation and Development (OECD) in 1974 to help countries collectively respond to oil supply disruptions.
- It is headquartered in Paris.
- The framework was anchored in the IEA treaty called the “Agreement on an International Energy Program”.
- A candidate country to the IEA must be a member country of the OECD.
- The IEA family now represents about 75% of global energy consumption. Members: IEA is made up of 30 member countries and 8 association countries India became an Associate Member in 2017.
- Other Publications: Global Energy & CO₂ Status Report.

115. Global Assessment Report:

Context:

Global Assessment Report on Disaster Risk Reduction (GAR) was launched.

Concept:

- It is published biennially by the UN Office for Disaster Risk Reduction (UNDRR), and is product of contributions of nations, public and private disaster risk-related science and research, amongst others.
- UNDRR was established in 1999, as part of the United Nations Secretariat.
- It serves as the focal point for the coordination of disaster reduction and to ensure synergies among the disaster reduction activities of the United Nations system and regional organizations.
- It supports the implementation, follow-up and review of the Sendai Framework for Disaster Risk Reduction.
- UNDRR is 99.2% funded through voluntary contributions from a diverse set of donors.

116.Bio-remediation and Bio-mining:

Context:

The National Green Tribunal (NGT) directed the Delhi government and civic bodies to deposit an amount of ₹250 crore to an escrow account for a bioremediation and biomining project that is to be undertaken to deal with the Okhla, Ghazipur and Bhalswa landfill sites.

Concept:

- Bioremediation is the treatment of pollutants or waste (as in an oil spill, contaminated groundwater, or an industrial process) by the use of microorganisms (such as bacteria) that break down the undesirable substances. Bio-mining is the process of using microorganisms (microbes) to extract metals of economic interest from rock ores or mine waste.
- Biomining techniques may also be used to clean up sites that have been polluted with metals.
- Bio-mining will involve the use of separator machines or large sieves to separate waste material of different sizes, thereby obtaining soil, plastic, wood and metal components in isolation for appropriate processing.

117.CARBON FOOTPRINT:

Carbon footprint can be defined as the total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide (CO₂). There are two types of carbon foot printing .

1. Organisational: Emissions from all the activities across the organisation such as energy use, industrial processes and company vehicles.

2. Product: Emissions over the whole life of a product or service, from the extraction of raw material and manufacturing rights through to its use and final reuse, recycling or disposal.

118. KEELADI:

According to a report published by the Tamil Nadu Archaeology Department (TNAD), the cultural deposits unearthed during the excavations at site **Keeladi** located in the Sivaganga district could be dated to a period between the **6th century BC** and the **1st century AD**.

Key Findings:

The title of the report was ‘Keeladi-An Urban Settlement of Sangam Age on the Banks of River Vaigai.’

Previously it was believed that the Keeladi artefacts belonged to the 3rd century BC.

But the carbon dating test confirmed the date of the Tamil-Brahmi script is dated to the year 580 BC.

The results suggest that the second urbanization (the first being the **Indus Valley Civilization**) of Vaigai plains happened in Tamil Nadu during the 6th century BC.

The contemporary of which in the Gangetic plains was the Iron Age & the period of the rise of various Heterodox sects.

Skeletal fragments of Cow/Ox & Buffalo, Sheep & Goat, Nilgai & Blackbuck, Wild boar, and Peacock suggest that the society in Keeladi had used animals predominantly for agricultural purposes.

Pottery specimens from Keeladi confirmed that the water containers and cooking vessels were shaped out of locally available raw materials.

The recovery of spindle whorls, pinpointed bone tip tools, hanging stones of the yarn, terracotta spheres, copper needle, and earthen vessels to hold liquid,

outlines the various stages of weaving industry from spinning, yarning, looming, weaving and dyeing.

Sangam Age:

The word ‘Sangam’ is the Tamil form of the Sanskrit word Sangha which means a group of persons or an association.

The Tamil Sangam was an academy of poets who flourished in three different periods and in different places under the patronage of the Pandyan kings.

The Sangam literature which was largely consolidated from the third Sangam, throws information on conditions of life of people around the beginning of the Christian era.

It deals with the secular matter relating to the public and social activities like government, war charity, trade, worship, agriculture, etc.

Sangam literature consists of the earliest Tamil works (such as the Tolkappiyam), the ten poems (Pattupattu), the eight anthologies (Ettutogai) and the eighteen minor works (Padinenkilkkanakku), and the three epics.

Tamil-Brahmi Script

The Brahmi script was the earliest script that the Tamils used.

In the late ancient and early medieval period they started evolving a new angular script, called the Grantha script, from which the modern Tamil is derived.

VAIGAI RIVER:

It is an east-flowing river.

The Vaigai river basin is an important basin among the 12 basins lying between the Cauvery and Kanyakumari.

This basin is bounded by the Cardamom Hills and the Palani Hills on the West and by the Palk Strait and Palk Bay on the East.

119. OSMANABADI GOAT:

The Osmanabadi goat breed is known for its high kidding (a baby goat is called a kid) percentage, disease resistance, quick growth, and suitability to all types of rearing systems.

Due to their hardy qualities, these goats have helped many families to survive and sustain themselves amidst the region's frequent droughts.

Now, the Osmanabad district administration has taken steps to get a Geographical Indication (GI) tag for the breed, saying that the tag will help the branding of the breed in the market and promote economic prosperity for farmers.

KEY FEATURES:

The breed is known for its early maturity, prolificacy, and good dressing percentage (percentage of the live animal weight against its carcass weight). According to the Osmanabad district administration, the process of GI tagging will lead to expansion of the Osmanabadi goats' milk and meat markets. The administration hopes to get the tag in the next couple of months.

With the GI tag, farmers here want the State government to tap the potential of meat export from the region. They aim to make goat rearing their main occupation.

Recently a self-help group of farmers in Tuljapur in Osmanabad district ventured into selling the packaged milk of Osmanabadi goats.

120. CARBON CAPTURE:

Carbon capture, use and storage (CCUS) is an integrated suite of technologies that can capture up to 90% of the CO₂ emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing the CO₂ from entering the atmosphere.

Capture technologies allow the separation of CO₂ from gases produced in electricity generation and industrial processes by one of three methods:
Pre-combustion capture
Post-combustion capture
Oxyfuel combustion
CO₂ is then transported for safe use or storage.

121..STEPPE EAGLE:

A Steppe Eagle (*Aquila nipalensis*) has been sighted in Andhra Pradesh during **Asian Bird Census**.

This is the second time a Steppe Eagle has been sighted in **Andhra Pradesh** in the past two decades.

The sighting of this rare species highlights the need for exploration of the diversity of avian life in the State.



The Steppe Eagle is a **migratory raptor** which has undergone extremely rapid population declines within all its range.

Steppe Eagles may make migratory movements of many thousands of kilometres crossing numerous national jurisdictional boundaries.

The bird has moved from 'Least Concern' to 'Endangered' under IUCN Red List.

It breeds in **Russia, Kazakhstan, and Mongolia** during the winter season. Steppe eagle is the **second-largest migratory eagle species** to India.

The threats to the Steppe Eagle include habitat loss/degradation, electrocution on/ collision with energy infrastructure, poisoning through herbicides/ pesticides/ veterinary drugs in food sources, etc.

122.IRRAWADDY DOLPHINS:



Irrawaddy dolphins (*Orcaella brevirostris*) are found in coastal areas in South and Southeast Asia, and in three rivers: **the Irrawaddy (Myanmar)**, **the Mahakam (Indonesian Borneo)** and **the Mekong (China)**. They are '**Endangered**' as per the IUCN Red List. The total population of these aquatic mammals in the world is estimated to be **less than 7,500**.

More than 6,000 Irrawaddy dolphins have been reported from Bangladesh. Dolphin distribution in **Chilika** is considered to be the highest single lagoon population.

Why in News:

During the Dolphin Census in Chilika lake, direct sighting of 146 Irrawaddy dolphins has been reported.

The Census is being carried out using **Hydrophone monitoring technique**. A hydrophone is a microphone designed to be used underwater for recording or listening to underwater sound.

123.CARBON NEUTRAL:

Carbon neutrality, or having a net zero carbon footprint, refers to achieving net zero carbon dioxide emissions by balancing carbon emissions with carbon removal (often through carbon offsetting) or simply eliminating carbon emissions altogether (the transition to the "post-carbon economy"). It is used in the context of carbon dioxide-releasing processes associated with transportation, energy production, agriculture, and industrial processes.

124.NAMAMI GANGA:

It is an umbrella programme which integrates previous and currently ongoing initiatives by enhancing efficiency, extracting synergies and supplementing them 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.

It replaced the National Ganga River Basin Authority (NGRBA).

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:

- Sewerage Treatment Infrastructure
- River-Surface Cleaning
- Afforestation
- Industrial Effluent Monitoring
- River-Front Development
- Bio-Diversity
- Public Awareness
- Ganga Gram

125.CHEETAH REINTRODUCTION PROGRAMME:

The Supreme Court has allowed the Centre to introduce the African cheetah to a suitable habitat in India.

The National Tiger Conservation Authority (NTCA) had previously told the Supreme Court that African cheetahs would be translocated in **India from Namibia** and would be kept at **Nauradehi wildlife sanctuary in Madhya Pradesh**.

International Union for Conservation of Nature (IUCN) has given a ‘no objection’ for the translocation.

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.

India now has the economic ability to consider restoring its lost natural heritage for ethical as well as ecological reasons

CHEETAH:

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 — which is the fastest land animal — 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.

Cheetah reintroduction programme in India:

The Wildlife Institute of India at **Dehradun** had prepared a ₹260-crore cheetah re-introduction project seven years ago.

Nauradehi in Madhya Pradesh was found to be the most suitable area for the cheetahs as its forests are not very dense to restrict the fast movement of the spotted cat. Besides, the prey base for cheetahs is also in abundance at the sanctuary.

126..IPBES:

IPBES is an independent intergovernmental body, established by member States in 2012.

It is a global scientific body, similar in composition and functioning to the **Intergovernmental Panel on Climate Change (IPCC)**.

IPCC's assessment reports form the scientific basis on which the international negotiations on climate change have been happening.

IPBES is often described as the "**IPCC for biodiversity**", as it is mandated to do a similar job for natural ecosystems and biodiversity.

The **objective is to strengthen the science-policy interface for biodiversity and ecosystem services.**

How does it differ from IPCC?

Like IPCC, IPBES does not produce any new science. It only evaluates existing scientific knowledge to make assessments and projections.

However, unlike IPCC, the **IPBES assessment reports are likely to feed into and inform several multilateral processes.**

Two UN Conventions are likely to be guided by this report in future, - **Convention on Biological Diversity that addresses biodiversity issues** **Convention on Combating Desertification that deals with sustainable land management**

Besides, the Ramsar Convention, Convention on International Trade in Endangered Species, and Cartagena Protocol may also find some inputs.

127.FISHERIES AND AQUACULTURE INFRASTRUCTURE DEVELOPMENT FUND (FIDF):

The government has approved Rs. 7522 crore **Fisheries and Aquaculture Infrastructure Development Fund (FIDF)**.

It creates employment opportunities to over 9.40 lakhs fishers/fishermen/ fisher folks and other entrepreneurs in fishing and allied activities.

It **attracts private investment** in creation and management of fisheries infrastructure facilities.

It helps in the creation of fisheries infrastructure **facilities both in marine and inland fisheries sectors**, which would boast fish production and help achieve target of **Rs. 15 million tonne by 2020 under Blue revolution.**

It aims to achieve a sustainable growth of **8% to 9%** in a move to augment fish production to the level of **about 20 million tonnes by 2022-23.**





Environment Prelims Notes

March - July, 2020

Santosh Sir

All 6 Prelims qualified
If I can do it, you can too

asksantoshsir@gmail.com, <https://t.me/asksantoshsir>

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Dear aspirants,

Preliminary stage is the most critical stage in CSE. It is the most competitive stage .Many think UPSC CSE Prelims is unpredictable and selection is like a lottery. However, this is not true. I Santosh Sir, have cracked all six prelims with huge margins back to back. As per my experience UPSC Prelims is predictable and easily doable if our strategy, sources and effort is in right direction.

I have selected each topic of the notes with a lot of diligence and thought. It includes dynamic/current topics with backward linkage to basic concepts. I strongly believe if anyone completes these notes along with **700 OPTIMA questions**, he would be able **to optimize** his last 50 days of preparation.

Particularly, if you are preparing of IFoS you need to score very high. **Trust be its doable. I have done, you can too.**

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March

1. TRAFFIC

- TRAFFIC is a leading non-governmental organization working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.
- It is a joint program of World Wildlife Fund (WWF) and the International Union for Conservation of Nature (IUCN).
- It was established in 1976 and has developed into a global network, research-driven and action-oriented, committed to delivering innovative and practical conservation solutions.

Functions:

- Since its establishment, it has helped in the evolution of the international wildlife trade treaties.
- It focuses on leveraging resources, expertise and awareness of the latest globally urgent species trade issues such as tiger parts, elephant ivory and rhino horn.
- Large scale commercial trade in commodities like timber and fisheries products are also addressed and linked to work on developing rapid results and policy improvements.

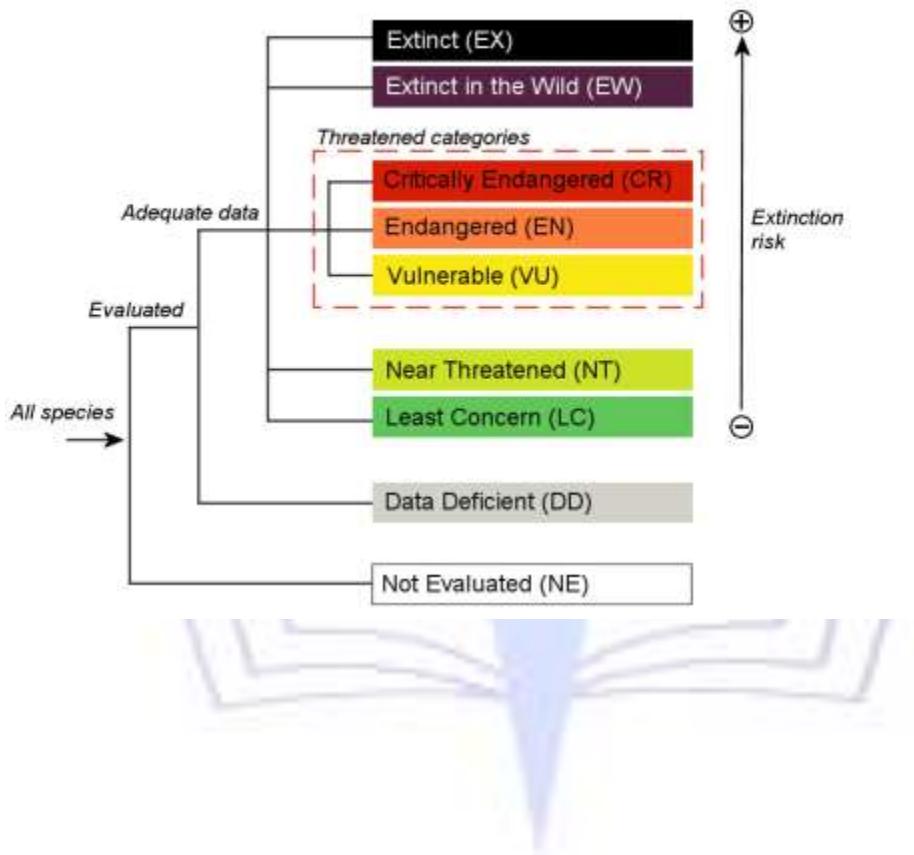


2. IUCN Red list

- Established in 1964, the International Union for Conservation of Nature's Red List of Threatened Species has evolved to become the world's most comprehensive information source on the global extinction risk status of animal, fungus and plant species.

Importance

- The IUCN Red List is a critical indicator of the health of the world's biodiversity. Far more than a list of species and their status, it is a powerful tool to inform and catalyse action for biodiversity conservation and policy change, critical to protecting the natural resources we need to survive.
- It provides information about range, population size, habitat and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decisions.



3. Red Panda in India

- The red panda is a small arboreal mammal found in the forests of India, Nepal, Bhutan and the northern mountains of Myanmar and southern China.
- It thrives best at 2,200-4,800m, in mixed deciduous and conifer forests with dense understories of bamboo.
- In India, it is found in Sikkim, western Arunachal Pradesh, Darjeeling district of West Bengal and parts of Meghalaya. It is also the state animal of Sikkim.
- Listed as Endangered in the IUCN red list of Threatened Species and under Schedule I of the Indian Wildlife (Protection) Act, 1972, the red panda has the highest legal protection at par with other threatened species.
-

4. SAWEN

- South Asia Wildlife Enforcement Network (SAWEN) is an inter-governmental wildlife law enforcement support body of South Asian countries.
- SAWEN was officially launched in January, 2011 in Paro Bhutan. It promotes regional cooperation to combat wildlife crime in South Asia.
- SAWEN operates its activities from the Secretariat based in Kathmandu, Nepal.

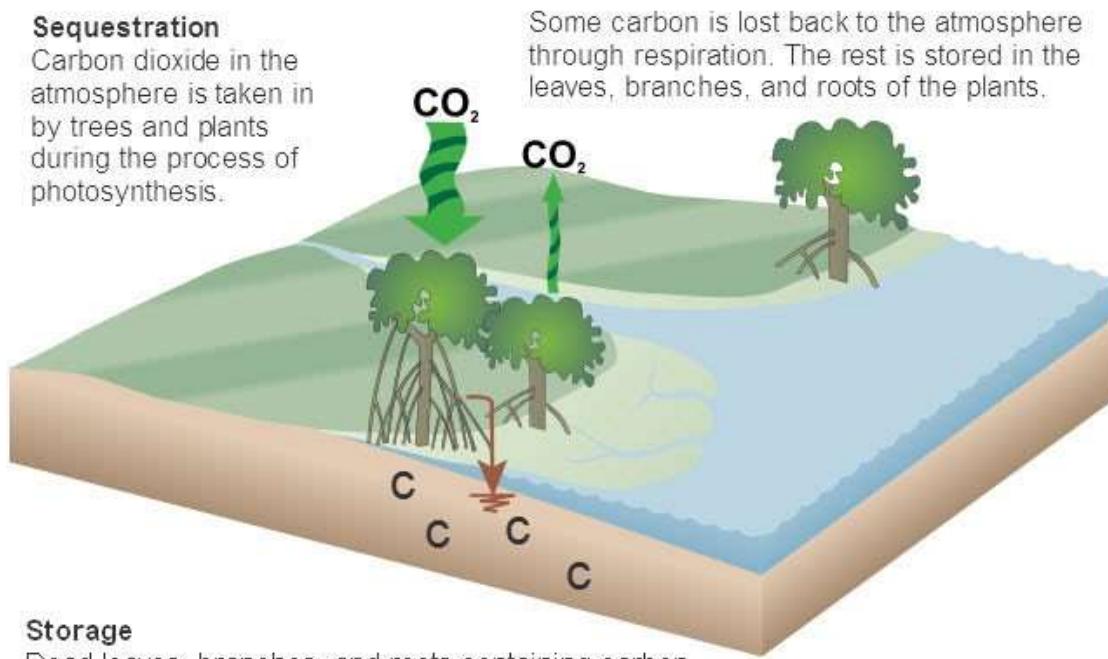
Objectives:

- To take initiatives for bringing harmonization and standardization in laws and policies of member countries concerning conservation of fauna and flora;
- To document the trend of poaching and illegal trade, and related threats to the natural biodiversity within and across countries in the region;
- To strengthen institutional responses to combat wildlife crime by promoting research and information sharing, training and capacity building, technical support, sharing experiences and outreach; and
- To encourage member countries to prepare and implement their National Action Plans in curbing wildlife crime and to collaborate towards effective implementation.

The South Asia region is very vulnerable to illegal traffic and wildlife crimes due to presence of precious biodiversity and large markets as well as traffic routes for wildlife products in the south East Asian region. The collaboration in harmonising as well as enforcing the wildlife protection in the region is considered very important for effective conservation of such precious biodiversity.

5. Carbon Sinks: Amazon forest

- A carbon sink is a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period.
- The process by which carbon sinks remove carbon dioxide (CO_2) from the atmosphere is known as carbon sequestration.
- The major natural sinks are the oceans and plants and other organisms that use photosynthesis to remove carbon from the atmosphere by incorporating it into biomass.
- The world's tropical forests store huge quantities of carbon in their biomass and thus constitute an important carbon sink.



