



INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

INSTA PT 2021 EXCLUSIVE

ENVIRONMENT

JUNE 2020 – JANUARY 2021

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INSIGHTSIAS Toppers from Offline Classroom Program (OGP) and CORE BATCH



Jaydev C S
Rank 5
OGP 2019 + Core Batch



Dheeraj Kumar Singh
Rank 64
OGP 2019



Yashaswini B
Rank 71
Core Batch +
Mains Test Series 2019



Nidhin K Biju
Rank 89
Core Batch +
Mains Test Series



M V Satya Sai Karthik
Rank 103
OGP 2018



Kumar Shivashish
Rank 108
OGP 2019 + Core Batch



Keerthana H S
Rank 167
OGP 2018



Abhishek Gowda MJ
Rank 278
OGP 2018



Vishnusankar
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Bengaluru Head Office:
9380863034, 7483163074, 6364270311
mains@insightsias.com | Offline@insightsias.com



Delhi:
01145637946, 7303318519, 7483163074
delhioffice@insightsias.com



Hyderabad:
8688512637, 7483163074
hyderabad@insightsias.com

Government Programmes / Initiatives

1. Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)" scheme

- ACROSS scheme pertains to the atmospheric science programs of the Ministry of Earth Sciences (MoES).
- It addresses different aspects of weather and climate services, which includes **warnings for cyclone, storm surges, heat waves, thunderstorms etc.**
- Each of these aspects is incorporated as nine sub-schemes under the umbrella scheme "ACROSS" and is implemented in an integrated manner.

Benefits of the Scheme:

- The scheme will provide **improved weather, climate and ocean forecast and services**, thereby ensuring transfer of commensurate benefits to the various services.
- It will also provide a sizable number of scientific and technical staff along with requisite administrative support, thereby generating employment.
- To ensure **last-mile connectivity of the weather-based services** to the end -user, a large number of agencies like the Krishi Vigyana Kendras of ICAR, Universities and local municipalities are roped in thus generating employment opportunities to many people.

2. Commission for Air Quality Management (CAQM)

The Commission for Air Quality Management (CAQM) in **NCR and adjoining areas** has begun the process of setting up a Decision Support System (DSS) having a web, GIS and multi-model based operational and planning decision support tool.

- This tool will help immensely in capturing the static and dynamic features of the emissions from various sources.

About the Commission for Air Quality Management (CAQM):

The Commission for Air Quality Management was formed by an ordinance in October 2020, the "Commission for Air Quality Management (CAQM) in National Capital Region and Adjoining Areas Ordinance 2020".

Composition:

Chairperson: To be chaired by a government official of the rank of Secretary or Chief Secretary.

It will be a permanent body and will have over **20 members**.

- The Commission will be a statutory authority.
- The Commission will supersede bodies such as the central and state pollution control boards of Delhi, Punjab, Haryana, UP and Rajasthan.
- It will have the powers to issue directions to these state governments on issues pertaining to air pollution.

Jurisdiction:

Exclusive jurisdiction over the NCR, including areas in Haryana, Punjab, Uttar Pradesh and Rajasthan, in matters of air pollution, and will be working along with CPCB and ISRO, apart from the respective state governments.

Will this new body also have penal powers?

Yes, the Commission will have some teeth. If its directions are contravened, through say, the setting up of an industrial unit in a restricted area, the Commission will have the power to impose a fine of up to Rs 1 crore and imprisonment of up to 5 years.

3. India's Arctic Expedition

India embarked upon the Arctic research by launching **first scientific expedition to Arctic in the first week of August, 2007**, using the international research facility in the Spitsbergen Island of Norway.