Storage

Dead leaves, branches, and roots containing carbon are buried in the soil, which is frequently, if not always, covered with tidal waters. This oxygen-poor environment causes very slow break down of the plant materials, resulting in significant carbon storage.

6. Critically Endangered IUCN Red list

- Critically endangered is the highest risk category assigned by the IUCN (International Union for Conservation of Nature) Red List to wild species.
- A taxon is critically endangered when the best available evidence indicates that it meets any of the following criteria:
 1. reduction in population (greater than 90% over the last 10 years),
 2. population size (number less than 50 mature individuals),
 3. quantitative analysis showing the probability of extinction in wild in at least 50% in their 10 years, and
 4. it is therefore considered to be facing an extremely high risk of extinction in the wild.



7. Vulture

- A unique ‘restaurant’ in Sukhnara village in Kangra district in Himachal Pradesh has attracted the attention of the local populace for conserving several species of vultures.
- Being natural scavengers, vultures have, for a long time, suffered from rapid urbanisation and deteriorating climate. Their population in the state dwindled as an increase in man-made activities reduced their food sources.
- In Asia, another cause of dwindling vulture populations has been attributed to the creation of painkiller drug *Diclofenac*.
- Nine species of vultures are found in India. The species worst hit were White-rumped, Indian, and Slender-billed Vultures. Others were affected too, but not as badly, due to a number of factors, including their migratory nature (such as Cinereous Vulture and Eurasian Griffon) or their habitats being more remote and forested (such as Himalayan Griffon).

White backed Vulture

- **IUCN status:** Critically Endangered (CR)
- **Population size and trend:** fewer than 10,000 mature individuals; declining
- **Distribution:** Pakistan, India, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Laos, Cambodia and southern Vietnam



Slender Billed Vulture

- **IUCN status:** Critically Endangered (CR)
- **Population size and trend:** fewer than 2,500 individuals; declining
- **Distribution:** mainly India, Nepal and Bangladesh



Long billed vulture

- **IUCN status:** Critically Endangered (CR)
- **Population size and trend:** 30,000 individuals; declining
- **Distribution:** India and south-eastern Pakistan



Red headed Vulture

- **IUCN status:** Critically Endangered (CR)
- **Population size and trend:** fewer than 10,000 mature individuals; declining
- **Distribution:** mainly India and Nepal, with scattered small numbers across south-east Asia



8. Convention on Migratory Species

India is host to 457 migratory fauna, shows latest CMS list. With new additions to the wildlife list put out by the Convention on the Conservation of Migratory Species (CMS), scientists say that the total number of migratory fauna from India comes to 457 species. Birds comprise 83% (380 species) of this figure.

About CMS:

- As an environmental treaty of the United Nations, CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats.
- CMS 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.
- As the only global convention specializing in the conservation of migratory species, their habitats and migration routes, CMS complements and co-operates with a number of other international organizations, NGOs and partners in the media as well as in the corporate sector.
- In this respect, CMS acts as a framework Convention. The agreements may range from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions.

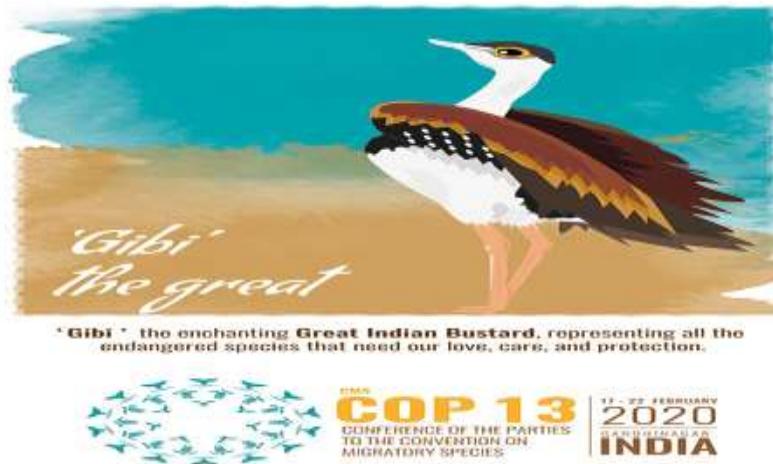
Convention:

- Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS 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. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species.
- Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the

Convention encourages the Range States to conclude global or regional agreements.

Organization structure:

The Conference of the Parties (COP) is the decision-making body of the Convention. It meets at three-yearly intervals.



Its Standing Committee (StC) gives policy and administrative guidance between meetings.

The Scientific Council (SC) meets between COP sessions to offer scientific advice and identify research and conservation priorities.

The Secretariat is provided by the United Nations Environment Programme (UNEP) and is based in Bonn, Germany and has an out-posted office in Abu Dhabi, United Arab Emirates.

9. Himalayan Ibex

- A recent study by scientists of the **Zoological Survey of India (ZSI)** has proved that **Himalayan Ibex is a distinct species from the Siberian Ibex**. The study was funded through the **National Mission on Himalayan Studies**.
- The National Mission on Himalayan Studies is **implemented by the Ministry of Environment, Forest and Climate Change**.

- It targets to provide much needed focus, through holistic understanding of system's components and their linkages, in addressing the key issues relating to conservation and sustainable management of natural resources in Indian Himalayan Region (IHR).
- Earlier the Himalayan Ibex was regarded as a subspecies of the Siberian Ibex (*Capra sibirica*). The Himalayan Ibex is distributed mainly in the **trans-Himalayan ranges** of the Union Territories of Ladakh and Jammu and Kashmir and Himachal Pradesh.
- Siberian Ibex is a species of wild goat..
- From Mongolia, its distribution extends towards Altai, Hangai, Gobi-Altai, the Hurukh mountain ranges as well as Sayan Mountains near Russia and scattered populations in the small mountains of Trans-Altai Gobi.
- In Asia, Ibex is distributed in the Montane habitats, ranging in elevations from 500 m to 6,700 m in countries like India, Kazakhstan, Tajikistan, Mongolia, Pakistan, Southern Siberia and China.

Its IUCN status is least concerned.

April

1. Section 51 to 59 of Disaster Management Act 2005

Context:

Cops to book cases under Disaster Management Act, 2005.

Concept:

Among the provision enshrined in the DMA, to expedite the 'effective management of disasters, Articles 51-60 of the Act defines Offences and Penalties both against officers and the public; These include Sections:

- 51. Punishment for obstruction
 - 52. Punishment for false claim.
 - 53. Punishment for misappropriation of money or materials, etc.
- Violating Sections 51, 52 and 53, can result in imprisonment of two-years, fine or both.
- 54. Punishment for false warning. Whoever makes or circulates a false alarm or warning as to a disaster or its severity or magnitude, leading to panic, shall on conviction, be punishable with imprisonment which may extend to one year or with fine
 - 55. Offences by Departments of the Government.
 - 56. Failure of officer on duty or his connivance at the contravention of the provisions of this Act.
 - 57. Penalty for contravention of any order regarding requisitioning.
 - 58. Offence by companies.
 - 59. Previous sanction for prosecution.
 - 60. Cognizance of offences

2. NTCA, Pench tiger reserve, Rhinotracheitis

Context:

Pench tiger death raises COVID-19 fears. NTCA mulls test after a big cat tested positive for the virus in a U.S. zoo

Concept:

NTCA

- The National Tiger Conservation Authority is a **statutory body** 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.
- '**Project Tiger**' is a **Centrally Sponsored Scheme** 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.
- **Powers and functions of the National Tiger Conservation Authority** are: approve tiger conservation plans, provide measures for man-animal conflicts, provide information on protection measures including future conservation plan, estimation of population of tiger and its natural prey species, status of habitats, disease surveillance, mortality survey, patrolling, reports on untoward happenings ,ensure that the tiger reserves and areas linking one protected area or tiger reserve with another protected area or tiger reserve are not diverted for ecologically unsustainable uses, except in public interest and with the approval of the National Board for Wild Life and on the advice of the Tiger Conservation Authority;

Pench tiger reserve

- Pench Tiger Reserve, Seoni (Madhya Pradesh) is one of the **major Protected Areas of Satpura-Maikal ranges** of the Central Highlands, which is among the most important tiger habitats of the world.
- Pench Tiger is among the sites notified as **IMPORTANT BIRD AREAS of India**.
- This is one of the highest herbivores densities in India.
- Pench Tiger Reserve comprises the Indira Priyadarshini Pench National Park, the Pench Mowgli Sanctuary and a buffer.
- The Tiger Reserve nestles in the Southern Slopes of the Satpura ranges of Central India.
- **The river Pench, which splits the National Park into two, forms the lifeline of the Park.**
- To the south of the tiger reserve lies the Pench Tiger Reserve of Maharashtra, the **first inter-state project tiger area of the country**.
- The area is dominated by fairly **open canopy mixed forests with considerable shrub cover and open grassy patches**. This high habitat heterogeneity favors **high population of Chital, Sambar, Wild boar & Blue bull**.
- So that pench tiger reserve **has of the highest density of herbivores** (90.3 animals per square kilometer) and the second highest prey base biomass in India after Nagarhole.

Rhinotracheitis

- Rhinotracheitis is a **respiratory disease caused by herpesvirus-1**.
- “Rhinotracheitis” means **inflammation of the nose and windpipe, or trachea**.

3. Air quality index

Context:

The lockdown has **pushed pollution levels in Delhi to a 5 year low** and, across India, the **number of cities that recorded 'good'** on the air quality index jumped from 6 on March 16 to 30 on March 29, according to the Central Pollution Control Board.

Concept:

- Air Quality Index (AQI) is a tool for **effective dissemination of air quality information to people**.
- It is '**One Number- One Colour-One Description**' for the common man to judge the air quality within his vicinity.
- There are **six AQI categories**, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe.

Numerical Value	Color	Air Quality Index Levels of Health Concern	Meaning
0 - 50	Green	Good	Air quality is considered satisfactory, and air pollution poses little or no risk.
51 - 100	Yellow	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
101 - 150	Orange	Unhealthy for sensitive groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
151 - 200	Red	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
201 - 300	Purple	Very unhealthy	Health alert: everyone may experience more serious health effects.
301 - 500	Maroon	Hazardous	Health warnings of emergency conditions. The entire population is more likely to be affected.

- The proposed AQI will **consider eight pollutants** (PM10, PM2.5, NO₂, SO₂, CO, O₃, NH₃, and Pb) for which short-term (up to 24-hourly averaging period). National Ambient Air Quality Standards are prescribed.
- **Associated likely health impacts for different AQI categories** and pollutants have been also been suggested, with primary inputs from the medical expert members of the group.
- The AQI has been **developed by the Central Pollution Control Board** in consultation with IIT-Kanpur and an expert group comprising medical, air quality professionals and other stakeholders.

4. Minor forest produce, TRIFED, Van Dhan Vikash Kendra scheme

Context:

Lockdown halts harvesting season in forests. Lakhs of tribal dependent on sale of non-timber products, stare at uncertain days

Concept:

i) Minor forest produce

- An important source of livelihoods for tribal people are non-wood forest products, generally termed 'Minor Forest Produce (MFP)' means **all non timber forest produce of plant origin and will include bamboo, canes, fodder, leaves, gums, waxes, dyes, resins and many forms of food** including nuts, wild fruits, Honey, Lac, Tusser etc.
- Govt. of India has decided to introduce the scheme of "**Mechanism for Marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) and development of value chain**".
- Ministry of Tribal Affairs, Govt of India. shall be the Nodal Ministry for implementation and monitoring of the scheme. **Ministry of Tribal Affairs shall announce Minimum Support Price (MSP) for the selected MFPs with the technical support from TRIFED.**
- TRIFED shall be Central Nodal Agency for implementation of the scheme through State level implementing agencies.

ii) TRIFED

- The Tribal Cooperative Marketing Development Federation of India (TRIFED) **came into existence in 1987**. It is a **national-level apex organization** functioning under the administrative control of Ministry of Tribal Affairs, Govt. of India.
- The ultimate objective of TRIFED is **socio-economic development of tribal people in the country by way of marketing development of the tribal products** on which the lives of tribals depends heavily as they spend most of their time and derive major portion of their income.
- It empowers tribal people with knowledge, tools and pool of information so that they can undertake their operations in a more systematic and scientific manner.
- It involves capacity building of the tribal people through sensitization, **formation of Self Help Groups (SHGs)** and imparting training to them for

undertaking a particular activity, **exploring marketing possibilities in national as well as international markets**, creating opportunities for marketing tribal products on a sustainable basis, creating a brand and providing other services.

iii) Van Dhan Vikas Karyakram

- The programme launched in 2018 aims to **tap into the traditional knowledge and skill sets of tribal people** by adding technology and Information Technology for upgradation of output at each stage and to convert the tribal wisdom into a remunerative economic activity.
- Van Dhan Vikas Karyakram seeks to promote and leverage the collective strength of tribal people to achieve a viable scale
- The proposition is to set-up tribal community owned MFP-centric multipurpose **Van Dhan Vikas Kendras (the Kendra) in predominantly tribal districts.**
- About 3000 Van DhanKendrasare proposed to be set up in span of 2 years i.e. 1500 Kendras to be set-up in each year. Each Kendra would act as common facility centres for procurement cum value addition to locally available MFPs and skill based handicraft.
- A typical Van Dhan Vikas Kendra shall constitute of **10 tribal Van Dhan Vikas Self Help Groups (SHG)**, each comprising of upto 30 MFP gatherers or tribal handicraft artisans.

5. State Disaster Response Fund

Context:

Amid demands by states to release higher grants and relaxation in their borrowing limits, **centre approved the release of Rs 11,092 crores under the State Disaster Risk Management Fund (SDRMF), to all States** to enhance their financial resources during the COVID-19 crisis.

Concept:

- The State Disaster Response Fund (SDRF), constituted under **Section 48 (1) (a)** of the Disaster Management Act, 2005, is the primary fund available with State Governments **for responses to notified disasters**.
- The **Central Government contributes 75% of SDRF allocation** for general category States/UTs and **90% for special category States/UTs** (NE States, Sikkim, Uttarakhand, Himachal Pradesh, Jammu and Kashmir).
- The annual Central contribution is released in two equal installments as per the recommendation of the Finance Commission.
- SDRF shall be used only for meeting the expenditure for providing immediate relief to the victims.
- **Disaster (s) covered under SDRF:** Cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloudburst, pest attack, frost and cold waves.
- **Local Disaster:** A State Government may use up to 10 percent of the funds available under the SDRF for providing immediate relief to the victims of natural disasters that they consider to be '**disasters' within the local context in the State and which are not included in the notified list of disasters** of the Ministry of Home Affairs .
- On March 14, COVID 19 has been declared as notified disaster by Ministry of Home Affairs.

6. Great adjutant Stork

- Greater adjutant stork is the world's most endangered stork.
- Earlier it was distributed throughout northern and eastern India and many countries of south and south-east Asia, it is **currently only in Assam and Bihar and a few other locations in Cambodia.**
- It is listed as "**Endangered**" in **IUCN Red list** of threatened species.
- It is locally called 'Hargila' in the Brahmaputra Valley in Assam, which harbours more than 80% of the global population of the species.
- **Purnima Devi Barman**, a wildlife biologist and conservationist from Assam, has been honoured for her enormous efforts for wildlife conservation who formed hargila army along with people to conserve stork.



- **The IUCN Red List of Threatened Species** is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of thousands of species. These criteria are relevant to most species and all regions of the world. With its strong scientific base, The IUCN Red List is recognized as the most authoritative guide to the status of biological diversity.
- **IUCN** is a membership Union composed of both government and civil society organizations working in the field of natural conservation and sustainable use of natural resources.

7. Special Rhino Protect Force, KNP

Context:

Amid lockdown, poachers eye rhino horns

Concept:

- SRPF was raised for better protection of rhinos.
- Government of Assam has decided to raise **Special Rhino Protection Force from the local youth hailing from the fringe areas** of the UNESCO's world heritage site of Kaziranga National Park. The force would be exclusively used for Kaziranga National Park, Orang National Park and Manas National Park.
- The Special Rhino Protection Force is the **result of an initiative taken by National Tiger Conservation Authority**, which led to a collaboration between central and state governments.

Kaziranga national park

- Formed in 1908 on the recommendation of Mary Curzon, the park is located in the **edge of the Eastern Himalayan biodiversity hotspots** – Golaghat and Nagaon district of Assam.
- In the year 1985, the park was declared as a World Heritage Site by UNESCO.
- Along with the iconic Greater one-horned rhinoceros, the park is the breeding ground of **elephants, wild water buffalo, and swamp deer**. Over the time, the tiger population has also increased in Kaziranga, and that's the reason why Kaziranga was **declared as Tiger Reserve in 2006**.
- Also, the park is recognized as an **Important Bird Area by BirdLife International** for the conservation of avifaunal species.
- Birds like lesser white-fronted goose, ferruginous duck, Baer's pochard duck and lesser adjutant, greater adjutant, black-necked stork, and Asian Openbill stork specially migrate from the Central Asia during the winter season.
- Due to the difference in altitude between the eastern and western areas of the park, here one can see mainly four types of vegetation' like **alluvial inundated grasslands, alluvial savanna woodlands, tropical moist mixed deciduous forests, and tropical semi-evergreen forests**.

8. Trimeresurus Salazar

Context:

The pit viper was discovered by the team of researchers in the thick evergreen forests of Pakke tiger reserve in July 2019 and has been named Trimeresurus Salazar.

Concept:

- The new species of snake has been **named after J.K. Rowling's fictional character** Salazar Slytherin, co-founder of the Hogwarts School of Witchcraft and Wizardry.

Pakke Tiger Reserve

- Pakke Tiger Reserve is located in the East Kameng district of Arunachal Pradesh.
- **Contiguous with the Nameri Tiger Reserve of Assam**, it is also an important habitat for the big cats, one of the most endangered species in the world.
- It falls within the **Eastern Himalaya Biodiversity Hotspot**.
- Pakke is also **the only Hornbill sanctuary in India**.
- The Pakke River lies to the east and the Bhareli River to the west and the north.
- The vegetation is predominantly of Assam valley **tropical semi-evergreen forest**.

9. Disaster Management

- The National Disaster Management Authority (NDMA) is the **apex statutory body for disaster management in India.**
- The NDMA was formally constituted on 27th September 2006, in **accordance with the Disaster Management Act, 2005** with **Prime Minister as its Chairperson** and nine other members, and one such member to be designated as Vice-Chairperson.
- Mandate: Its primary purpose is to **coordinate response to natural or man-made disasters** and for capacity-building in disaster resiliency and crisis response. It is also the apex body to lay down policies, plans and guidelines for Disaster Management to ensure timely and effective response to disasters.
- Vision: To build a **safer and disaster resilient India by a holistic, proactive, technology driven and sustainable development strategy** that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation.