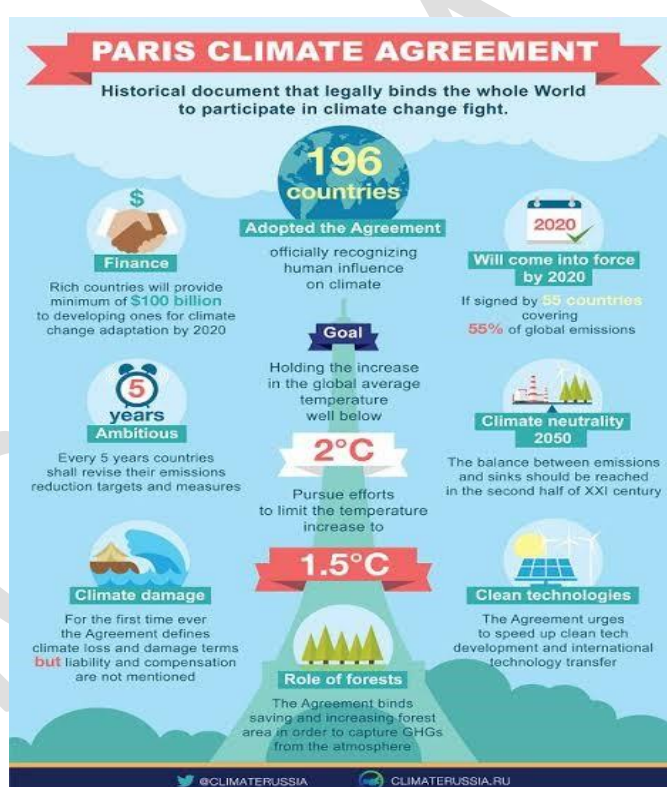
- Subsequently, India has been sending scientific teams every summer and winter for carrying out studies in the Arctic, primarily in the fields of glaciology, hydrochemistry, microbiology, and atmospheric sciences.

Background:

- India is also a signatory to the **Antarctic Treaty and to the Protocol to the Antarctic Treaty on Environmental Protection** and has **two research stations in Antarctica**: Bharati (commissioned in 2012) and Maitri (since 1988).
- India has the **Observer Status in the Arctic Council**.

4. India's Paris climate goals

- The **Union Environment Ministry** has constituted a high-level inter-ministerial **apex committee for Implementation of Paris Agreement (AIPA)** under the chairmanship of Secretary, MoEFCC. to ensure that India is "on track" towards meeting its obligations under the Paris Agreement including its submitted **Nationally Determined Contributions (NDCs)**.
- The committee will also act as a **national authority for the regulation of carbon markets in India**.



What are NDCs?

NDCs are the accounts of the **voluntary efforts** to be made by countries that are a part of the Paris Agreement, to reduce greenhouse gas emissions and mitigate the impacts of anthropogenic climate change.

- The NDCs are implemented in the post-2020 period.
- India had submitted its NDCs in 2015.

The three quantitative goals in the Indian NDCs are:

- A 33-35 per cent reduction in the gross domestic product emissions intensity by 2030 from 2005 levels.
- A 40 per cent share of non-fossil fuel based electricity by 2030.
- Creating a carbon sink of 2.5-3 billion tonnes of carbon dioxide through afforestation programmes.

Environment Minister Prakash Javadekar said that **India was the only major G20 country that was on track towards keeping to its nationally determined commitments** to halt runaway global warming.

- It had **achieved 21% of its emissions intensity reduction target as a proportion of its GDP in line with its pledge to a 33-35% reduction by 2030.**

5. Khadi Prakritik paint

- It is **India's first cow dung paint** - developed by Khadi and Village Industries Commission.
- It is an eco-friendly, non-toxic paint.
- It is a first-of-its-kind product, with anti-fungal, anti-bacterial properties.
- Based on cow dung as its main ingredient, the paint is cost-effective and odorless, and has been certified by Bureau of Indian Standards.
- The paint is free from heavy metals like lead, mercury, chromium, arsenic, cadmium and others.

6. Coastal Regulatory Zone norms

Under **the section 3 of Environment Protection Act, 1986** of India, Coastal Regulation Zone notification was issued in February 1991 for the first time.

- In **2018-19**, fresh Rules were issued, which aimed to remove certain restrictions on building, streamlined the clearance process, and aimed to encourage tourism in coastal areas.

Objectives:

- **They restrict certain kinds of activities** — like large constructions, setting up of new industries, storage or disposal of hazardous material, mining, reclamation and bunding — within a certain distance from the coastline.

What are the restrictions?

- The **restrictions depend on criteria** such as the population of the area, the ecological sensitivity, the distance from the shore, and whether the area had been designated as a natural park or wildlife zone.
- The latest Rules have a **no-development zone of 20 m** for all islands close to the mainland coast, and for all backwater islands in the mainland.

For the so-called **CRZ-III (Rural) areas**, two separate categories have been stipulated.