National disaster management plan

- The NDMP has been aligned broadly with the **goals and priorities set out in the Sendai Framework for Disaster Risk Reduction.**
- The Vision of the Plan is to **“Make India disaster resilient, achieve substantial disaster risk reduction, and significantly decrease the losses.**
- The National Disaster Management Plan (NDMP) provides a framework and direction to the government agencies for all phases of disaster management cycle
- For each hazard, the approach used in this national plan incorporates the **four priorities enunciated in the Sendai Framework** into the planning framework for Disaster Risk Reduction under **the five Thematic Areas for Actions:**
 - Understanding Risk
 - Inter-Agency Coordination
 - Investing in DRR – Structural Measures
 - Investing in DRR – Non-Structural Measures
 - Capacity Development

National Executive Committee (NEC)

- A National Executive Committee is **constituted under Section 8 of DM Act, 2005** to assist the National Authority in the performance of its functions.
- **Union Home secretary is its ex-officio chairperson.**
 - NEC powers and functions:
 - act as the coordinating and monitoring body for disaster management;
 - prepare the National Plan to be approved by the National Authority;
 - coordinate and monitor the implementation of the National Policy;
 - lay down guidelines for preparing disaster management plans by different Ministries or Departments of the Government of India and the State Authorities;
 - provide necessary technical assistance to the State Governments and the State Authorities for preparing their disaster management plans in accordance with the guidelines laid down by the National Authority;

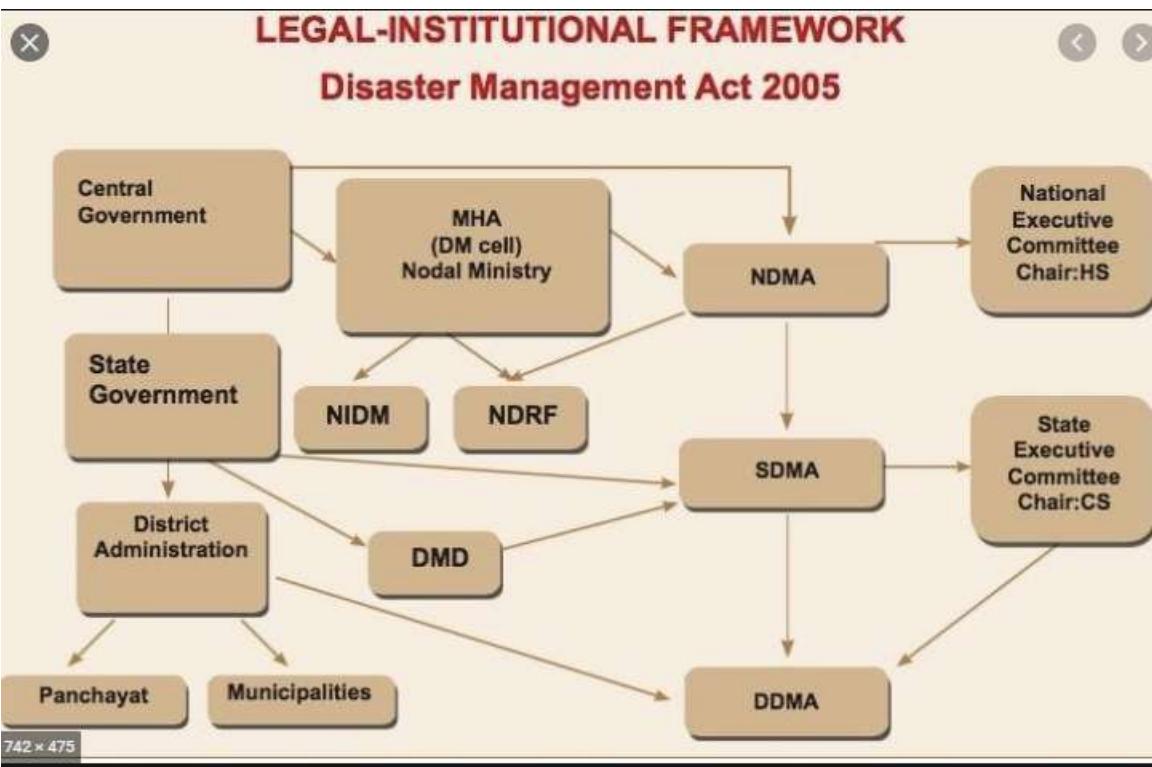
State Disaster Management Authority (SDMA)

Every state to constitute SDMA **headed by Chief Minister of the respective state**,

- SDMA lays down the policies and plans for disaster management in the state. It is responsible to coordinate the implementation of the state Plan, recommend provision of funds for mitigation and preparedness measures and review the developmental plans of the different departments of the state to ensure integration of prevention, preparedness and mitigation measures.
- **State Executive Committee (SEC)- Headed by the Chief Secretary of the state**, has the responsibility for coordinating and monitoring the implementation of the National Policy, the National Plan and the State Plan as provided under the DM Act.

District Disaster management Authority (DDMA)

Every district to constitute District Disaster Management Authority headed by district collector.



10.Cropping season

Context:

While the government's focus is now on harvesting and marketing of the rabi crop, there is a noless- immediate challenge of ensuring adequate seed availability in the ensuing kharif planting season.

Concept:

- India has three cropping seasons — rabi, kharif and zaid.

RABI

- Rabi crops are **sown in winter from October to December and harvested in summer from April to June.**
- Some of the important rabi crops are **wheat, barley, peas, gram and mustard.**
- Though, these crops are grown in large parts of India, states from **the north and northwestern parts** such as Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and Uttar Pradesh are important for the production of wheat and other rabi crops.
- Availability of precipitation during winter months due to the western temperate cyclones helps in the success of these crops.

KHARIF

- Kharif crops are grown **with the onset of monsoon** in different parts of the country and these are **harvested in September-October.**
- Important crops grown during this season are **paddy, maize, jowar, bajra, tur (arhar), moong, urad, cotton, jute, groundnut and soyabean**

ZAID

- In between the rabi and the kharif seasons, there is a **short season during the summer months** known as the Zaid season.
- Some of the crops produced during 'zaid' are watermelon, muskmelon, cucumber, vegetables and fodder crops

11. Open pollinated variety seeds:

- Open-pollination is when those cute little insects, birds, wind, or other natural instrument creates pollination.
- Because **open-pollination is uncontrolled and unrestricted on the movement or flow of pollens** between individuals and plants, open-pollinated plants are usually more genetically diverse.
- This causes an amazing variation within plant populations, which ultimately allows them to **adapt to local growing conditions and climates every year**.
- Seeds coming from open-pollinated variety of plants **can be replanted** and the same exact plant grow out of it
- **Heirloom seeds** on the other hand is how and what open-pollinated varieties are but is **usually saved and handed down** through multiple generations of families.

Hybrid seeds

- Hybrid Seeds is a **product of hybridization**. Hybridization is a process in which the **pollen of two different species or varieties are crossed by human intervention**. The objective of which is to get the best traits of two different varieties and combine them to come up with a better variety.
- Hybrid seeds can come and occur naturally through random crosses, but big companies usually come up with hybridized seeds, often **labeled as F1 varieties**. They are deliberately created to **breed a desired trait, or characteristic**.
- The first plant coming from a hybridized seed also tends to grow better and produce better yields than the parent varieties. However, **any seed produced by the first plant coming from a hybrid seed is genetically unstable**, hence, it's not advised to be saved and planted for use in the following years.

12. Minor Forest Produce

Context

In another set of relaxations in the guidelines to the rural sector amid the Covid-19 crisis, the Ministry of Home Affairs (MHA) on Friday allowed collection, harvesting, and processing of minor forest produce

Concept

Forest Produce

Section 2(4) of the Indian Forest Act 1927 defines only "forest-produce" and this term connotes to those products whether found in, or brought from a forest such as

- a. timber, charcoal, caoutchouc, catechu, wood-oil, resin, natural varnish, bark, lac, mahua flowers, mahua seeds, kuth and myrabolams,
- b. trees and leaves, flowers and fruits, and all other parts or produce of trees,
- c. plants not being trees (including grass, creepers, reeds and moss), and all parts or produce of such plants,
- d. wild animals and skins, tusks, horns, bones, silk, cocoons, honey and wax, and all other parts or produce of animals, and
- e. peat, surface soil, rock and minerals (including lime-stone, laterite, mineral oils), and all products of mines or quarries;

In short, the essential condition to be qualified as a forest produce is that the products should be either found in or be brought from forest.

Minor Forest Produce:

Minor Forest Produce (MFP) is a subset of forest produce and got a definition only in 2007 when the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**, was enacted. Section 2(i) of the said Act

defines a Minor Forest Produce (MFP) as all non-timber forest produce of plant origin and includes bamboo, brushwood, stumps, canes, Tusser, cocoon, honey, waxes, Lac, tendu/kendu leaves, medicinal plants and herbs, roots, tuber and the like.

Thus, the definition of "minor forest produce" includes bamboo and cane, thereby changing the categorization of bamboo and cane as "trees" under the Indian Forest Act 1927.

13.NBWL

Context:

Amid the countrywide lockdown, the National Board for Wild Life (NBWL) has recommended coal mining in a part of an elephant reserve in Assam. There is a proposal for use of 98.59 hectares of land from the Saleki proposed reserve forest land for a coal mining project by North-Easter Coal Field (NECF), a unit of Coal India Limited

Saleki is a part of the **Dehing Patkai Elephant Reserve** that includes the Dehing Patkai Wildlife Sanctuary covering 111.19 sq km of rainforest and several reserve forests

Concept:

- It is a “**Statutory body**” constituted under the **Wildlife Protection Act, 1972**.
- Its roles is “**advisory**” in nature and advises the Central Government on framing policies and measures for conservation of wildlife in the country.
- It has power to **review all wildlife-related matters and approve projects in and around national parks and sanctuaries**. No alteration of boundaries in national parks and wildlife sanctuaries can be done without approval of the NBWL.
- Composition: The **NBWL is chaired by the Prime Minister**. It has 47 members including the Prime Minister. Among these, 19 members are ex-officio members. Other members include three Members of Parliament (two from Lok Sabha and one from Rajya Sabha), five NGOs and 10 eminent ecologists, conservationists and environmentalists.

14.Chinakara

Context:

Four arrested for poaching chinkara in Jaisalmer

Concept:

- Common name: Chinkara; Indian gazelle.
- Distribution: It is native to Iran, Afghanistan, Pakistan and India. Around 60% of the global population of Indian gazelles is presently found in western Rajasthan.
- Habitat: Chinkara live in **arid plains and hills, deserts, dry scrub and light forests**. They can go without water for long periods and can get sufficient fluids from plants and dew.
- IUCN Red List Status: **Least Concern**.





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May

1. Algal bloom and food chain

Context:

Blooms of algae turn out to be a death zone for fishes in the Arabian Sea, scientific studies have revealed.



What is algal bloom?

An **algal bloom** or **algae bloom** is a rapid increase or accumulation in the population of algae in freshwater or marine water systems, and is often recognized by the discoloration in the water from their pigments

Findings:

- Global warming has exerted a disproportionately strong influence on the Eurasian land surface, causing a steady decline in snow cover [in the Himalayas].
- This has disrupted “winter convective mixing” which occurs when cold winter winds blow over the Arabian Sea, driving the surface waters down, which are in turn replaced by nutrient rich waters from below.
- That process allows photosynthetic phytoplankton, the basic building block of our ocean food chain to thrive, along with all the fish species that eventually result in the seafood bounty so many of us rely on.
- Disrupted winter convective mixing led to spectacular growth of Noctiluca which demonstrates the scale of the threat to nutritional security. The

brilliance of their appearance is due to the phenomenon called **bioluminescence**. Nicknamed ‘Sea Sparkle’, these pretty spots **ironically indicate zones of decline** as fish cannot thrive and sometimes die because of these blooms. The algae feeds voraciously on planktonic organisms at the base of the fish-food chain called diatoms. They also **excrete large amounts of ammonia, which is linked to high fish mortality.**

- And also Noctiluca are **not a preferred food for higher trophic organisms**, they mostly **attract only salps, jellyfish and turtles**, thereby short-circuiting the food chain in the Arabian Sea.



2. Manas NP

Context:

Villagers near Manas NP get respite as hanging fence deters jumbos.

Concept:

Manas, at the base of **foot hills of the Bhutan-Himalayas** in the state of Assam, with unique biodiversity and landscape is one of the first reserves included in the network of tiger reserve under Project tiger in 1973

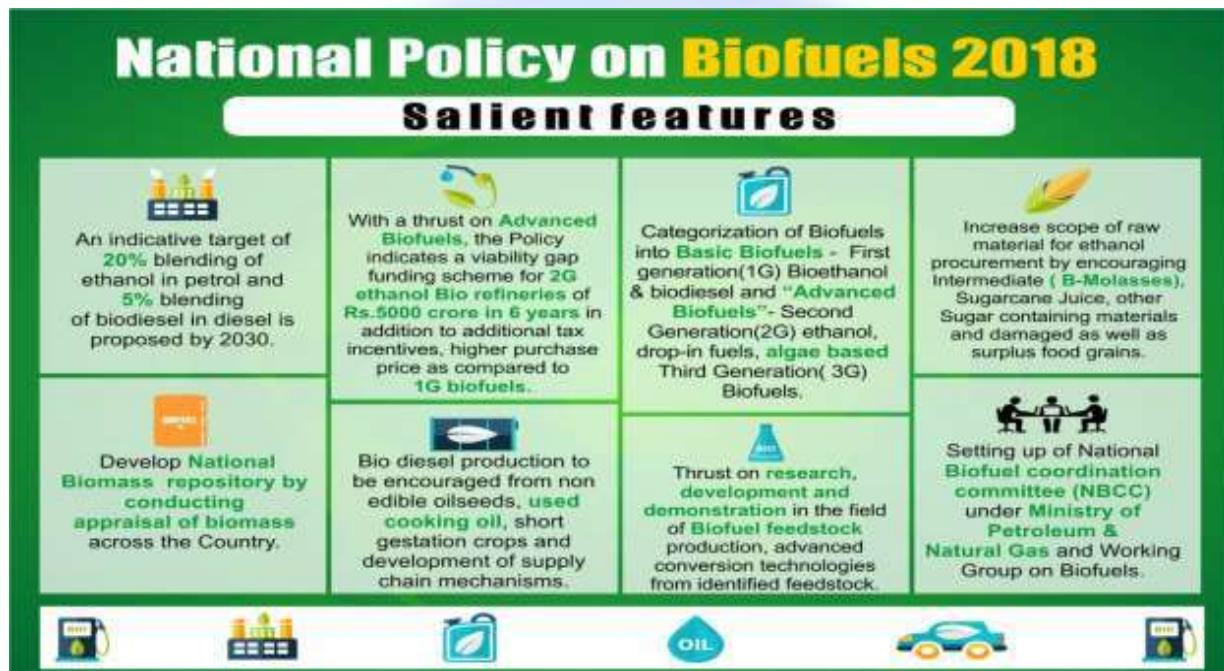
- In 1985, the Manas Wildlife Sanctuary was inscribed as **World Heritage Site**.
- In 1989, **Manas acquired the status of a Biosphere reserve**. It extends over an area of 2837 Sq. Km from **Sankosh River in the west to Dhansiri river in the east**, with a core area of 500 Sq. Km. of **the National park, which declared in 1990**.
- The **river Manas flows into the national Park** from the gorges of Bhutan.
- About the half of the Park is covered by **Grasslands of Terai and Bhabar type**, the riparian areas have colonizing grasslands and woodlands of several species. The thick woodlands are called **Eastern Moist Deciduous Forests** of various types. The undergrowths are very thick. There are more than **650 species of Angiosperms alone**. The commonly seen trees are the Simul, Oxi, Sissoo, Khaie, Gamari, etc.
- Manas is **the only landscape in the world where pristine Terai Grasslands are seen merging with the Bhabar grasslands interspersed with diverse habitats ascending to Semi-Evergreen forests and then to Bhutan Himalayas**. The Biodiversity is very rich here.
- **The last population of the Pygmy Hog survive in the wilds of Manas and nowhere else in the world.**

3. Biofuel policy and National Biofuel Coordination Committee (NBCC)

Context:

The press release said the National Biofuel Coordination Committee (NBCC) has decided to use “surplus” rice available with the Food Corporation of India (FCI) for conversion to ethanol.

Concept:



- The new National Policy on Biofuels had a target of **20 per cent blending of ethanol in petrol and 5 per cent blending of biodiesel** in diesel by 2030.
- This was to be achieved by **increasing production using second generation biorefineries and developing new feedstock for biofuels**. It allowed the production of ethanol from damaged food grains like wheat and broken rice, which are unfit for human consumption.
- The new policy **allowed the use of excess food grain for ethanol in a bounty crop year**, so long as the surplus is endorsed by the Union Ministry of Agriculture.
- The **approval for this is to be given by the National Biofuel Coordination Committee**, chaired by the Union Minister Petroleum and Natural Gas.
- It includes representatives from 14 other central departments.

4. Endemic species

Context:

Study of flowering plant endemism of Northern Western Ghats highlights importance of plateaus in conservation plans

Findings:

- Scientists at the Agharkar Research Institute (ARI), Pune, an autonomous institute of the Department of Science and Technology have **come up with plant data of the Northern Western Ghats** which indicates that plateaus, in addition to the forests, should be prioritized for conservation of the Northern Western Ghats.
- It is the **plateaus and the cliffs that harbour most of the endemic species**, thus increasing their importance in conservation plans.
- The Western Ghats of India is one of the **global biodiversity hotspots owing to the endemism that is sheltered by a chain of mountains**. The northern part of this biodiversity hotspot, along with the Konkan region, is considerably different from its southern and central counterparts on account of lesser precipitation and extended dry season.
- A notable geographical feature of the Northern Western Ghats is the presence of plateaus and cliffs that display maximum endemic species, unlike forests. **Forests of the Northern Western Ghats harbour many species which are not endemic.**

Concept:

Endemic species are **plants and animals that exist only in one geographic region**. Species can be endemic to large or small areas of the earth: some are endemic to a particular continent, some to part of a continent, and others to a single island. Usually an area that contains **endemic species is isolated in some way**, so that species have difficulty spreading to other areas, or it has **unusual environmental characteristics** to which endemic species are uniquely adapted.

5. EIA

Context:

In an affidavit submitted to the State Level Environment Impact Assessment Authority (SEIAA), the company admitted that **as of May 10, 2019, the unit did not have a “valid environmental clearance substantiating the produced quantity, issued by the competent authority for continuing operations”.**

Concept:

- Environment Impact Assessment or EIA can be defined as the **study to predict the effect of a proposed activity/project on the environment**. A decision making tool, EIA **compares various alternatives for a project** and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.
- **Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support.**
- On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, **under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory** for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification.
- The MoEF **recently notified new EIA legislation in September 2006**. The notification makes it **mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries** including very small electroplating or foundry units to get environment clearance.
- Environment Impact Assessment Notification of 2006 **has decentralized the environmental clearance projects** by categorizing the developmental projects in two categories, i.e., **Category A (national level appraisal) and Category B (state level appraisal)**.
 - Category A projects are appraised at national level by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC) and Category B projects are appraised at state level.
 - State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to Category B process.

6. NGT

Context:

The NGT also directed LG Polymers India Pvt to **submit Rs 50 crore an interim amount for damage to life**. A bench, headed by NGT Chairperson Justice Adarsh Kumar Goel, set up a 5-member Committee to probe gas leak incident in the chemical factory

Findings:

- The NGT said that Styrene gas is a **hazardous chemical as defined under Schedule I to the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989** and the Rules require on-site and off-site Emergency Plans to ensure prevention of damage
- Leakage of hazardous gas at such a scale adversely affecting public health and environment, clearly **attracts the principle of 'Strict Liability'** against the enterprise engaged in a hazardous or inherently dangerous industry

Concept:

- It is a specialized body set up under the **National Green Tribunal Act (2010)** for **effective and expeditious disposal of cases** relating to environmental protection and conservation of forests and other natural resources.
- With the establishment of the NGT, India became the **third country in the world to set up a specialised environmental tribunal**, only after Australia and New Zealand, and the first developing country to do so.
- NGT is mandated to make disposal of applications or appeals finally **within 6 months of filing of the same**.
- Structure of NGT
The Tribunal comprises of the **Chairperson, the Judicial Members and Expert Members**. They shall hold office **for term of five years and are not eligible for reappointment**. The Chairperson is **appointed by the Central Government** in consultation with Chief Justice of India (CJI)
- Powers & Jurisdiction
The Tribunal **has jurisdiction over all civil cases involving substantial question relating to environment**. The Tribunal is **not bound by the procedure laid down under the Code of Civil Procedure 1908**, but shall be guided by principles of 'natural justice'.

- The NGT deals with **civil cases under the seven laws** related to the environment, these include:
 - The Water (Prevention and Control of Pollution) Act, 1974,
 - The Water (Prevention and Control of Pollution) Cess Act, 1977,
 - The Forest (Conservation) Act, 1980,
 - The Air (Prevention and Control of Pollution) Act, 1981,
 - The Environment (Protection) Act, 1986,
 - The Public Liability Insurance Act, 1991 and
 - The Biological Diversity Act, 2002.
- Two important acts - **Wildlife (Protection) Act, 1972 and Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** have been kept out of NGT's jurisdiction.