- In the densely populated rural areas (**CRZ-IIIA**) with a population density of 2,161 per sq km as per the 2011 Census, the no-development zone is 50 m from the high-tide level, as against the 200 m stipulated earlier.
- **CRZ-IIIB** category (rural areas with population density below 2,161 per sq km) areas continue to have a no-development zone extending up to 200 m from the high-tide line.

Implementation:

While the CRZ Rules are made by the Union environment ministry, implementation is to be ensured by state governments through their **Coastal Zone Management Authorities**.

7. Voluntary disclosure scheme

The Ministry of Environment, Forest and Climate Change (MoEFCC) had come out with an advisory on a **one-time voluntary disclosure scheme that allows owners of exotic live species** that have been acquired illegally, or without documents, to declare their stock to the government between June and December 2020.

What can be the impact?

With this scheme, the government aims to address the challenge of zoonotic diseases, develop an inventory of exotic live species for better compliance under **the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**, and regulate their import.

What kind of exotic wildlife is covered?

- The advisory has defined exotic live species as animals named under the Appendices I, II and III of the CITES.
- It does not include species from the Schedules of the **Wild Life (Protection) Act 1972**.
- A plain reading of the advisory **excludes exotic birds from the amnesty scheme**.

How big a problem is illegal trade of exotic animals in India?

- The **Directorate of Revenue Intelligence (DRI)**, which enforces anti-smuggling laws, says India has emerged as a big demand centre for exotic birds and animals with an increase in smuggling of endangered species from different parts of the world.
- Most of this exotic wildlife is imported through illegal channels and then sold in the domestic market as pets.

8. Graded Response Action Plan (GRAP)

When the air quality of Delhi and Noida was in the 'severe' category, the newly formed **Commission on Air Quality Management**, as an interim measure, gave the **CPCB powers to operationalise measures under the Graded Response Action Plan (GRAP) on air pollution**.

What is GRAP?

The GRAP is a set of emergency measures to be implemented to control air pollution depending upon the air quality.

- **Approved by the Supreme Court** in 2016.
- The plan was **prepared by Environment Pollution (Prevention & Control) Authority**.
- It works only as **an emergency measure**.
- When the air quality shifts from poor to very poor, **the measures listed have to be followed since the plan is incremental in nature**.

Overview of the plan:

1. The plan requires action and coordination among 13 different agencies in Delhi, Uttar Pradesh, Haryana and Rajasthan (NCR areas).
2. At the head of the table is the EPCA, mandated by the Supreme Court.
3. Before the imposition of any measures, EPCA holds a meeting with representatives from all NCR states, and a call is taken on which actions have to be made applicable in which town.

9. Environment Pollution (Prevention and Control) Authority

- EPCA is a **Supreme Court mandated body** tasked with taking various measures to tackle air pollution in the **National Capital Region**.
- It was notified in **1998** by Environment Ministry under the **Environment Protection Act, 1986**.

Composition:

Besides the chairman, the EPCA has 14 members, some of whom are the environment secretary of the National Capital Territory of Delhi (NCT), chairperson of the New Delhi Municipal Council, transport commissioner of the NCT, the commissioners of various municipal corporations of Delhi and professors at IIT Delhi and Jawaharlal Nehru University.

Powers:

It has the **power suo-moto**, or on the basis of **complaints made by any individual, representative body or organization functioning in the field of environment**.

Functions:

- To protect and improve quality of environment and prevent and control environmental pollution in National Capital Region.
- To enforce Graded Response Action Plan (GRAP) in NCR as per the pollution levels.

10. National Air Quality Index

Launched in **2014** with outline 'One Number – One Color -One Description' for the common man to judge the air quality within his vicinity.

- **The measurement of air quality is based on eight pollutants**, namely: Particulate Matter (PM10), Particulate Matter (PM2.5), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2), Carbon Monoxide (CO), Ozone (O3), Ammonia (NH3), and Lead (Pb).
- **AQI has six categories of air quality.**
These are: Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe.
- It has been developed by **the CPCB in consultation with IIT-Kanpur** and an expert group comprising medical and air-quality professionals.