Strict liability Vs absolute liability

- Under "**strict liability principle**", a party is not liable and need **not pay compensation** if a hazardous substance escapes his premises **by accident or by an "act of God"** among other circumstances
- Under the "**absolute liability principle**", a company in a hazardous industry cannot claim any exemption. It has to mandatorily pay compensation, whether or not the disaster was caused by its negligence. Hazardous enterprise has an "**absolute non delegable duty to the community**"
- The Supreme Court, while deciding the **Oleum gas leak case of Delhi**, found **strict liability woefully inadequate to protect citizens' rights** in an industrialised economy like India and replaced it with the '**absolute liability principle**'

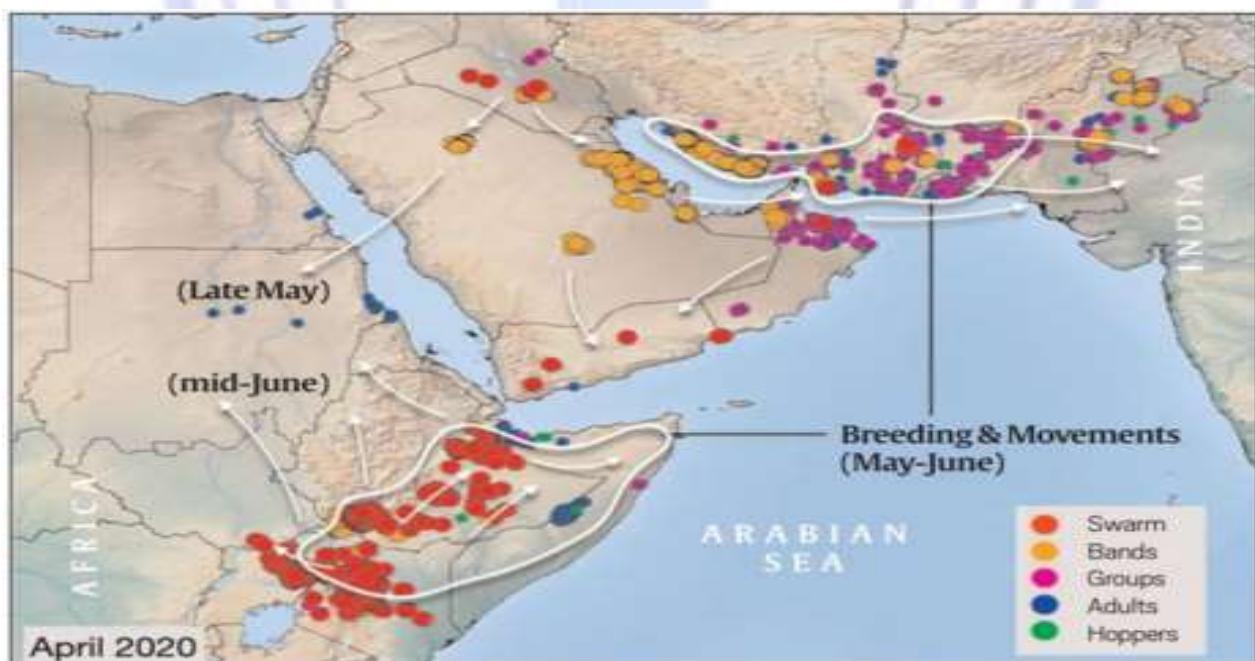
7. Locust

Context:

- At a time India is battling COVID, locusts present a new worry with their potential for exponential growth and crop destruction.
- While locusts are **seen in India as well, that is normally only during July-October** and mostly as solitary insects or in small isolated groups. Their being **spotted along the India-Pakistan border before mid-April this time** — and coming after the damage they caused to the growing **rabi crops along western Rajasthan and parts of northern Gujarat during December-January** — has raised the alarm bells.

Concept:

- Desert Locusts are a **group of short-horned grasshoppers** that multiply in numbers as they migrate long distances in destructive swarms.
- India has a locust control and research scheme that is being implemented through the **Locust Warning Organisation (LWO)**, established in 1939 and amalgamated in 1946 with the Directorate of Plant Protection Quarantine and Storage (PPQS) of the Ministry of Agriculture, according to the PPQS.
- The LWO's responsibility is monitoring and control of the locust situation in Scheduled Desert Areas, mainly in Rajasthan and Gujarat, and partly in Punjab and Haryana



- Although no locust plague cycles have been observed after 1962, during 1978 and 1993, largescale attacks were reported. India is most at risk of a swarm invasion just before the onset of the monsoon. The swarms usually originate in the Arabian Peninsula and the Horn of Africa.
- Locusts are **polyphagous**, i.e. they can feed on a wide variety of crops. Secondly, they have an ability to **multiply rapidly**. A single female desert locust lays 60-80 eggs thrice during its roughly 90-day life cycle.
- The **favourable conditions for breeding** include moist sandy or sand / clay soil to a depth of 10-15 cm below the surface, or some bare areas for egg-laying, and green vegetation for hopper development.
- In the current case, climate change-induced unseasonal rain or frequent cyclones have been considered to be the main reasons for the infestations.
- Ten types of chemicals divided into three categories are recommended to be used for controlling locusts by the United Nations Food and Agriculture Organization (FAO).
 - The first category is mycoinsecticide. This is of low risk to non-target organisms including birds and reptiles which ingest the treated locusts.
 - The second category is insect growth regulators (like diflubenzuron, teflubenzuron and triflumuron). It is very low human toxicity and is less hazardous in comparison to neurotoxic insecticides although there are some adverse effects on certain non-target organisms, especially aquatic arthropods.
 - The **Organophosphates should be the last resort, according to the FAO.**

8. Sal tortoise

Context:

Sal forest tortoise **habitat stretches over unprotected areas** as protected areas are designated in a largely mammal-centric way, many equally threatened reptiles and amphibians live outside

Concept:

- The sal forest tortoise is **widely distributed over eastern and northern India and Southeast Asia**. However, it is not common in any of this terrain.
- In fact, 23 of the 29 species of freshwater turtle and tortoise species found in India come under the threatened category in the IUCN red list and are under severe existential threat due to human activities.
- Also known as the **elongated tortoise (*Indotestudo elongata*)**, the sal forest tortoise, recently assessed as **critically endangered**, is heavily hunted for food. It is collected both for local use, such as decorative masks, and international wildlife trade.



9. Forest Advisory Committee

Context:

- The Forest Advisory Committee has once again **deferred its decision** on a controversial hydropower project in Arunachal Pradesh.
- The 3,097 mw **Etalín Hydropower project, in the State's Dibang Valley**, has been delayed for over six years. This is because it required diverting 1,165 hectares of forest in a region of rich biodiversity.

Concept:

- It is a **statutory body** which was constituted by the **Forest (Conservation) Act 1980**.
- It comes under the Ministry of Environment, Forests & Climate Change (MoEF&CC).
- It **considers questions on the diversion of forest land for non-forest uses** such as mining, industrial projects, townships and advises the government on the issue of granting forest clearances.
- Its role is **advisory** in nature.
- **Director General of Forests** is chairperson of the committee.

10. Global Forest Resource Assessment 2020

Context:

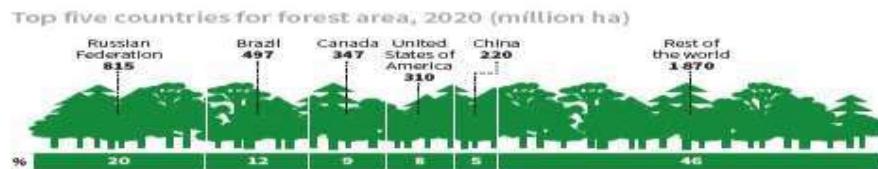
Food and Agriculture Organisation has released **Global Forest Resources Assessment 2020** (FRA 2020).

Concept:

FRA 2020 examines the status of, and trends in, more than 60 forest-related variables in 236 countries and territories in the period 1990–2020.

Key findings

- More than half (**54 percent**) of the world's forests are in only five countries –the Russian Federation, Brazil, Canada, the United States of America and China.
- **Ninety-three percent** of the forest area worldwide is composed of **naturally regenerating** forests and 7 percent is planted. The area of naturally regenerating forests has decreased since 1990 (at a declining rate of loss), but the area of planted forests has increased by 123 million ha.



Loss and Gain

- The world has **lost 178 million ha of forest since 1990**, which is an area **about the size of Libya**. The **rate of net forest loss decreased substantially** over the period 1990–2020 due to a reduction in deforestation in some countries, plus increases in forest area in others through afforestation and the natural expansion of forests.

- Africa had the largest annual rate of net forest loss in 2010–2020, at 3.9 million ha. The rate of net forest loss has increased in Africa in each of the three decades since 1990.
- Asia had the highest net gain of forest area in 2010–2020.

Forest risks

- About 98 million ha of **forest were affected by fire** in 2015; this was **mainly in the tropical domain**, where fire burned about 4 percent of the total forest area in that year. More than two-thirds of the total forest area affected was in Africa and South America.
- **Insects, diseases and severe weather events damaged** about 40 million ha of forests in 2015, mainly in the **temperate and boreal domains**.

11.Gharial

Context:

In Uttar Pradesh, forty gharials (*Gavialis gangeticus*) were released into the Ghaghara river.

Concept:

River Ghaghara

- The Ghaghara acts as **an important aquatic corridor for gharials** in Uttar Pradesh.
- The river is a **major left bank tributary of the Ganges**.

Gharials

- The gharial (*Gavialis gangeticus*), also known as the gavial, and **fish-eating crocodile** is a crocodilian in the family Gavialidae, **native to sandy freshwater river banks** in the plains of the northern part of the Indian subcontinent.



- Gharials are **critically endangered** in the IUCN red list
- The species is also listed under Schedule I of the Wild Life (Protection) Act, 1972.
- A major chunk of gharials in India is **found in the Chambal river**, which has about 1,000 adults. However, there are satellite populations of less than 100 adults in the **Girwa river** (Katarniaghata Wildlife Sanctuary in Uttar Pradesh), the **Ramganga river** in Jim Corbett National Park and the **Sone river**.
- **Chambal River in National Chambal Sanctuary is the natural habitat of gharial.**

12.Pre monsoon shower and yellow alert

Context:

The India Meteorological Department (IMD) has issued yellow alerts in nine districts of Kerala.

Concept:

Pre-monsoon shower

- The pre-monsoon showers also called **mango showers or summer rain, occurs from March to May**
- It is characterized by **squally winds** i.e, they come with **sudden, sharp winds that last for a long time** and occur during the rain, and thunderstorms or heavy snows.
- They also bring with them **heat and humidity in the day and night**.
- The rains are sharp and intense but go away, after one downpour. **The rains are usually patchy**.
- In the south, **thunderstorms occur in Kerala and adjoining parts of Karnataka and Tamil Nadu** particularly in the evenings and nights. These pre-monsoonal showers are called by various names:
- **Tea showers in Assam** (they are good for tea, jute and rice)
- **Mango showers in Kerala and coastal areas of Karnataka** as they help in the early ripening of mangoes.
- **Cherry Blossoms/ Coffee showers in Kerala** and nearby areas (good for coffee plantations)

Alerts:

- The cyclone warnings are issued to state government officials in four stages:
- 1st stage: "**PRE CYCLONE WATCH**" issued **72 hours in advance Information**: Early warning about the development of a cyclonic disturbance in the north Indian Ocean, its likely intensification into a tropical cyclone and the coastal belt likely to experience adverse weather.
- 2nd stage: "**CYCLONE ALERT**" issued at least **48 hrs in advance of the expected commencement of adverse weather over the coastal areas**.

Information: Location and intensity of the storm likely direction of its movement, intensification, coastal districts likely to experience adverse weather and advice to

fishermen, general public, media and disaster managers.

- 3rd stage: "**CYCLONE WARNING**" issued at least 24 hours in advance of the expected commencement of adverse weather over the coastal areas.

Information: Landfall point is forecast at this stage. These warnings are issued at 3 hourly interval giving the latest position of cyclone and its intensity, likely point and time of landfall, associated heavy rainfall, strong wind and storm surge along with their impact and advice to general public, media, fishermen and disaster managers.

- 4th stage: "**POST LANDFALL OUTLOOK**" issued at least 12 hours in advance of expected time of landfall.

Information: It gives likely direction of movement of the cyclone after its landfall and adverse weather likely to be experienced in the interior areas.

- Different colour codes as mentioned below are being used since post monsoon season of 2006 the different stages of the cyclone warning bulletins as desired by the National Disaster Management.

Stage of warning	Colour code
Cyclone Alert	Yellow.
Cyclone Warning	Orange.
Post landfall out look	Red.

13.Rare palm critically endangered

Context:

A rare palm endemic to the South Andaman Island is finding a second home at Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI), Palode Trivandrum.

Concept:

- **Pinanga andamanensis**, a critically endangered species and one of the least known among the endemic palms of the Andaman Islands.
- But its **entire population of some 600 specimens** naturally occurs only in a tiny, evergreen forest pocket in **South Andaman's Mount Harriet National Park**.
- Five or six specimens were **introduced at the Field Gene Bank at Palode in 1994**. By **conserving the germplasm on the Indian mainland, JNTBGRI** can ensure its continued survival in the event of its minuscule original home getting wiped out



14.Ecologically Sensitive Area of Western Ghats

Context:

Union Minister of Environment, Forest and Climate Change interacted with Chief Ministers, Cabinet Ministers of **six states viz, Kerala, Karnataka, Goa, Maharashtra, Gujarat and Tamil Nadu** through Video Conference to discuss issues relating to **notification of Ecologically Sensitive Area (ESA) pertaining to Western Ghats.**

Concept:

ESZ:

- The basic aim of ESZ is **to regulate certain activities around National Parks and Wildlife Sanctuaries so as to minimise the negative impacts** of such activities on the fragile ecosystem encompassing the protected areas
- ESZs are notified by MoEFCC, Government of India under **Environment Protection Act 1986.**
- The guidelines include a broad list of **activities that could be allowed, promoted, regulated or promoted.** This is an important checklist for conservationists to keep in mind while identifying threats in ESZs.
- For this purpose, the ministry has asked **all states to constitute a committee** comprising the wildlife warden, an ecologist and a revenue department official of the area concerned to suggest the requirement of an eco-sensitive zone and its extent.
- The width of the ESZ and type of regulation may vary from protected area to area. However, as a general principle, **the width of the ESZ could go up to 10 kms around the protected area.**

Western Ghats:

- Still there is no consensus among six states and union over notification of ESZ in western ghats, as there is need for balance between ecology and economic growth
- Union Government in 2010 had set up the **Western Ghats Ecology Expert Panel headed by Dr Madhav Gadgil.** In his report submitted in 2011, Dr Gadgil had recommended that **large swathes of areas falling within the Western Ghats be marked as ecologically sensitive areas** and excluded from damaging activities.

- However, owing to opposition from states, the MoEF set up another committee in August 2012 called the **High Level Working Group headed by former ISRO Chief Dr K Kasturirangan** who further reduced the area to be notified as ESAs. However, this report too was rejected by many states.

Gadgil Committee	Kasturirangan Committee
The entire Western Ghats is an "Ecologically Sensitive Area".	Only approximately 37% of the entire Western Ghats is an "Ecologically Sensitive Area".
Recommends a bottom-up approach to conservation with Gram Sabhas playing a crucial role in decision-making.	Envisages decision-making as a responsibility that lies primarily with the government and the bureaucracy (such as forest officials).
Recommends the recognition of three grades of Ecologically Sensitive Zones and the complete ban on the construction of high-capacity storage dams and sand mining in ESZ-1 areas.	Hydroelectric power plants to be permitted in ESAs only after a detailed study. Recommends a complete ban on quarrying, mining, and sand mining in ESAs.
Constitute the Western Ghats Ecology Authority under the MoEF to regulate and oversee the conservation of the Western Ghats.	Strengthen the current legal framework (such as the State Pollution Control Boards and the State Biodiversity Boards).

15. International Day for Biological Diversity 2020

Context:

In a virtual celebration of the International Day for Biological Diversity 2020, Union Ministry of Environment, Forest and Climate Change has launched several initiatives.

Concept:

- Theme: **“OUR SOLUTIONS ARE IN NATURE”**
- National Biodiversity Authority (NBA) and United Nations Development Programme (UNDP) Biodiversity Samrakshan Internship Programme wishes to engage dynamic and creative students, who **are willing to learn about natural resource management and biodiversity conservation** and to **support the projects of NBA** in various State and Union Territories and to technically assist the State Biodiversity Boards/UTs Biodiversity Council in discharge of their mandates
- The virtual event also saw the **Launch of UNEP Campaign on Illegal Trafficking of Endangered Species: ‘Not all Animals Migrate by Choice’**. Illegal trade in wildlife carries the risk of spreading dangerous pandemics.

16. Renewable Energy Certificates

Context:

Recent official data shows **sales of renewable energy certificates reduced over 35 per cent** to 2.37 lakh units in April compared to 3.68 lakh in the same month a year ago.

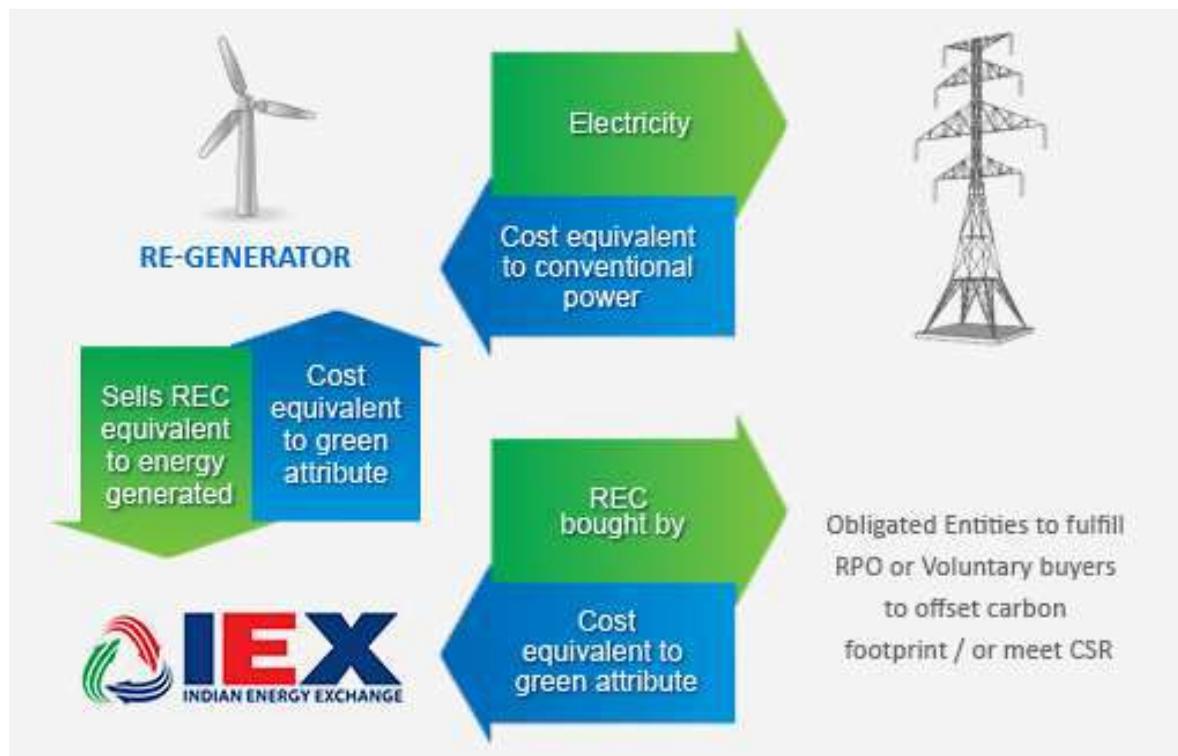
Concept:

- Central Electricity Regulatory Commission introduced REC mechanism to **ease the purchase of renewable energy by the state utilities and obligated entities**, including the states which are **not well endowed with RE sources**. REC framework seeks to create a national level market for renewable generators to recover their cost.
- It is a market based mechanism which will **help the states meet their regulatory requirements** (such as Renewable Purchase Obligations (RPOs)) by overcoming the geographical constraints on existing renewable potential in different states.
- One REC is created when **one megawatt hour of electricity is generated from an eligible renewable energy source**.
- RECs help in **incentivizing the production of renewable energy over and above the RPO state limit** as tradable certificates are not constrained by the geographical limitations of commodity electricity.

Attributes	Details
Participation	Voluntary
REC denomination	1MWh
Categories of REC	Solar REC Non-solar REC
Validity	365 days after issuance
Central Agency	National Load Despatch Centre (NLDC)
Trading Platform	Power exchanges: 1. Indian Energy Exchange Limited (IEX), Delhi 2. Power Exchange India Limited (PXIL), Mumbai
Obligated entities in a state (required to purchase RE or REC)	1. Distribution Licensees 2. Captive Consumers 3. Open Access users
Total RE generators signed up till now	689

- Under the REC mechanism, a generator can generate electricity through the renewable resources in any part of the country. **For the electricity part, the**

generator receives the cost equivalent to that from any conventional source while the environment attribute is sold through the exchanges at the market determined price. The obligated entity from any part of the country can purchase these RECs to meet its RPO compliance.



17. Charru mussel

Context:

An invasive mussel is spreading quickly in the **backwaters of Kerala**, elbowing out other mussel and clam species and **threatening the livelihoods of fishermen** engaged in molluscan fisheries.

Concept:

- Charru mussel is an invasive **mussel native to the South and Central American coasts**



- Surveys show the **presence of the Charru mussel** in the Kadinamkulam, Paravur, Edava-Nadayara, **Ashtamudi, Kayamkulam, Vembanad**, Chettuvai and Ponnani estuaries/backwaters. Ashtamudi Lake, a Ramsar site in Kollam district, remains the worst-hit.
- With a population as high as 11,384 per sq metre here, it has **replaced the Asian green mussel (*Perna viridis*) and the edible oyster *Magallana bilineata*** (known locally as muringa).

Reasons for invasion

- In all probability, the mussel **reached the Indian shores attached to ship hulls** or as larval forms **in ballast water discharges**.
- **Cyclone Ockhi may have simply sped up** their invasion of inland waters.

Impacts:

- Economic and biodiversity loss
- May affect indigenous fishes and threaten livelihoods of fishers.

18.Dugong

Context:

World Dugong Day has been celebrated on May 28, 2020.

Concept:

- Commonly known as "sea cows," dugongs **graze peacefully on sea grasses in shallow coastal waters of the Indian and western Pacific Oceans.**
- **IUCN: Vulnerable**
- Dugongs are an **endangered marine species** like sea turtles, seahorses, sea cucumbers and others. They are protected in India under **Schedule I of the Wild (Life) Protection Act, 1972.**
- There were just 250 dugongs in the **Gulf of Mannar in Tamil Nadu, the Andaman and Nicobar Islands and the Gulf of Kutch in Gujarat** according to the 2013 survey report of the Zoological Survey of India (ZSI).



- In order to conserve and manage the declining populations of dugong in India, the Ministry of Environment, Forests and Climate Change under the Government of India **constituted a 'Task Force for Conservation of Dugongs'** to look into the entire gamut of issues related to conservation of dugongs and implementation of the '**UNEP/Convention on Migratory Species Dugong MoU**' in India

Threats to dugongs

- Human activities such as the **destruction and modification of habitat, pollution, rampant illegal fishing activities**, vessel strikes, unsustainable hunting or poaching and unplanned tourism are the main threats to dugongs.

- **The loss of seagrass beds due to ocean floor trawling** was the most important factor behind dwindling dugong populations in many parts of the world.

19.CNG and City Gas Distribution (CGD) network

Context:

Minister of Petroleum and Natural Gas dedicates 56 CNG stations spread over 11 States/UTs.

Concept:

CNG Vs H-CNG

- CNG is compressed natural gas. With natural gas mainly **composed of methane**, CNG **emits less air pollutants** — carbon dioxide, carbon monoxide, nitrogen oxides and particulate matter — than petrol or diesel.
- **Environmental Benefits:** No impurities, No Sulphur (S), No lead (Pb) and Very low levels of polluting gaseous emissions without smell and dust. Molecular structure compactness prevents the reactive processes which lead to the formation of Ozone (O₃) in the troposphere
- **Safety Benefits:** Lighter than air - in case of leak no dangerous puddles Unlikely to ignite due to: **High ignition temperature, Narrow range of ignition**
- H-CNG is a **blend of hydrogen and CNG**, the **ideal hydrogen concentration being 18%**. Compared to conventional CNG, use of H-CNG **can reduce emission of carbon monoxide up to 70%**, besides enabling up to **5% savings in fuel**.
- While recommending the use of H-CNG as an alternative fuel, the NITI Aayog-CII Action Plan for Clean Fuel notes that physical blending of CNG and hydrogen involves a series of energy-intensive steps that would make **H-CNG more expensive than CNG**.

City gas distribution network

- Purpose for development of CGD networks is **to increase the availability of cleaner cooking fuel** (i.e. Piped Natural Gas) and **transportation fuel** (i.e. Compressed Natural Gas) in the country.
- The **Petroleum and Natural Gas Regulatory Board (PNGRB)** authorizes entities to develop **Natural Gas Distribution Network** as per PNGRB Act,

2006 and the Regulations notified thereunder. PNGRB identifies the Geographical Areas (GAs) for the development of City Gas Distribution (CGD) network depending on the natural gas pipeline connectivity/natural gas availability and techno-commercial viability

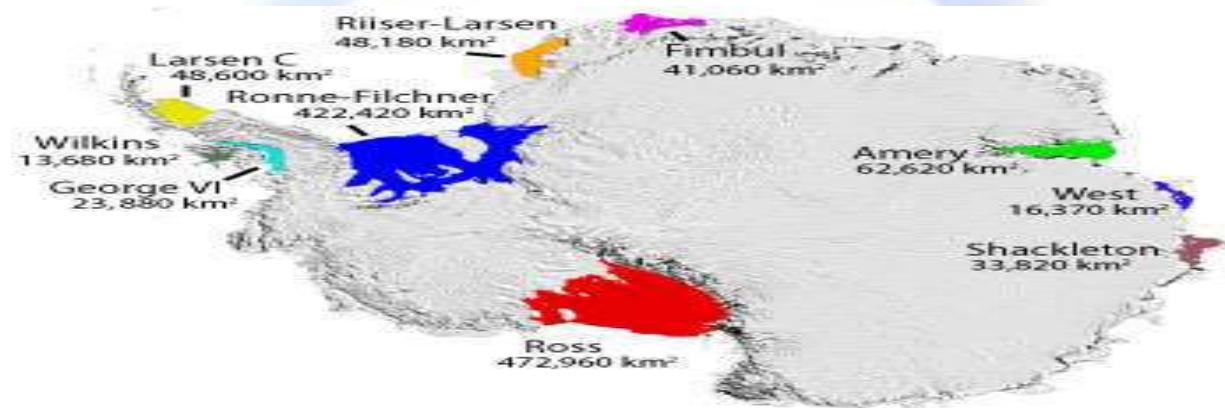
20. Amery Ice Shelf

Context:

NCPOR study found that there will be **major impact on climate due to extension of Amery Ice Shelf**

Concept:

The Amery Ice Shelf is one of the largest glacier drainage basins in the world, located on the east coast of Antarctica.



- There would be a **24 per cent increase in the expansion of the Amery Ice Shelf (AIS) boundaries** in Antarctica by 2021 and another 24 per cent by 2026 from its 2016 positions, the National Centre for Polar and Ocean Research (NCPOR) in Goa has predicted.
- NCPOR observations revealed a **critical cooling of the sea surface temperature**, resulting in an advancement of the ice shelf by 88 per cent in the past 15 years.
- These changes would **contribute in a major way to climate variability**.
- The study clearly demonstrated the future dynamism of ocean heat fluctuation and Antarctic Amery ice shelf mass shifting-extent.
- The **floating sheets of ice called 'ice shelves'** play a multi-faceted role in maintaining the stability of a glacier. **Ice shelves connect a glacier to the landmass**.
- The **ice sheet mass balance, sea stratification, and bottom water formation** are important parameters for the balancing of a glacier.

- The insulation of ice shelves from atmospheric forcing is dependent on a temperature gradient that the ocean cavity beneath the ice shelves provides.
- It is the **pressure exerted by the ice shelves upon the ocean cavity that determines this temperature gradient.**



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OPTIMA 2020 2.0		
Test no.	Subject	Test Date
OPTIMA 1	History	8 th Aug, 2020
OPTIMA 2	Polity	15 th Aug, 2020
OPTIMA 3	Geography+ Environment	22 nd Aug, 2020
OPTIMA 4	Economy	29 th Aug, 2020
OPTIMA 5	Sci&Tech+IR+Msc	6 th Sept, 2020
OPTIMA 6	Full length Test 1	19 th Sept, 2020
OPTIMA 7	Full length Test 2	26 th Sept ,2020

Aspirants who missed to become a part of OPTIMA 1.0 and want to make the most of the remaining 60 days: OPTIMA 2.0

<https://optimizeias.com/strategy-for-the-last-60-days-for-upsc-prelims-2020/>

June

1. Rare scorpion fish found in Gulf of Mannar

Context:

Researchers at the Central Marine Fisheries Research Institute (CMFRI) have found a rare fish in the Gulf of Mannar.

Concept:

- During finding, it is camouflaged within the seagrass meadows
- This bandtail Scorpion fish (*Scorpaenopsis neglecta*) is well known for **its stinging venomous spines and ability to change colour**
- The fish is called 'scorpionfish' because its spines **contain neurotoxic venom**. When the spines pierce an individual, the venom gets injected immediately and it can be extremely painful.



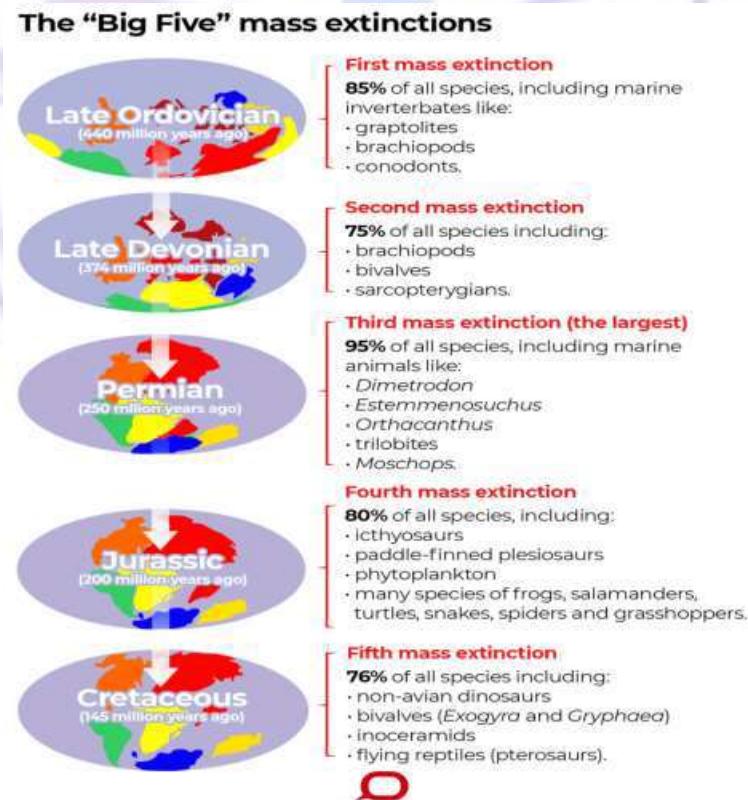
2. Sixth mass extinction

Context:

Sixth mass extinction of wildlife accelerating, scientists warn

Concept:

- Mass extinction refers to a **substantial increase in the degree of extinction or when the Earth loses more than three-quarters of its species in a geologically short period of time.**
- So far, during the entire history of the Earth, there have been five mass extinctions. The **sixth, which is ongoing, is referred to as the Anthropocene extinction.**
- The earlier five mass extinctions that took place in the last 450 million years have led to the **destruction of 70-95 per cent of the species of plants, animals and microorganisms** that existed earlier.
- These extinctions were **caused by “catastrophic alterations” to the environment**, such as **massive volcanic eruptions, depletion of oceanic oxygen or collision with an asteroid.**



- After each of these extinctions, it took millions of years to regain species comparable to those that existed before the event.
- Further, **attributing sixth mass extinction to humans**, scientists said that one of the reasons that **humanity is an “unprecedented threat” to many living organisms** is because of their growing numbers.
- The loss of species has been occurring since human ancestors developed agriculture over 11,000 years ago. Since then, the human population has increased from about 1 million to 7.7 billion.



3. TRAFFIC

Context:

A report by WWF-India's programme division Traffic has found "**significant increase**" in reported poaching of wild animals during the lockdown, which is not restricted to any geographical region or state, or to any specific wildlife area.

Concept:

- The TRAFFIC, the Wildlife Trade Monitoring Network, is a **leading non-governmental organisation** working on wildlife trade in the context of both biodiversity conservation and sustainable development.
- It is a **joint program of World Wildlife Fund (WWF) and the International Union for Conservation of Nature (IUCN)**.
- It was established in 1976 and has developed into a **global network, research-driven and action-oriented, committed** to delivering innovative and practical conservation solutions.
- Headquarters: Cambridge, United Kingdom
- It aims to ensure that trade in wild plants and animal is not a threat to the conservation of nature.

4. State of India's Environment

Context:

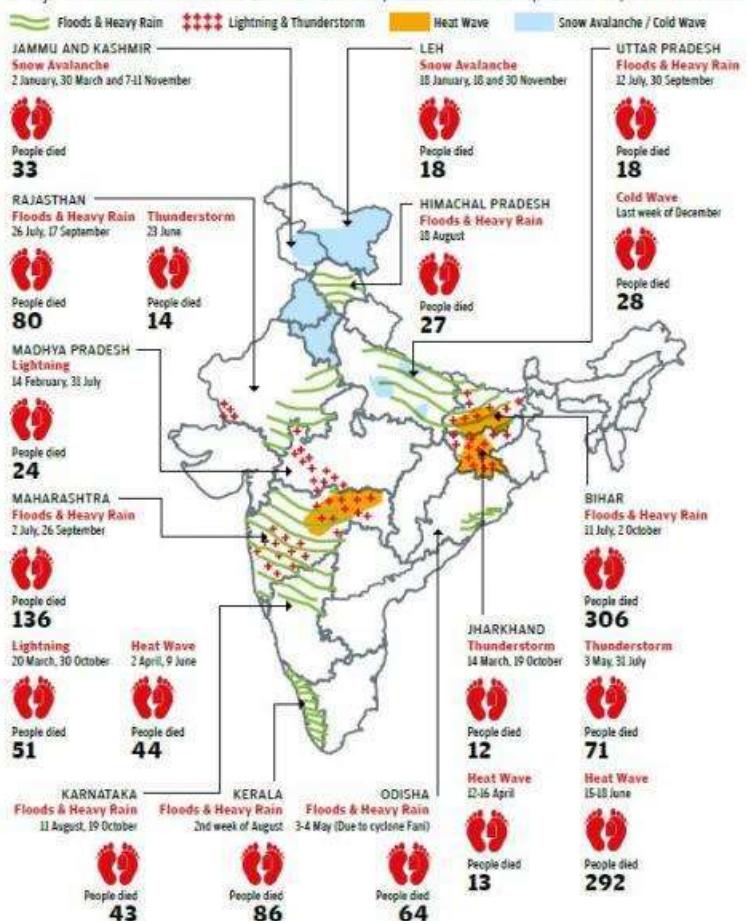
Centre for science and environment has released state of environment 2020 report

Findings

- The report outlines the status on progress of sustainable development goals(SDGs), state of forests, groundwater development, wasteland and live stocks.
- It has been observed in the report that the country facing challenges in achieving 9 of the total 17 SDGs which is pushing down its global ranking on preparedness. The report also focused on environmental crimes in the country and global economic risks
- India had one in five of all internal displacements caused by disasters across the world in 2019, mostly caused by floods, cyclones and drought
- It notes that there were 747 more tigers in 2018 than in 2014. However, the net area meant for tiger conservation shrunk by 179 sq.km.
- Forest cover has shrunk in 38% of districts, while five out of 21 river basins are now in a state of absolute water scarcity
- Nineteen extreme weather events in 2019 claimed 1,357 lives, with heavy rain and floods accounting for 63 per cent of these deaths
- There was a 69 per cent increase in the number of heat wave days between 2013 and 2019 as well, the report said. Over 5,300 people died from heat waves in the past seven years, the report pointed out.
- Cold waves increased by 69 per cent within a year, between 2017 and 2018, with the latter year reported to have an extremely cold winter, with the most casualties (279) in the past seven years.
- The Union government decreased its expenditure on natural disasters, even as the impact suffered by people from them increased, according to the report.

Extreme weather events

19 major extreme weather events claimed 1,357 lives in 2019. Heavy rains and floods were responsible for 63 per cent of the deaths.



Note: Jammu and Kashmir is categorised as a Union Territory.
Source: India Meteorological Department, Ministry of Earth Sciences, 2020.

5. Bio-Medical Waste Rules

Context:

- Chennai-based environmental group seeks **more norms for disposal of COVID-19 medical waste** in Tamil Nadu.
- It has demanded that the government set up at least one Common Bio-medical Waste Treatment and Disposal Facility per district immediately.

Concept:

- Bio Medical Waste Management Rules, (BMWM), 2016 **defines Bio Medical Waste as any Waste generated during the diagnosis, treatment or immunization** of human being and animals, in research activities or in production or testing of Biological.
- Bio Medical Waste is categorized into **four categories Yellow, Red, Blue and White** and needs special consideration during its handling, storage, transportation treatment and disposal specific to its color code.
- BMWM Rules 2016 specify the statutory **responsibility of waste management of Waste generator, Occupier of Health care establishment, Common Facility operator, SPCB** and stake holder departments responsible for BMW management at both Central and state government, in accordance with the provisions of BMW Rules and Guidelines issued by CPCB & SPCB.

6. World Environment Day : Celebrating Biodiversity

Context:

- June 5 is celebrated as World Environment Day every year.
- **The theme for World Environment Day 2020 is biodiversity.**

Concept:

- The first major conference on environmental issues was held in the year 1972 from June 5-16 in Stockholm (Sweden).
- Later that year, on December 15, the General Assembly adopted a resolution designating June 5 as World Environment Day.
- In 1974, the first World Environment Day was celebrated.
- Since then, World Environment Day is celebrated every year on June 5, engaging governments, businesses, celebrities and citizens to focus their efforts on a pressing environmental issue.

Biodiversity

- Biodiversity describes the variety of life on Earth, including the 8 million plant and animal species on the planet, the ecosystems that house them, and the genetic diversity among them.
- Biodiversity is a complex, interdependent web, in which each member plays an important role, drawing and contributing in ways that may not even be visible to the eye.
- Biodiversity is the foundation that supports all life on land and below water.
- It affects every aspect of human health, providing clean air and water, nutritious foods, scientific understanding and medicine sources, natural disease resistance, and climate change mitigation.
- Changing or removing one element of this web affects the entire life system and can produce negative consequences. Without nature, life on earth would not be possible.

7. Blue Water Navy

Context:

Environment Protection and Green Initiatives have always been a key focus area of the Indian Navy. So the Indian Navy **has embarked on reducing its environmental footprint**

Concept:

'Indian Navy Environment Conservation Roadmap' (INECR) has been the guiding document and key enabler for progressively achieving the vision of the Indian Navy **to add a Green Footprint to its Blue Water operations.**



8. Healthy and Energy Efficient Buildings

Context:

On occasion of World Environment Day, today, Energy Efficiency Services Limited (EESL) in partnership with the U.S. Agency for International Development (USAID) launched the “Healthy and Energy Efficient Buildings” initiative under MAITREE.

Concept:

- This initiative is **addressing the challenges of retrofitting existing buildings and air conditioning systems** so that they are both healthy and energy efficient.
- Most buildings in India are **not equipped to establish and maintain healthy indoor air quality** and need to be upgraded. Such retrofit measures, like increasing outside air and additional filtration in the air conditioning system, typically come at the cost of occupant comfort and increased energy use. Nor are there standardized approaches to retrofitting.
- The EESL office pilot will **address this problem by developing specifications for future use in other buildings throughout the country**, as well as aid in evaluating the **effectiveness and cost benefits of various technologies** and their short and long-term impacts on air quality, comfort, and energy use.
- The **Market Integration and Transformation Program for Energy Efficiency (MAITREE)**, under which this initiative has been launched, is a **part of the US-India bilateral Partnership between the Ministry of Power and USAID** and is aimed **at accelerating the adoption of cost-effective energy efficiency as a standard practice** within buildings, and specifically focuses on cooling.

About EESL

- Energy Efficiency Services Limited (EESL), under the administration of **Ministry of Power**, Government of India, is working towards **mainstreaming energy efficiency and is implementing the world's largest energy efficiency portfolio** in the country.
- Driven by the **mission of Enabling More** – more transparency, more transformation, and more innovation, EESL aims to create market access for efficient and future-ready transformative solutions that create a win-win situation for every stakeholder.

About USAID:

USAID is the world's premier international development agency and a catalytic actor driving development results.



9. Icommit

Context:

Ministry of Power initiated the '#iCommit' campaign, on the occasion of World Environment Day.

Concept:

- The initiative is a clarion call to **all stakeholders and individuals to continue moving towards energy efficiency, renewable energy, and sustainability** to create a robust and resilient energy system in the future.
- The '#iCommit' initiative, driven by Energy Efficiency Services Limited (EESL) is uniting a diverse set of players such as Governments, Corporates, Multilateral and Bilateral Organisations, Think Tanks and Individuals.
- The '#iCommit' initiative is **centred around the idea of building an energy resilient future**.
- The pre-requisite for that goal is to create a flexible and agile power system. A **healthy power sector can help the nation in meeting the objective of energy access and security for all**.
- The initiative will also **celebrate and promote key undertakings of Government of India** such as **National Electric Mobility Mission 2020, FAME 1 and 2**, DeenDayalUpadhyaya Gram JyotiYojana, the Saubhagya Scheme, Ujwal DISCOM Assurance Yojna (UDAY), Atal Distribution system Improvement Yojna (AJAY), Smart Meter National Programme, KUSUM, Solar Parks, Grid Connected Rooftop, UnnatJyoti by Affordable LED for All (UJALA), Atal JyotiYojna (AJAY) amongst others.