CENTRAL POLLUTION CONTROL BOARD'S AIR QUALITY STANDARDS

AIR QUALITY INDEX (AQI)	CATEGORY
0-50	Good
51-100	Satisfactory
101-200	Moderate
201-300	Poor
301-400	Very Poor
401-500	Severe

11. Tree Transplantation Policy

Delhi Cabinet has given its nod for 'Tree Transplantation Policy'. With this, Delhi has become **the first State in India to pass this policy.**

WHAT THE TRANSPLANTATION POLICY SAYS

For any construction project, at least **80%** of the total number of trees to be felled need to be transplanted to another location

- 10 times the number of saplings to be planted
- National-level agencies that have successfully carried out tree transplantation will be appointed as part of an expert panel
- Invasive species such as vilayati kikar and subabul will be excluded from the list of species that will be transplanted
- Survival rate and audits to be carried out after a year to assess which trees were able to withstand the process

Poor survival rate a challenge

- For the Pragati Maidan project, of the **2,583** trees to be cut, **1,713** trees were to be transplanted
- An expert panel found only **573** trees from these could survive the 'shock' of transplantation
- Of these, only **36** trees (2.1%) based on health, form and good structure were found viable enough to be transplanted

Cost of transplanting a tree ₹50,000 to 1 lakh (approx)

What was done earlier

In lieu of every tree cut, compensatory plantation in the form of 10 tree saplings was carried out

CM says the saplings may take years to 'replace' the felled tree, so transplantation is being done in addition

12.Green Term Ahead Market (GTAM)

Green Term Ahead Market (GTAM) in electricity launched as a first step towards greening the Indian short-term power market.

What is GTAM?

It is an alternative new model introduced for selling off the power by the renewable developers in the open market without getting into long term PPAs.

Key features of GTAM:

- **Transactions** through GTAM will be **bilateral in nature** with clear identification of corresponding buyers and sellers, there will not be any difficulty in accounting for Renewable Purchase Obligations (RPO).
- GTAM **contracts will be segregated into Solar RPO & Non-Solar RPO** as RPO targets are also segregated.
- **Daily & Weekly Contracts** – Bidding will take place on MWh basis.
- **Price discovery will take place on a continuous basis** i.e. price time priority basis. Subsequently, looking at the market conditions open auction can be introduced for daily & weekly contracts.
- **Energy scheduled through GTAM contract** shall be considered as deemed RPO compliance of the buyer.

Significance and benefits of the move:

- The introduction of GTAM platform would **lessen the burden on RE-rich States and incentivize them to develop RE capacity beyond their own RPO.**
- This would **promote RE merchant capacity addition** and help in achieving RE capacity addition targets of the country.
- It will **benefit buyers of RE through competitive prices and transparent and flexible procurement.**
- It will also benefit RE sellers by providing **access to pan- India market.**

13.Draft Environment Impact Assessment (EIA) notification 2020

- The **United Nations (UN) Special Rapporteurs** have raised several concerns about the draft Environment Impact Assessment (EIA) notification, 2020.

Who are UN Special Rapporteurs?

- They are independent experts working on behalf of the United Nations. They work on a country or a thematic mandate specified by the United Nations Human Rights Council.

Background:

Under the **Environment (Protection) Act, 1986**, India notified its **first EIA norms in 1994**, setting in place a legal framework for regulating activities that access, utilise, and affect (pollute) natural resources.

- Every development project has been required to go through the EIA process for obtaining prior environmental clearance ever since.
- The 1994 EIA notification was replaced with a **modified draft in 2006.**
- Earlier this year, the government **redrafted** it again **to incorporate the amendments and relevant court orders issued since 2006, and to make the EIA “process more transparent and expedient.”**

14.Climate Smart Cities Assessment Framework (CSCAF) 2.0

Launched recently by the **Ministry of Housing and Urban Affairs (MoHUA).**

What is CSCAF?

- CSCAF initiative **intends to inculcate a climate-sensitive approach to urban planning and development in India.**
- The objective of CSCAF is to **provide a clear roadmap for cities towards combating Climate Change** while planning and implementing their actions, including investments.
- The **Climate Centre for Cities** under **National Institute of Urban Affairs (NIUA)** is supporting MoHUA in implementation of CSCAF.

The framework has 28 indicators across five categories namely:

1. Energy and Green Buildings.
2. Urban Planning, Green Cover & Biodiversity.
3. Mobility and Air Quality.
4. Water Management.
5. Waste Management.

15. Net Present Value (NPV)

The Union Ministry of Mines had requested the Environment Ministry to exempt it from paying NPV.

- However, the Environment Ministry has refused saying that it **would be 'inappropriate' to grant such an exemption as this was mandated by the Supreme Court.**

What is NPV?