10.Ambarnaya River Oil spill in Russia

Context:

Russia declared a state of emergency after **20,000 tonnes of diesel oil leaked into Ambarnaya river in Arctic region** turning its surface crimson red.

Concept:

Reason for spill

- The thermoelectric power plant at Norilsk is built on permafrost, which has weakened over the years owing to climate change.
- This caused the pillars that supported the plant's fuel tank to sink leading to a loss of containment.

Permafrost

- Permafrost is **any ground that remains completely frozen—32°F (0°C) or colder—for at least two years straight.**
- These permanently frozen grounds are most common in regions with high mountains and in Earth's higher latitudes—near the North and South Poles.
- Permafrost is **made of a combination of soil, rocks and sand that are held together by ice.** The soil and ice in permafrost stay frozen all year long.
- **Near the surface**, permafrost soils also **contain large quantities of organic carbon—a material leftover from dead plants that couldn't decompose**, or rot away, due to the cold. Lower permafrost layers contain soils made mostly of minerals.
- A layer of soil on top of permafrost does not stay frozen all year. This layer, called the active layer, thaws during the warm summer months and freezes again in the fall. In colder regions, the ground rarely thaws—even in the summer.

Climate change and permafrost

- As Earth's climate warms, the **permafrost is thawing.** That means the ice inside the permafrost melts, leaving behind water and soil. Thawing permafrost can have dramatic impacts on our planet and the things living on it. For example:
- **Thawing permafrost can destroy houses, roads and other infrastructure.**
- When permafrost is frozen, plant material in the soil—called organic carbon—can't decompose, or rot away. As permafrost thaws, microbes

begin decomposing this material. This process **releases greenhouse gases** like carbon dioxide and methane to the atmosphere.

- The **newly-unfrozen microbes could make humans and animals very sick.** Scientists have discovered microbes more than 400,000 years old in thawed permafrost.



11. Aerosol Radiative Forcing

Context:

Researchers at the Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital an autonomous research institute under the Department of Science and Technology (DST) have found that **aerosol radiative forcing larger than the global averages** over the trans-Himalayas implying some amount of radiative effects, in spite of the clean atmosphere.

Concept:

- Aerosol radiative forcing is defined as the **effect of anthropogenic aerosols on the radiative fluxes** at the top of the atmosphere (TOA) and at the surface and on the absorption of radiation within the atmosphere.
- Aerosols **affect climate in multiple ways**. Aerosol **absorbs or scatters radiation** in the atmosphere (so-called direct effect). Aerosols, except dust, interfere mainly with solar radiation. Some aerosols **act as cloud condensation nuclei (CCN)**, thus **affecting cloud albedo and lifetime** (so-called indirect effect). Dark color aerosols can be deposited on sea ice, snow packs and glaciers, thus darkening the snow and ice surfaces, and **enhancing the absorption of sunlight (so-called surface darkening effect)**. Some of the aerosols can absorb sunlight efficiently and heat the atmosphere.

12. Deep Sea Micro plastic hotspots

Context:

Deep sea hotspots of biodiversity are also likely to get affected by micro plastics deposition, according to a recent study published in Science

Concept:

- The researchers **found thermohaline driven currents caused microplastics to accumulate in the same regions** where underwater organisms flock in the benthic region
- Reason for flocking of organisms is that the same currents **also supply oxygen and nutrients to the deep sea benthos.**
- **Winds drive ocean currents in the upper 100 meters of the ocean's surface.**
- However, ocean currents also flow thousands of meters below the surface.
- These **deep-ocean currents are driven by differences in the water's density, which is controlled by temperature (thermo) and salinity (haline).** This process is known as **thermohaline circulation.**



13.Race to Zero

Context:

With the 26th Conference of the Parties (COP26) to UNFCCC pushed back a full year – to November, 2021 – the **UNFCCC's Climate Ambition Alliance has launched a global campaign called “Race to Zero”**

Concept:

- It is an “international campaign **for a healthy, resilient zero carbon recovery**”
- The campaign aims to codify commitments made via the Climate Ambition Alliance (CAA)

Climate Ambition Alliance

- Climate Ambition Alliance (CAA) was launched ahead of last year’s COP25 in Madrid.
- The CAA currently includes 120 nations, 996 businesses, 458 cities, 24 regions, 505 universities and 36 investment groups that have **committed to achieving zero net greenhouse gas emissions by 2050**.
- Signatories are responsible for 23 percent of current greenhouse-gas emissions worldwide and 53 percent of global GDP.

14. Environment Performance Index

Context:

India has improved its place in Environment Performance Index but still poorly ranked

Concept:

- India secured **168 rank in the 12th edition of the biennial Environment Performance Index** (EPI Index 2020) that measured the environmental performance of 180 countries
- It was released by the Yale University on June 4, 2020.
- India's rank was 177 (with a score of 27.6 out of 100) in 2018.
- All South Asian countries, except Afghanistan, were ahead of India in the ranking.

15.Assam Gas Leak

Context:

Since the morning of May 27, natural gas has been continuously flowing out of a gas well in Assam

Concept:

- The **Baghjan 5 well** is a purely gas-producing well in Tinsukia district. Sometimes, the pressure balance in a well may be disturbed leading to 'kicks' or changes in pressure. If these are not controlled in time, the 'kicks' can turn into a sudden blowout.

Issues:

- **Maguri-Motapung wetland**, an Important Bird Area notified by the Bombay Natural History Society situated near to the site. The park is famous for its birds, butterflies, wild cats, and feral horses.
- **Dibru-Saikhowa National Park** is located at an aerial distance of 900 meters from the leak site.

Dibru-Saikhowa National Park

- Dibru-Saikhowa is a **National Park as well as a Biosphere Reserve** situated in the south bank of the river Brahmaputra in the extreme east of Assam state in India.
- Situated in the flood plain of Brahmaputra, Dibru-saikhowa is a safe haven for many extremely rare and endangered species of Wildlife.
- The forest type of Dibru-Saikhowa **comprises of semi-evergreen forests, deciduous forests, littoral and swamp forests and patches of wet evergreen forests**.

16.Indian gaur

Context:

Population estimation of Indian gaur has been carried out in Nilgiris forest division.

Concept:

- Gaur, or Indian Bison, is a close wild relative of domestic cattle.
- The best habitat for gaur is forested hills and grassy areas of south to south east Asia, with undisturbed tracts of forest, water sources and abundant forage in the form of coarse grasses, shrubs and trees
- It is native to South and Southeast Asia and has been **listed as Vulnerable on the IUCN**

Red List.

- It is **state animal of Goa**
- Gaur is highly threatened by **poaching for trade to supply international markets and loss of habitats.**
- The Western Ghats and their outflanking hills in southern India constitute one of the most extensive extant strongholds of gaur, in particular in the **Wayanad – Nagarhole – Mudumalai – Bandipur complex**. And also spotted in **Tadoba Andhari Tiger Project , Periyar Tiger Reserve , Silent Valley National Park, Kanha National park and Bhadra Wildlife Sanctuary Nilgiris Biosphere Reserve**
- The NBR harbors a wide spectrum of ecosystem types such as **tropical evergreen forests, Montane sholas and grasslands**, semi-evergreen forests, moist deciduous forests, dry deciduous forests and thorn forests.
- **Nilgiri Biosphere Reserve Nature Park** is the most popular biosphere reserves in India and the major **National Park and Wildlife Sanctuary of South India.**
- Nilgiri Biosphere Reserve area is located at the **foothills of the famous Nilgiris hills or Blue Mountains at the meeting point of two majestic mountain ranges the Western Ghats and the Eastern Ghats** and shares boundaries with Tamil Nadu, Karnataka and Kerala states.
- The Nilgiri Biosphere Reserve includes many National parks and wildlife sanctuaries and also declared a Tiger Reserve.

- Important faunal elements which need protection are Tiger, Elephant, Gaur, Lion tail macaque, Sambar, Wild Boar, Nilgiri Tahr etc.
- It includes the Aralam, Mudumalai, Mukurthi, **Nagarhole, Bandipur and Silent Valley national parks**, as well as the Wayanad and Sathyamangalam wildlife sanctuaries.



17.Lonar Lake

Context:

The colour of water in Lonar Lake has changed to pink

Concept:

Reason:

- The **low level of water may lead to increased salinity** and change in the behaviour of algae because of atmospheric changes. This may be the reason for colour change. This is not the first time that the colour of water has changed
- It is also known as Lonar crater, which was **formed after a meteorite hit the Earth** some 50,000 years ago
- It is a notified **national geo-heritage monument**.
- Geological Survey of India (GSI) declares geo-heritage sites/ national geological monuments for protection and maintenance.



18.I-FLOWS

Context:

Integrated Flood Warning System called 'IFLOWS-Mumbai' has been launched

Concept:

- It is a **joint initiative between the Ministry of Earth Sciences (MoES) and Brihanmumbai Municipal Corporation (BMC)**
- The warning system will **relay alerts of possible flood-prone areas anywhere between six to 72 hours in advance.**
- The system can provide all information regarding **possible flood-prone areas, likely height of the floodwater, location-wise problem areas** and calculate the vulnerability and risk of elements exposed to flood.
- Mumbai is only the **second city in the country** after Chennai to get this system. Similar systems are being developed for Bengaluru and Kolkata.

Working method:

- **Amount of rainfall, tidal waves and storm tides** are the primary source for the system.
- The system includes **weather models** from the National Centre for Medium Range Weather Forecasting (NCMRWF), India Meteorological Department (IMD), field data from the rain gauge network of 165 stations.



- In the last two years, researchers have been conducting studies to provide real-time weather information by measuring the city's rainfall, **how much water drained out, topography, land use, infrastructure development, population, lakes, creeks and data on river bathymetry** of all rivers namely Mithi, Dahisar, Oshiwara, Poisar and Ulhas.

19.National Action Plan on Forest Fires

Context:

Kerala Forest Department has been given time by NGT to submit report on the steps taken to prevent forest fires and implement the National Action Plan on Forest Fire in the State.

Concept:

- Ministry of Environment, Forest and climate change has prepared a **National Action Plan on forest fires in 2018** after several rounds of consultation with all states and Union Territories.
- The objective of this plan is to **minimize forest fires by informing, enabling and empowering forest fringe communities and incentivizing them to work in tandem with the State Forest Departments.**
- The plan also intends **to substantially reduce the vulnerability of forests across diverse forest ecosystems in the country against fire hazards, enhance capabilities of forest personnel and institutions in fighting fires and swift recovery subsequent to fire incidents.**
- While **forests are managed by states concerned**, the ministry provides **forest fire prevention and management measures under the Centrally Sponsored Forest Fire Prevention and Management scheme** and also the Centre provides funds for forest fire management.

Forest Fire Prevention and Management Scheme (FPM)

- The FPM is the **only centrally funded program specifically dedicated to assist the states in dealing with forest fires.**
- The FPM replaced the Intensification of Forest Management Scheme (IFMS) in December 2017
- By revamping the IFMS, the **FPM has increased the amount dedicated for forest fire work**
- Funds are allocated under the FPM in **90:10 ratio of central to state funding in the Northeast and Western Himalayan regions and a 60:40 ratio for all other states.**

20.Athirappally Hydel Power Project

Context:

Kerala government gives nod to Athirappally hydel power project

Concept:

- It is 163-megawatt (MW) Hydro Electric Project proposed on the **Chalakudy river in Thrissur district**
- Around **168 hectares of biodiversity-rich forests in the Western Ghats would be submerged** if the project got implemented.
- In addition, **Kadar tribal settlements in the forests will be dismantled**. The fresh move is even violative of the forest rights granted to the Kadars under Forest Rights Act.
- The project which was **initially mooted by KSEB in 1996**, had been in **limbo with the local community strongly opposing the move, backed by environmentalists**.
- Even the majestic Athirappally waterfall would dry up once the project comes up.
- Apart from flora and fauna involving four varieties of rare hornbills, even fish varieties in the Chalakudy river would be impacted.

Chalakudy River

- It is the **4th longest river in Kerala**.
- Chalakudy River is the one of very few rivers of Kerala, which is **having relics of riparian vegetation in substantial level**.
- Chalakudy River is the **richest river in fish diversity perhaps in India**.
- The famous waterfalls, **Athirappilly Falls and Vazhachal Falls**, are situated **on this river**.
- For irrigation purposes **Thumboormoozhy Dam** is constructed across this river.
- It **merges with the Periyar River** near Puthanvelikkara.
- The Parambikulam Dam has been built on the **Parambikulam River, one of its four tributaries**.

Riparian vegetation

- Riparian vegetation **grows along banks of a waterway extending to the edge of the floodplain** (also known as fringing vegetation).

- This includes the emergent aquatic plants growing at the edge of the waterway channel and the ground cover plants, shrubs and trees within the riparian zone.
- Riparian zones dissipate stream energy which slow the flow of water and reduces soil erosion and flood damage. Sediment is trapped, reducing suspended solids to create less turbid water, replenish soils, and build stream banks. Pollutants are filtered from surface runoff, enhancing water quality via bio-filtration.
- The riparian zones also provide wildlife habitat, increased biodiversity, and wildlife corridors, enabling aquatic and riparian organisms to move along river systems avoiding isolated communities.



21. Diversion of forest areas

Context:

In Annual report published by Union Ministry of Environment, Forest and Climate Change, it was found that total 11,467.83 hectares forest lands were diverted in 22 states between January 1 and November 6, 2019

Concept:

- Forest land is usually **recommended for diversion by state governments** for the development of various infrastructure projects or mining, and then given a **final approval by the Union Ministry of Environment, Forest and Climate Change** after having received clearance from the Ministry's Forest Advisory Committee or the ten Regional Empowered Committees.

CAMPA

- Whenever forest land is diverted for non-forest purposes, it is **mandatory under the Forest (Conservation) Act, 1980 that an equivalent area of non-forest land has to be taken up for compensatory afforestation.**
- In addition to this, funds for raising the forest are also to be imposed on whosoever is undertaking the diversion. The land chosen for afforestation, if viable, must be in close proximity of reserved or protected forest for ease of management by forest department.
- In 2002, the **Supreme Court (SC) ordered that a Compensatory Afforestation Fund** had to be created in which all the contributions towards **compensatory afforestation and net present value of land had to be deposited.**
- In April 2004, Ministry of Environment and Forests **constituted Compensatory Afforestation Fund Management and Planning Authority (CAMPA)** to overlook and manage the Compensatory Afforestation Fund (CAF) as directed by the SC. The authority was termed as the 'custodian' of the fund.
- Further in 2009, the government ordered that **State CAMPAs had to be set up** to boost compensatory afforestation at state level and also manage Green India Fund.
- Despite all these efforts, CAG report in 2013 revealed that the **CAMPA funds remained unutilised.** The report stated that between 2006 and 2012, CAF with ad hoc CAMPA grew from ₹ 1,200 crores to ₹ 23,607 crores.

Statutory backing

- **Compensatory Afforestation Fund Act, 2016 came into force from 2018.**
The Act established a **National Compensatory Afforestation Fund** under the **Public Account of India** and State Compensatory Afforestation Fund under the Public Account of each state.
- The payments made for compensatory afforestation, net present value and others related to the project will be deposited in the fund.
- The **State Funds will receive 90% of the payments while National Fund will receive remaining 10%**. These funds will be regulated by State and National CAMPA.
- The Ministry also stressed that the **fund had to be used for important needs such as 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 and others.**

Green credit scheme

- Forest Advisory Committee (FAC) has approved the Green Credit Scheme which **will allow the Forest Department to outsource the responsibility of reforesting** to nongovernment agencies
- It would allow agencies like **private companies and village forest communities to identify land and grow plantations.**
- After a period of three years, they would be **eligible to be considered as compensatory forest land if they met the criteria set by the Forest Department.**
- An industry in need of forest land could then pay for these patches of forest land, and this would then be transferred to the Forest Department.
- Previously, in 2015, a 'Green Credit Scheme' for degraded forest land with public-private participation had been recommended, but was shelved when it was not approved by the Union environment ministry.

22. MB Lal Committee

Context:

The natural gas well at Baghjan in Upper Assam's Tinsukia district that had been leaking gas since May 27, caught fire on June 9.

Concept:

- According to the **Oil Industry Safety Directorate**, eight accidents in oil and gas installations took place between April and June 1, 2020.
- Such accidents are a **grave reminder of the inadequate safety measures and the lackadaisical implementation of safety standards** at oil and gas installations in the country
- The MB Lal committee was constituted following a fire incident in 2009 at the IOCL terminal at Jaipur. It had nearly 118 recommendations with regard to **safety guidelines to be followed by oil companies at their installations**.
- All recommendations of the committee approved by the petroleum ministry were supposed to be implemented immediately. But the recommendations are **remaining idle**.
- **Emergency Response Centres (ERCs) to handle major oil fires** in the fastest way possible are yet to be set up in India, **more than a decade after they were recommended** by the MB Lal Committee.

23. Soil a living organism

Context:

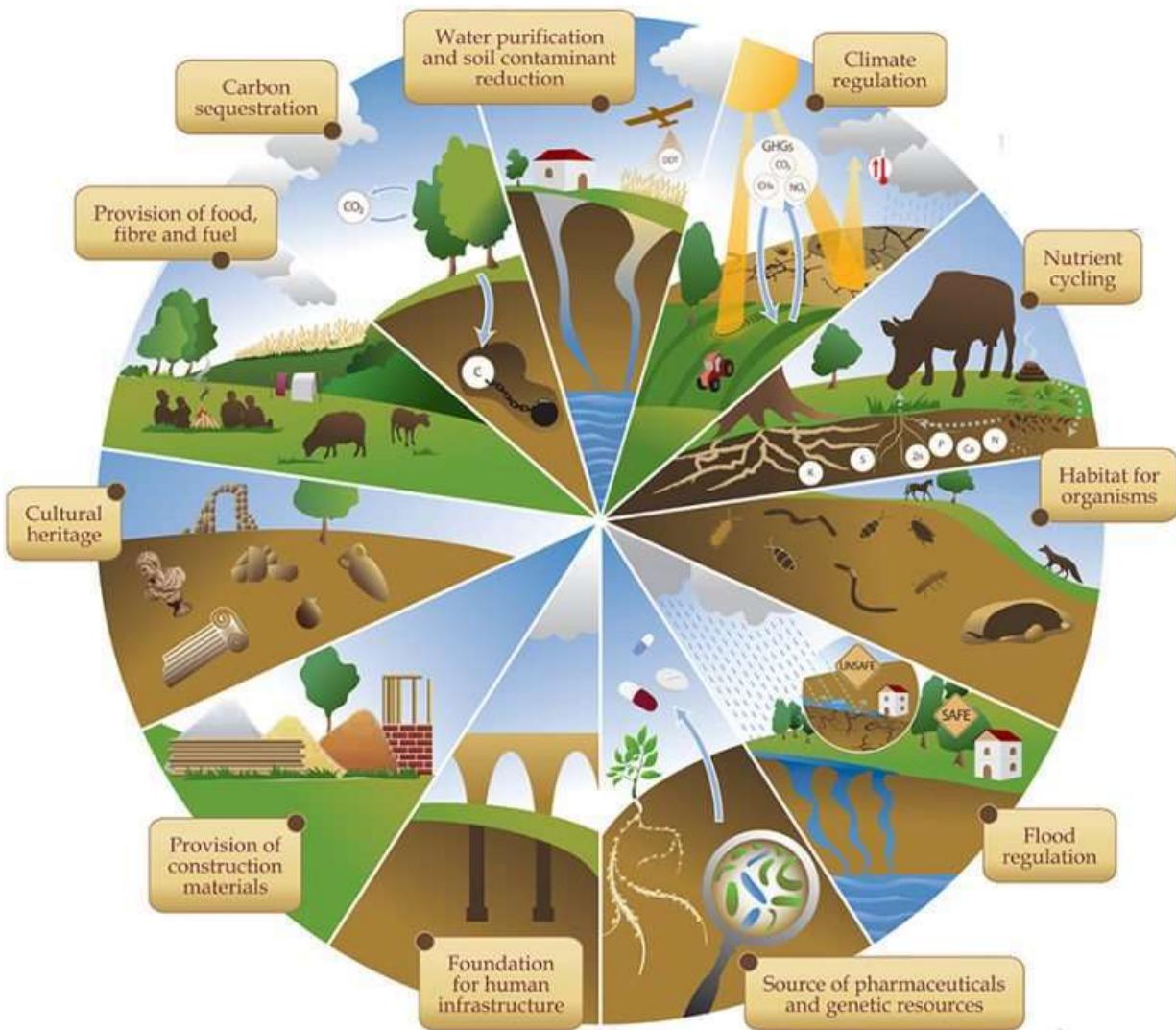
Professor Rattan Lal, the winner of this year's World Food Prize spoke about importance of soil. Improving soil health not only boosts crop productivity, and makes farming profitable, but also mitigate the effects of climate change.

Concept:

- Soil is living because it has **25 per cent of all biodiversity**.
- There are **more species of organisms in the soil than there are aboveground**.
- These organisms include everything from **badgers and gophers to bacteria and viruses** that are invisible to the naked eye.
- There are millions of organisms large and small that live in the soil and perform many important roles. It is important to **maintain healthy soils by protecting soil from disturbance and organic matter loss**.
- This ensures plenty of shelter and food for soil organisms, so that belowground diversity remains high and the soil microorganisms can provide us with ecosystem services.

Ecosystem services of soil

Ecosystem services are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life.



Per the 2006 Millennium Ecosystem Assessment (MA), ecosystem services are "the benefits people obtain from ecosystems .It also delineated the four categories of ecosystem services— **supporting, provisioning, regulating and cultural**

Provisioning Services are ecosystem services that describe the material or energy outputs from ecosystems. They include food, water and other resources.

Regulating Services are the services that ecosystems provide by acting as regulators eg. Regulating the quality of air and soil or by providing flood and disease control. **Local climate and air quality: Carbon sequestration and storage** **Moderation of extreme events** **Waste-water treatment** **Erosion prevention and maintenance of soil fertility** **Pollination** **Biological control**
Supporting Services: **Habitats for species:** Maintenance of genetic diversity

Cultural Services: Aesthetic appreciation and inspiration for culture, art and design, Spiritual experience and sense of place: **Recreation and mental and physical health:**



24.Golden Langur

Context:

Golden Langurs are facing threat of electrocution from power supply lines.

Concept:

- It is **endemic to the semi-evergreen and mixed deciduous forests straddling India and Bhutan.**



- The golden langurs in Assam are hemmed in by three rivers Brahmaputra in the south, Manas in east and Sonkosh in west. Their northern limit is the range of hills in Bhutan up to 2,400 metres above sea level.
- IUCN status – **Endangered**
- In Assam, its main population is in the **Manas Biosphere Reserve**, a forested area along the border of Bhutan.

25.What are Exotic Species?

Context:

The Directorate of Revenue Intelligence (DRI) has arrested two persons involved in an alleged wildlife smuggling syndicate and seized a consignment of 22 exotic macaws.

Concept:

- The birds were identified as Hyacinth Macaw, Pesquet's Parrot, Severe Macaw and Hahn's Macaw.
- They are all **protected species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**, with Hyacinth Macaw being accorded the highest protection and listed under Appendix I.
- Protection under CITES implies ban in global and domestic trade of the species.
- All the birds were seized under provisions of **the Customs Act and Wild Life Protection Act, 1972**.

Exotic species:

- As opposed to native species, which are indigenous and found naturally in an environment, **animals and plant species introduced from other countries and which are not otherwise found locally are termed exotic**.
- These introduced or exotic species **can adversely affect the ecosystem**.
- In India, large varieties of exotic animal and plant species have been introduced from other parts of the world through the ages. Some exotic plants have turned into weeds, multiplying fast and causing harm to the ecosystem, e.g. water hyacinth and lantana.

26.Wildlife Corridor

Context:

Maharashtra state forest department declared 29.53 sqkm area of Dodamarg forest range, which is wildlife corridor in Sindhudurg district as 'Tillari Conservation Reserve'.

Concept:

The 38-km-long **Dodamarg wildlife corridor** that connects **Radhanagari Wildlife Sanctuary** in Maharashtra to **Bhimgad Wildlife Sanctuary** in Karnataka frequently witnesses elephant and tiger movement.

Wildlife corridors

- A wildlife corridor is a **way of connecting fragmented habitats**. The corridor allows movement between isolated patches of habitat **without other disturbances, such as traffic or development**.
- Wildlife corridors are also known as **habitat corridors or green corridors**.
- These green corridors are also **designed to keep animals out of danger of highways, busy roads, and other areas** where their traditional migratory patterns intersect with potential dangerous manmade places.

Conservation reserve

- Conservation reserves and community reserves in India are terms denoting **protected areas of India which typically act as buffer zones to or connectors and migration corridors** between established national parks, wildlife sanctuaries and reserved and protected forests of India.
- Such areas are designated as conservation areas if they are uninhabited and completely owned by the Government of India but used for subsistence by communities and community areas if part of the lands is privately owned.
- These protected area categories were first introduced in the **Wildlife (Protection) Amendment Act of 2002 – the amendment to the Wildlife Protection Act of 1972**.
- These categories were added because of reduced protection in and around existing or proposed protected areas due to private ownership of land, and land use.

27. Arctic Warming

Context:

The Arctic Circle has recorded likely all-time high temperatures reaching over 38 degrees Celsius in the Siberian town of Verkhoyansk which seem to have been 18 degree Celsius higher than normal in June.

Concept:

- The Arctic's extreme warming, known as **Arctic amplification or polar amplification**, may be due to three factors.
- One, the **region's reflectivity, or albedo** is changing as the world warms.
- If the sea ice melts in the Arctic that will remove that white surface off of the ocean, and what will be exposed is this **darker ocean surface that will absorb more of the sun's heat**.
- This dovetails with the second factor: **changing currents**.
- Ocean currents normally bring in warmer water from the Pacific, and colder water exits out of the Arctic into the Atlantic.
- But those **currents may be changing because more melting ice is injecting the Arctic Ocean with freshwater**, which is less dense than saltwater, and therefore floats above it.
- The missing ice also exposes the surface waters to more wind, **speeding up the Beaufort Gyre in the Arctic**, which traps the water it would normally expel into the Atlantic.
- This acceleration **mixes up colder freshwater at the surface and warmer saltwater below**, raising surface temperatures and **further melting ice**.
- Ocean **currents influence the weather**, a third factor.
- They drive the powerful polar jet stream, which moves hot and cold air masses around the Northern Hemisphere. This is **a product of the temperature differences between the Arctic and the tropics**.
- But as the Arctic warms, the **jet stream now undulates wildly north and south**. This has been **injecting the Arctic with warm air in the summer and the US with extremely cold air in the winter**, like during the “polar vortex” of January 2019.

28.Environment Impact assessment

Context:

Several students unions in the country wrote letter to government to hold draft EIA notification 2020.

Concept:

- Environment Impact Assessment or EIA can be defined as the **study to predict the effect of a proposed activity/project on the environment**. A decision making tool, EIA **compares various alternatives for a project** and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.
- **Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support.**
- On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, **under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory** for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification.
- The MoEF recently notified new EIA legislation in September 2006. The notification makes it **mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries** including very small electroplating or foundry units to get environment clearance.
- Environment Impact Assessment Notification of 2006 **has decentralized the environmental clearance projects** by categorizing the developmental projects in two categories, i.e., **Category A (national level appraisal) and Category B (state level appraisal)**.
- Category A projects are appraised at national level by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC) and Category B projects are appraised at state level.
- State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to Category B process.

29.Coccolithophores

Context:

National Centre for Polar and Ocean Research (NCPOR) has conducted research on Coccolithophores and has found that there is a decrease in the concentration of oceanic calcium carbonate (CaCO_3) in the southern Indian ocean.

Concept:

- Coccolithophores (ancient marine algae) have been playing a key role in **marine ecosystems and the global carbon cycle** for millions of years.
- Coccolithophores **calcify marine phytoplankton**. Coccolithophores **build exoskeletons from individual CaCO_3 plates** consisting of chalk and seashells building the tiny plates on their exterior.
- Though carbon dioxide is produced during the formation of these plates, **coccolithophores help in removing it from the atmosphere and ocean by consuming it during photosynthesis**.
- At equilibrium, coccolithophores absorb more carbon dioxide than they produce, which is **beneficial for the ocean ecosystem**.
- Its **abundance and diversity enrichment of coccolithophores** highly depend on factors such as silicate concentrations, calcium carbonate concentration, diatom abundance, light intensity and availability of macro and possibly micronutrient concentrations.
- Recent decrease in CaCO_3 is attributed to the **increase in the concentration of another single-celled algae known as diatoms**. This, in turn, will **affect the growth and skeleton structure of coccolithophores**, with potential significance for the world ocean ecosystem.
- The research team's analysis revealed that **the reduction of coccolithophore diversity in the early summer and late summer periods is due to an increase in the presence of diatom algae**, which occurs after sea ice breakdown with climate change and ocean acidification, and increases the silicate concentration in the waters of the Southern Ocean.
- The results of the study point to **climate change as a major reason for the altered coccolithophore calcification rate**.
- These investigations are important for future intervention to bring positive changes in the marine ecosystem and global carbon cycle.

30.Bhitarkanika fishing cats

Context:

The Odisha forest department has started a two-year conservation project for fishing cats in Bhitarkanika National Park.

Concept:

- The **fishing cat is nocturnal** and apart from fish also preys on frogs, crustaceans, snakes, birds, and scavenges on carcasses of larger animals.
- In India, fishing cats are **mainly found in the mangrove forests** of the Sundarbans, on the foothills of the Himalayas along the Ganga and Brahmaputra river valleys and in the Western Ghats.
- One of the major threats facing the fishing cat is the **destruction of wetlands**.
- The fishing cat is listed **as Endangered on the IUCN Red List**. The Convention on International Trade in Endangered Species (CITES) lists the fishing cat on Appendix II of CITES, which governs international trade in this species. In India, the fishing cat is **included in Schedule I of the Wildlife (Protection) Act, 1972** and thereby protected from hunting.
- The wetland is represented by as many as 3 protected Areas, namely “The Bhitarkanika National Park”, “The Bhitarkanika Wildlife Sanctuary” and “The Gahirmatha Marine Sanctuary”.

Bhitarkanika National Park

- Bhitarkanika is a **unique habitat of Mangrove Forests** criss-crossed with numerous creeks and mud flats located in Kendrapara district of Orissa.
- Bhitarkanika located in the **estuary of Brahmani, Baitarani, Dhamra& Mahanadi river systems**, has unique attraction and a boast of nature's most picturesque sites.
- Bhitarkanika National Park is a prime habitat of **leopard cat, fishing cat, jungle cat, hyena, wild boar, spotted deer, sambar, porcupine, dolphin, salt water crocodile** including partially white crocodile, python, king cobra, water monitor lizards, terrapin, marine turtle, kingfisher, wood pecker, hornbill, bar headed geese, brahminy duck, pintail, white bellied sea eagle, tern, sea gull, waders and a large **variety of resident and migratory birds**.

31. Illegal wildlife trade

Context:

“Money Laundering and the Illegal Wildlife Trade” report was released by FATF.

Concept:

Findings:

- The illegal wildlife trade (IWT) is a **major transnational organised crime** that fuels corruption, threats biodiversity, and can have significant public health impacts. In particular, the spread in recent years of zoonotic diseases underlines the importance of ensuring that wildlife is traded in a legal, safe and sustainable manner, and that countries remove the profitability of illegal markets.
- According to the 2016 **UN World Wildlife Crime report**, criminals are illegally trading products derived from over 7 000 species of wild animals and plants across the world. This includes iconic mammals, but also lesser-known species of reptiles, birds and amphibians.
- Criminals are relying on “established” methods to launder proceeds from IWT, including the placement and layering of funds through the formal financial sector. This shows the **important role that financial institutions can play in detecting suspicious activity**.
- Wildlife traffickers often use **front companies that have connections to import-export industries** to help to justify the movement of goods and payments across borders (e.g., plastics, timber, frozen foods, or artwork).
- **New technologies play an important role in facilitating communication and non-face-to-face payments** between buyers and sellers for illegal wildlife.
- In particular, encrypted communication platforms and illegal wildlife marketplaces hosted via **social media sites, online vendor platforms, and the dark net increase the ease with which wildlife transactions can occur** between buyers and sellers

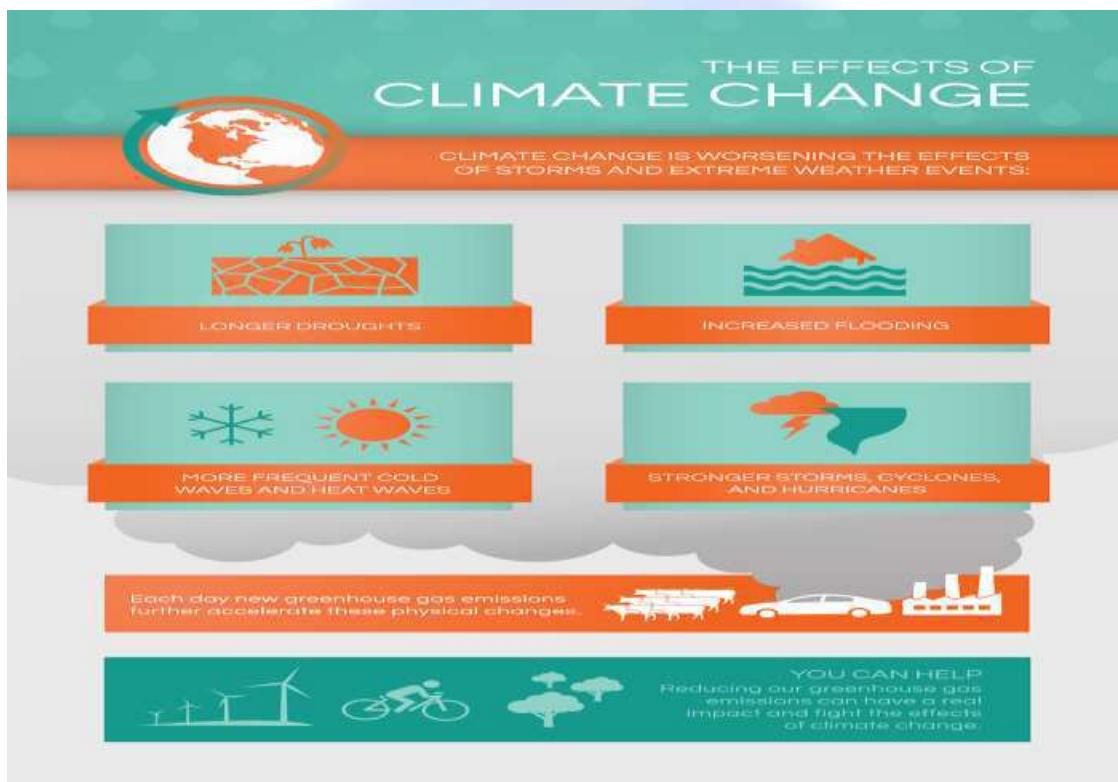
July

1. Extreme Climatic events

Context:

The major cause of worst locust attack after gap of 26 years is extreme weather events linked to climate change.

Concept:



- Extreme weather events include **unexpected, unusual, severe, or unseasonal weather**; weather at the **extremes of the historical distribution**, the range that has been seen in the past.
- As the world has warmed, that **warming has triggered many other changes to the Earth's climate**.
- Changes in extreme weather and climate events, such as **heat waves and droughts**, are the primary way that most people experience climate change.
- Human-induced climate change has **already increased the number and strength of some of these extreme events**.

2. *Globba Andersonii* Plant

Context:

Researchers have “rediscovered” a rare plant species called *Globba andersonii* from the Sikkim Himalayas near the Teesta river valley region after a gap of nearly 136 years.

Concept:



- It is “critically endangered” and “narrowly endemic”, the species is restricted mainly to Teesta River Valley region which includes the Sikkim Himalays and Darjeeling hill ranges.
- Plant usually grows in a dense colony as a lithophyte (plant growing on a bare rock or stone) on rocky slopes in the outskirts of evergreen forests.
- It is especially prevalent near small waterfalls along the roadside leading to these hill forests, which are 400-800 m. above sea level.

3. Namami Ganga

Context:

The World Bank has approved a five year loan to the Namami Gange project worth ₹3,000 crore (\$400 million) to develop and improve infrastructure projects to abate pollution in the river basin.

Concept:

- Namami Gange Programme is an **Integrated Conservation Mission**, approved as 'Flagship Programme' by the Union Government in June 2014 with budget outlay of Rs.20,000 Crore to accomplish the twin objectives of **effective abatement of pollution, conservation and rejuvenation of National River Ganga**.
- Main pillars of the Namami Gange Programme are:
 - Sewerage Treatment Infrastructure
 - River-Surface Cleaning
 - Afforestation
 - Industrial Effluent Monitoring
 - River-Front Development
 - Bio-Diversity
 - Public Awareness
 - Ganga Gram
- **National Mission for Clean Ganga(NMCG)** was registered as a society under the Societies Registration Act 1860. It acted as **implementation arm of National Ganga River Basin Authority(NGRBA)** which was constituted under the provisions of the **Environment (Protection) Act (EPA),1986**.
- **The Act envisages five tier structure at national, state and district level** to take measures for prevention, control and abatement of environmental pollution in river Ganga and to ensure continuous adequate flow of water so as to rejuvenate the river Ganga as below;
 - **National Ganga Council** under chairmanship of Hon'ble Prime Minister of India.
 - **Empowered Task Force (ETF)** on river Ganga under chairmanship of Hon'ble Union Minister of Jal Shakti
 - **National Mission for Clean Ganga(NMCG)**.
 - **State Ganga Committees**
 - **District Ganga Committees** in every specified district abutting river Ganga and its tributaries in the states.



4. Urban Forest

Context:

Urban Forest inaugurated at the Office of the Comptroller and Auditor General of India in New Delhi.

Concept:

- Urban forests are the **lungs of the cities and act as an oxygen bank and Carbon Sink.**
- **Miyawaki method** of forest creation is employed which could help in reducing the temperature by as much as 14 degree & increase the moisture by more than 40%.
- The Urban forest has an ecosystem which has the **capacity to restore habitat** for birds, bees, butterflies and micro fauna. These are essential for pollination of crops and fruits and to help **maintain a balanced ecosystem**.
- On the occasion of World Environment Day this year, the **government announced implementation of the Nagar van scheme** to develop **200 Urban Forests across the country in next five years** with a renewed focus on people's participation and collaboration between Forest Department, Municipal bodies, NGOs, Corporates and local citizens.

Miyawaki method

Miyawaki method is a method of urban afforestation by turning backyards into mini-forests.

ALL ABOUT MIYAWAKI METHOD



The image shows a person working in a field where small plants are being planted or grown. The field appears to be a mix of soil and some existing vegetation. A green hose is visible on the right side of the frame.

<ul style="list-style-type: none">➤ Urban forests grown in 2 to 5 cents of land➤ Native species to be surveyed to identify the best species suitable for the area➤ Assessment of soil nutrition and fertility will be done➤ Nutrient-rich soil to be prepared for fuelling growth of sapling	<ul style="list-style-type: none">➤ For two years, weeds will be regularly removed and saplings will be allowed to grow swiftly➤ Saplings are planted so close to each other that they compete for sunlight by growing taller➤ In 10 years, the area will be transformed into a dense forest
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5. Namdapha National Park.

Context:

Lepidopterists have discovered two new butterflies Striped Hairstreak and Elusive Prince in Arunachal Pradesh

Concept:

- The Striped Hairstreak (*Yamamotozephyrus kwangtungenensis*) was located in Vijaynagar bordering Myanmar while the Elusive Prince was found in Miao on the periphery of the Namdapha National Park.

Namdapha national park

- Namdapha National Park is the **largest protected area in the Eastern Himalaya biodiversity hotspot** and is located in **Arunachal Pradesh**.
- It is India's **easternmost tiger reserve**. It is located in the Changlang district of Arunachal Pradesh near the international border with Myanmar.
- Among the last great remote wilderness areas of Asia, Namdapha and its adjoining areas, is flanked by the Patkai hills to the south and south-east and by the Himalaya in the north.

The area lies close to the **Indo-Myanmar-China trijunction**.

- The entire area is mountainous and comprises the **catchment of the Noa-Dihing River, a tributary of the great Brahmaputra river** which flows westwards through the middle of Namdapha
- It is **only park in the World to have the four Feline species** of big cat namely the Tiger, Leopard, Snow Leopard and Clouded Leopard and numbers of Lesser cats.
- A number of primate species are seen in the park, such as Assamese macaque, pig-tailed macaque, stump-tailed macaque and number of the **distinctive Hoolock Gibbons**, highly **endangered and only 'ape' species found in India dwells in this impenetrable virgin forest**.
- Of the many other important animals are the elephants, black bear, Indian Bison, several species of deers, reptiles and a variety of arboreal animals.
- Among the bird species, most notable are the White winged Wood Ducks, a rare and endangered species, the great Indian hornbills, jungle fowls and pheasants flop their noisy way through the jungle, and which harbours other colourful bird and animal species.