The Net Present Value (NPV) is **a monetary approximation of the value that is lost when a piece of forest land has been razed.**

- This is on the basis of the services and ecological value and there are prescribed formulae for calculating this amount which **depends on the location and nature of the forest** and the **type of industrial enterprise** that will replace a particular parcel of forest.
- It was developed by a committee led by Professor Kanchan Gupta, of the Institute of Economic Growth.

When was it introduced?

To regulate forest diversions, **Supreme Court introduced a high 'net present value' (NPV) charge on the lands diverted.**

16. Policy on Promotion of City Compost

- To process and use city waste as compost, the Policy on Promotion of City Compost was **approved in 2016.**
- Under the policy, **assistance of Rs 1,500 per tonne of city compost will be provided to fertilizer companies** for marketing and promotion of city compost.
- Announced by **the Ministry of Chemicals and Fertilizers.**
- The lack of an appropriate market and ineffective implementation hasn't given this much-needed practice the desired popularity.

Potential for city compost:

India currently produces close to **1.5 lakh tonnes of solid waste every day** and its biodegradable fraction ranges between 30 per cent and 70 per cent for various Indian cities. This means **there is a huge potential for composting, the most natural form of processing wet waste.**

Why this is a serious issue?

Uncontrolled decomposition of organic waste in dumpsites also leads to emission of potent greenhouse gases.

17. 'Beach Environment and Aesthetics Management Services' (BEAMS) program

India has launched its own eco-label **BEAMS** (Beach Environment & Aesthetics Management Services) under ICZM (Integrated Coastal Zone Management) **project**.

- BEAMS has been prepared over two years by the **Society of Integrated Coastal Management (SICOM)** under MoEFCC.

Its objective is to:

- Abate pollution in coastal waters.
- Promote sustainable development of beach facilities.
- Protect and conserve coastal ecosystems and natural resources.
- Maintain high standards of cleanliness, hygiene and safety for beachgoers in accordance with coastal environment and regulations.
- Maintain high standards of cleanliness, hygiene and safety for beachgoers in accordance with coastal environment and regulations.

What is ICZM Project?

ICZM aims to improve livelihood of coastal communities and conserve the coastal ecosystem.

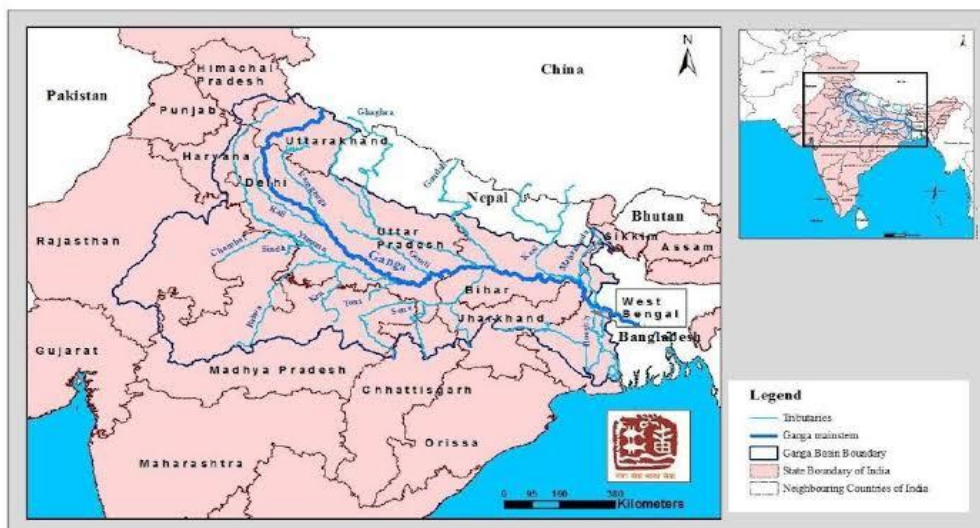
- It is a **World Bank assisted project**.
- The **National Centre for Sustainable Coastal Management (NCSCM)**, Chennai, will provide scientific and technical inputs.

The concept of ICZM was born in **1992 during the Earth Summit of Rio de Janeiro**.

18. Namami Gange Programme

It an Integrated Conservation Mission, approved as a 'Flagship Programme' in June 2014.

- It seeks to accomplish the twin objectives of **effective abatement of pollution and conservation and rejuvenation of National River Ganga**.
- It is being operated under **Ministry of Jal Shakti**.