6. Where is Nagarhole Park situated and why its important?

Context:

The Forest Department is going to have **traffic monitoring mechanism** along the roads adjacent to Nagarhole National Park to **ensure better compliance of forest laws** by motorists and to minimise road kills.

Concept:

- Nagarhole is named after Nagarhole (Cobra river in the local language, Kannada), **a winding river which runs eastwards through its centre.**
- Situated in the two districts of Mysore and Kodagu in the **state of Karnataka.**
- It was originally constituted into a sanctuary in the year 1955 and given the status of a National Park in 1983.
- It is located to the north-west of Bandipur National Park and the **Kabini reservoir separates the two parks.**
- Nagarhole National Park **forms a part of the Nilgiri Biosphere Reserve** and together with Bandipur National Park (875 sq. kms) and Mudumalai Wildlife Sanctuary (325 sq. kms) to its South East and Wayanad (350 sq. kms) to the South-West
- It is one of the last remaining and **best protected habitats for endangered species like the Elephant and the Tiger.**
- The vegetation in this park predominantly comprises of **moist, tropical and mixed deciduous forest, with some portions being the dry deciduous type.** Rosewood, Sandalwood, Teakwood and Silver Oak are some of the more commercially important and easily available trees in this area.

7. e-Waste

Context:

United Nations University (UNU) released report on e-waste.

Concept:

Findings:

- E-waste will increase by 38 per cent in the decade between 2020 and 2030.
- There was 53.6 million tonnes (MT) e-waste in 2019, according to the report. That is a nearly 21 per cent increase in just five years.
- Asia generated the greatest volume of e-waste in 2019 about 24.9 MT, followed by the Americas (13.1 MT) and Europe (12 MT). Africa and Oceania generated 2.9 MT and 0.7 MT respectively.
- Less than 18 per cent of the e-waste generated in 2019 was collected and recycled.
- The number of countries that have adopted a national e-waste policy, legislation or regulation has increased from 61 to 78 and includes India.

Concept:

- E-waste is a health and environmental hazard, containing toxic additives or hazardous substances such as mercury, which damages the human brain and / or coordination system. According to the report.
- There are 312 authorized recyclers of e-waste in India, with the capacity for treating approximately 800 kilo tonnes annually.
- However, formal recycling capacity remains under-utilized, as the large majority of the waste is still handled by the informal sector. About 90 per cent of the country's e-waste is recycled in the informal sector, according to the report.

8. Bharat Stage Emission norms

Context:

The Supreme Court recalled its **March 27 order which allowed automobile dealers 10 days' time**, immediately after lockdown is lifted, **to sell 10 per cent of their stock of BS-IV emission norm-compliant vehicles.**

Concept:

- The Bharat Stage emission standards are **standards instituted by the government to regulate the output of air pollutants** from motor vehicles from internal combustion engine equipment, including motor vehicles.
- India has been **following European (Euro) emission norms, although with a time lag of five years.**
- The **BS IV norms had been enforced across the country since April 2017.**
- In 2016, the Centre had announced that the **country would skip the BS-V norms altogether and adopt BS-VI norms by 2020.**
- Implementation of the intermediate BS-V standard was originally scheduled for 2019.
- The **main difference in standards between the existing BS-IV and the new BS-VI auto fuel norms** is the presence of sulphur.
- The **BS-VI fuel is estimated to bring around an 80 per cent reduction of sulphur**, from 50 parts per million to 10 ppm. According to analysts, the **emission of NOx (nitrogen oxides) from diesel cars is also expected to come down** by nearly 70 per cent and 25 per cent from cars with petrol engines.

9. Rewa Solar Power Project

Context:

Prime Minister has inaugurated **Asia's largest solar energy plant in Rewa, Madhya Pradesh.**

Concept:

- India is among the top 5 nations of the world in renewable energy utilization process and this scheme will help farmers become partners in the nation's energy sufficiency project.
- The **750-megawatt ultra-mega solar power plant** touted to reduce the country's emission drastically, by an amount equivalent to 15 lakh tonne of carbon dioxide annually.
- Rewa Solar Project reaffirms India's commitment towards achieving the **target of 175 Gigawatt (GW) installed renewable energy capacity by 2022.**

10.All India Tiger Estimation 2018

Context:

The fourth cycle of the All India Tiger Estimation 2018, results of which were declared to the nation on Global Tiger Day last year has entered the Guinness World Record for **being the world's largest camera trap wildlife survey.**

Concept:

- The All India Tiger Estimation done quadrennially is steered **by the National Tiger Conservation Authority** with technical backstopping from the Wildlife Institute of India and implemented by State Forest Departments and partners.
- The latest results of 2018 had shown that India now has an **estimated 2967 tigers out of which 2461 individual tigers have been photo captured**, a whopping 83 % of the tiger population, highlighting the comprehensive nature of the survey.
- There is hardly any parallel of such a focused species oriented program like Project Tiger across the world, which started with 9 Tiger Reserves, with 50 tiger reserves currently.
- India has now firmly established a leadership role in tiger conservation, with its **bench marking practices being looked at as a gold standard across the world.**

11.Aerosol

Context:

WHO has formally acknowledged the **possibility that the novel coronavirus can remain in the air** in crowded indoor spaces, where short-range aerosol transmission cannot be ruled out.

Concept:

- Aerosols are defined as a **combination of liquid or solid particles suspended in a gaseous or liquid environment**.
- “**Primary**” aerosols, like dust, soot, or sea salt, come directly from the **planet’s surface**. They get lifted into the atmosphere by gusty winds, shot high into the air by exploding volcanoes, or they waft away from smokestacks or flames.
- “**Secondary**” aerosols form when different things floating in the **atmosphere** like organic compounds released by plants, liquid acid droplets, or other materials—crash together, culminating in a chemical or physical reaction.
- Aerosols come **from both natural and human sources**.
- Natural sources of aerosols include sea salt generated from breaking waves, mineral dust blown from the surface by wind, and volcanoes.
- Anthropogenic aerosols include sulfate, nitrate, and carbonaceous aerosols, and are mainly from fossil fuel combustion sources.

12.The Global Annual to Decadal Climate Update

Context:

According to a recent World Meteorological Organization (WMO) report, average global temperature can rise by 1.5°C in next 5 years.

Findings

- This is significant as the countries under 2015 Paris Agreement had agreed to try and limit the average global temperature rise to below 2°C by the end of the century.
- If the annual average temperature increase shoots past the 1.5°C-mark more frequently, achieving the Paris targets would be challenging. The **last five years have already been the warmest ever recorded, according to WMO.**

13. Forest Rights Act (FRA)

Context:

Fourteen states rejected over 5 lakhs claims under the Scheduled Tribes and Other traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, in suo motu review.

Concept:

History of forest laws

- In the colonial era, the **British diverted abundant forest wealth of the nation to meet their economic needs**. While procedure for settlement of rights was provided under statutes such as the **Indian Forest Act, 1927**, these were hardly followed. As a result, tribal and forest-dwelling communities, who had been living within the forests in harmony with the environment and the ecosystem, continued to live inside the forests in tenurial insecurity, a situation which continued even after independence as they were marginalized.
- **The symbiotic relationship between forests and forest-dwelling communities found recognition in the National Forest Policy, 1988.**
- The policy called for the need to associate tribal people in the protection, regeneration and development of forests.
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, was **enacted to protect the marginalised socioeconomic class of citizens and balance the right to environment with their right to life and livelihood.**
- **Preamble:** The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA) was enacted to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded.

Provisions:

- The act **recognize and vest the forest rights and occupation in Forest land in forest Dwelling Scheduled Tribes (FDST) and Other Traditional Forest Dwellers (OTFD)** who have been residing in such forests for generations.

- The act also establishes **the responsibilities and authority for sustainable use, conservation of biodiversity and maintenance of ecological balance** of FDST and OTFD.
- It strengthens the conservation regime of the forests while ensuring livelihood and food security of the FDST and OTFD.
- The act identify **four types of rights**:
- **Title rights:** It gives FDST and OTFD the **right to ownership to land farmed** by tribals or forest dwellers subject to a maximum of 4 hectares. Ownership is only for land that is actually being cultivated by the concerned family and no new lands will be granted.
- **Use rights:** The rights of the dwellers extend to **extracting Minor Forest Produce, grazing areas**, to pastoralist routes, etc.
- **Relief and development rights:** To rehabilitation in case of illegal eviction or forced displacement and to basic amenities, subject to restrictions for forest protection
- **Forest management rights:** It includes **the right to protect, regenerate or conserve or manage any community forest resource** which they have been traditionally protecting and conserving for sustainable use.

14.Cestrumnocturnum

Context:

Eco-Development Committees in Nilgiris biosphere reserve are restoring native Shola habitats in places overrun with invasive species.

Concept:

- Cestrum nocturnum plants have **encroached on native Shola habitats and do not allow any native flora to thrive.**
- The Cestrum plants, unless completely removed with their roots, will keep sprouting and keep taking over Shola and native grasslands.
- The Toda tribes are also growing their own saplings and have set up a nursery which will have more than 7,000 saplings of native Shola trees ready to be planted in the landscape in the coming years.

Shola forest

- The **Shola forests of South India derive their name from the Tamil word solai**, which means a ‘tropical rain forest’.
- Classified as ‘**Southern Montane Wet Temperate Forest**’ by experts Harry George Champion and SK Seth, the Sholas are found in the **upper reaches of the Nilgiris, Anamalais, Palni hills, Kalakadu, Mundanthurai and Kanyakumari in the states of Tamil Nadu and Kerala.**
- These forests are found sheltered in valleys with sufficient moisture and proper drainage, at an altitude of more than 1,500 metres. The upper reaches are covered with grasslands, known as Shola grasslands.
- The **vegetation that grows in Shola forests is evergreen**. The trees are stunted and have many branches. Their rounded and dense canopies appear in different colours.
- Generally, the leaves are small in size and leathery.
- Red-coloured young leaves turning into different colours on maturity is a prominent characteristic of the Shola forests.
- Epiphytes like lichens, ferns and bryophytes usually grow on the trees.
- Sholas play a **major role in conserving water supply of the Nilgiris' streams**. Sholas thus act as ‘overhead water tanks’.

15. Swarm, upsurge and plague

Context:

Food and Agriculture Organization (FAO) has warned India to remain on high alert against locust attack for the next four weeks.

Concept:

- The FAO has three categories of Desert Locust situations:
- Outbreak: It is common occurrence Upsurge: **current locust attack (2019-2020) has been categorised as an upsurge.**

Plague

- **Upsurges and plagues do not occur overnight; instead, they take many months to develop.**
- The last major plague was in 1987-89 and the last major upsurge was in 2003-05.

Locust attacks and developments:

- **Before the outbreak stage**, the FAO first issues '**Desert Locust threats**' that are determined from an analysis of national survey and control data combined with **remote sensing imagery and historical records**. Such threats have been issued in 2012, 2013, and 2015. Not all threats develop into an outbreak.
- When there are **good rains and green vegetation develops**, desert Locusts which are always present somewhere in the **deserts between Mauritania and India** can rapidly increase in number and within a month or two, start to concentrate.

16. Extended Producer responsibility

Context:

With increasing biomedical waste like PPE , Centre needs to stitch together a national protocol that combines The Bio-Medical Waste Management Rules, 2016, with the recently released Environment Ministry guidelines on 'extended producer responsibility' (EPR) for producers of plastic.

Concept:

- Extended Producer Responsibility (EPR) is a **policy approach** under which **producers are given a significant responsibility** financial and/or physical **for the treatment or disposal of post-consumer products**.
- Assigning such responsibility could in principle **provide incentives to prevent wastes** at the source, **promote product design for the environment** and support the achievement of public recycling and materials management goals.



17. Record Temperature Verkhoyansk

Context:

Temperatures exceeded 38C in the Russian town of Verkhoyansk on 20 June, the highest temperature ever recorded north of the Arctic circle.

Concept:

- This **new record breaks the Arctic town's 32-year record** it set on 25 July 1988, which was a sweltering 37.3 degrees Celsius set on 25 July 1988.
- The town of about 1,300 is located farther north than Fairbanks, Alaska, and is **known for having an unusually wide temperature range**.
- During the winter, **Verkhoyansk is one of the coldest spots in the world**, with temperatures frequently dipping well below minus-50 degrees.
- It has accelerated the **melting of snow and ice**; contributed to **permafrost melt**, and have gotten the **Siberian wildfire season** off to an unusually early and severe start.
- An international team of climate scientists found the record average temperatures were likely to happen less than once every 80,000 years without human-induced climate change.
- That makes such an event “almost impossible” had the world not been warmed by greenhouse gas emissions, they conclude in the study.
- The scientists described the finding as “**unequivocal evidence of the impact of climate change on the planet**”.

18.Global Forest Resources Assessment

Context:

According to the latest Global Forest Resources Assessment (FRA) report, **India has ranked third** among the top 10 countries that have **gained in forest areas in the last decade**.

Concept:

- **Food and Agriculture Organization** has brought out this comprehensive assessment every five years since 1990.
- This report **assesses the state of forests, their conditions and management** for all member countries.
- The top 10 countries that have recorded the **maximum average annual net gains in forest area during 2010-2020** are China, Australia, India, Chile, Vietnam, Turkey, the United States, France, Italy and Romania.
- India reported **38 per cent annual gain in forest, or 266,000 ha of forest increase every year** at an average.
- The FRA 2020 has **credited the government's Joint Forest Management programme** for the significant increase in community-managed forest areas
- **India accounts for two per cent of total global forest area.**
- **India reported the maximum employment in the forestry sector in the world.**
- Globally, 12.5 million people were employed in the forestry sector. Out of this, India accounted for 6.23 million, or nearly 50 per cent.

19.Urban mining

Context:

With increasing e waste around the cities, urban mining gains importance.

Concept:

- Urban mining is the **practice of extracting valuable metals and materials** from electronic waste
- This makes it possible to obtain high quality steel from old washing machines.
- Precious metals such as gold, silver, platinum or palladium can be extracted from old mobile phones and computers.
- **Urban mining has many advantages over primary mining:** the materials are already in the city where they are likely to be needed again, so there is **no need for long transport routes**. And the **environmental impact, particularly in land use, is clearly lower than mining** for natural resources.

20.Environment impact assessment

Context:

Huge criticism is rising against the draft Environment Impact Assessment (EIA) 2020 notification issued to amend rules.

Concept:

- Environment Impact Assessment or EIA can be defined as the **study to predict the effect of a proposed activity/project on the environment**. A decision making tool, EIA **compares various alternatives for a project** and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.
- **Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support.**
- On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, **under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory** for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification.
- The MoEF recently notified new EIA legislation in September 2006. The notification makes it **mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries** including very small electroplating or foundry units to get environment clearance.
- Environment Impact Assessment Notification of 2006 **has decentralized the environmental clearance projects** by categorizing the developmental projects in two categories, i.e., **Category A (national level appraisal) and Category B (state level appraisal)**.
- Category A projects are appraised at national level by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC) and Category B projects are appraised at state level.
- State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to Category B process.

21.Acclimatization

Context:

“Periglacial Flora of Western Himalayas Diversity And Climate Change Vulnerability” study by Botanical survey of India found **high altitudes plants are facing the “climb higher or die” situation due to climate change.**

Concept:

- Acclimatization is the process in which an **individual organism adjusts to a change in its environment** (such as a change in altitude, temperature, humidity, photo period, or pH), allowing it **to maintain performance across a range of environmental conditions.**
- Acclimatization occurs in a short period of time (hours to weeks), and within the organism's lifetime (compared to adaptation, which is a development that takes place over many generations).
- This may be a discrete occurrence (for example, when mountaineers acclimate to high altitude over hours or days) or may instead represent part of a periodic cycle, such as a mammal shedding heavy winter fur in favor of a lighter summer coat.
- Organisms can **adjust their morphological, behavioral, physical, and/or biochemical traits in response to changes in their environment.**

22.NGT

Context:

The National Green Tribunal (NGT) has ordered Oil India Limited (OIL) to deposit ₹25 crore with the administration of eastern Assam's Tinsukia district for environmental damage due to the fire in Baghjan well.

Concept:

- The well is close to the Maguri-Motapung wetland, which is within the eco-sensitive zone of the fragile Dibru-Saikhowa National Park.

NGT

- It is a specialized body set up under the **National Green Tribunal Act (2010)** for **effective and expeditious disposal of cases** relating to environmental protection and conservation of forests and other natural resources.
- With the establishment of the NGT, India became the **third country in the world to set up a specialised environmental tribunal**, only after Australia and New Zealand, and the first developing country to do so.
- NGT is mandated to make disposal of applications or appeals finally **within 6 months of filing of the same**.

Structure of NGT

- The Tribunal comprises of the **Chairperson, the Judicial Members and Expert Members**. They shall hold office **for term of five years and are not eligible for reappointment**. The Chairperson is **appointed by the Central Government** in consultation with Chief Justice of India (CJI)

Powers & Jurisdiction

- The Tribunal **has jurisdiction over all civil cases involving substantial question relating to environment**. The Tribunal is **not bound by the procedure laid down under the Code of Civil Procedure 1908**, but shall be guided by principles of 'natural justice'.
- The NGT deals with **civil cases under the seven laws** related to the environment, these include:
The Water (Prevention and Control of Pollution) Act, 1974,
The Water (Prevention and Control of Pollution) Cess Act, 1977,
The Forest (Conservation) Act, 1980,

The Air (Prevention and Control of Pollution) Act, 1981,
The Environment (Protection) Act, 1986,
The Public Liability Insurance Act, 1991 and
The Biological Diversity Act, 2002.

- Two important acts – **Wildlife (Protection) Act, 1972** and **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** have been kept out of NGT's jurisdiction.



23.Status of Tiger

Context:

Union Ministry for Environment, Forests and Climate Change has released the detailed Status of Tigers Report 2018 on occasion of International Tiger Day celebrated on July 29.

Findings:

- Tigers were observed to be **increasing at a rate of 6 per cent per annum in India** from 2006 to 2018.
- There were nine tiger reserves when Project Tiger started in 1973. Now, India has 50 tiger reserves. **Seventy per cent of the world's tigers are in India and the conservation effort has been a huge success.**
- While tiger populations remain stable in the country, the report warns that with the **populations being confined to small Protected Areas**, some of which have habitat corridors that permit tiger movement between them, "**most of the corridor habitats in India are not protected areas, and are degrading due to unsustainable human use and developmental projects**".
- **Tiger occupancy has increased in Madhya Pradesh and Andhra Pradesh.** The former also registered a substantial increase in tiger population, and along **with Karnataka, ranks highest in tiger numbers.**
- The **Northeast has, meanwhile, suffered losses in population.**
- The population in Jharkhand, Chhattisgarh and Odisha too have seen a decline in the number of tigers
- The **largest contiguous tiger population in the world of about 724 tigers was found in the Western Ghats** (Nagarhole-Bandipur-Wayanad-Mudumalai- Satyamangalam-BRT block).

International Tiger Day

- International Tiger Day was **established in 2010 at Saint Petersburg Tiger Summit in Russia** to raise awareness about the decline of wild tiger numbers, leaving them in the brink of extinction and to encourage the work of Tiger conservation.

24. Ammonia pollution

Context:

High levels of ammonia were detected in the Yamuna river.

Concept:

- The level of ammonia in raw water of Yamuna river was 1.8 parts per million (ppm) but the acceptable maximum limit of ammonia in drinking water, as per the Bureau of Indian Standards, is 0.5 ppm.
- **Ammonia is a colourless gas and is used as an industrial chemical** in the production of fertilisers, plastics, synthetic fibres, dyes and other products.
- Ammonia occurs naturally in the environment from the breakdown of organic waste matter, and may also find its way to ground and surface water sources through industrial effluents or through contamination by sewage.
- If the concentration of ammonia in water is **above 1 ppm it is toxic to fishes.**
- In humans, long term ingestion of water having ammonia levels of 1 ppm or above may **cause damage to internal organs.**
- The most likely source to Yamuna river is **effluents from dye units, distilleries and other factories in Panipat and Sonepat districts in Haryana,** and also sewage from some unsewered colonies in this stretch of the river.

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OPTIMA 5	Sci&Tech+IR+Msc	6 th Sept, 2020
OPTIMA 6	Full length Test 1	19 th Sept, 2020
OPTIMA 7	Full length Test 2	26 th Sept ,2020