Implementation:

The program is being implemented by the **National Mission for Clean Ganga (NMCG)**, and its state counterpart organizations i.e., State Program Management Groups (SPMGs).

- **NMCG is the implementation wing of National Ganga Council** (set in 2016; which replaced the National Ganga River Basin Authority (NRGBA).

- **National Ganga Council (NGC)** was Created in October 2016 under the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016. It is Headed by Prime Minister.

Funding:

It has a Rs. 20,000-crore, centrally-funded, non-lapsable corpus and consists of nearly 288 projects.

Main Pillars of the Namami Gange Programme are:

1. Sewerage Treatment Infrastructure
2. River-Surface Cleaning
3. Afforestation
4. Industrial Effluent Monitoring
5. River-Front Development
6. Bio-Diversity
7. Public Awareness
8. Ganga Gram

19. One Sun, One World, One Grid (OSOWOG) initiative

OSOWOG initiative was **proposed by India** to set up a framework for facilitating global cooperation which aims at building a global ecosystem of interconnected renewable energy resources that can be easily shared.

Details of the initiative:

- **Parent Body:** The Union Ministry of New and Renewable Energy (MNRE).
- **Objective:** To build global consensus about sharing solar resources among more than 140 countries of West Asia and South-East Asia.
- **The vision** is 'The Sun Never Sets' and is a constant at some geographical location, globally, at any given point of time.
- **This grid** shall be **interconnected with the African power pools** also at the later stage.
- It has been taken up under **the technical assistance program of the World Bank**.

20. National Clean Air Programme (NCAP)

The **National Green Tribunal** had slammed the **Ministry of Environment and Forests (MoEF)** over its report on the **National Clean Air Programme (NCAP)** which proposes 20-30% reduction of air pollution by 2024.

The NGT has disapproved this submission saying that **the MoEF's view was against the constitutional mandate under Article 21 and also against statutory mandate**.

Observations made by the NGT:

- **Right to Clean Air** stood recognised as part of **Right to Life** and failure to address air pollution was denial of Right to Life.
- The enforcement of '**Sustainable Development**' principle and '**Public Trust Doctrine**' required stern measures to be adopted to give effect to the mandate of international obligations for which **the Environment (Protection) Act, 1986 and other laws** had been enacted.

What does the NCAP say on this? What are the issues?

Under the NCAP, the target is **to achieve norms in 10 years and reduce load to the extent of 35% in first three years** with further reduction of pollution later.

- This meant **for 10 years pollution would remain unaddressed** which is too long period of tolerating violations when **clean air was Right to Life**.
- Further, it is also **not clear what type of pollutants or all pollutants would be reduced**.

- Besides, in 2019, the number of **Non-Attainment Cities (NACs)** has gone up from 102 to 122.

About the National Clean Air Programme:

Launched by the **Union Ministry of Environment, Forests and Climate Change** in 2019.

It was **not notified under the Environment Protection Act or any other Act.**

It is envisaged as a **scheme to provide the States and the Centre with a framework to combat air pollution.**

- It has a **major goal of reducing the concentration of coarse (particulate matter of diameter 10 micrometer or less, or PM10) and fine particles (particulate matter of diameter 2.5 micrometer or less, or PM2.5) in the atmosphere by 20% to 30% by the year 2024, with 2017 as the base year for comparison.**
- Under NCAP, 122 non-attainment cities have been identified across the country based on the Air Quality data from 2014-2018.

Who all will participate?

Apart from experts from the industry and academia, the programme will be a **collaboration between** the Ministry of Road Transport and Highways, Ministry of Petroleum and Natural Gas, Ministry of New and Renewable Energy, Ministry of Heavy Industry, Ministry of Housing and Urban Affairs, Ministry of Agriculture, Ministry of Health, NITI Aayog, and Central Pollution Control Board.

21. Nationally Determined Contributions (NDC) – Transport Initiative for Asia (TIA)

NITI Aayog has launched the India Component of the **Nationally Determined Contributions (NDC)–Transport Initiative for Asia (TIA).**

About NDC- TIA:

It is a **joint programme**, supported by the **International Climate Initiative (IKI)** of the German Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

- It aims **to promote a comprehensive approach to decarbonize transport in India, Vietnam, and China.**
- It is **implemented by a consortium of seven other organisations.**
- On behalf of the Government of India, **NITI Aayog** will be the implementing partner.

Implementation:

The NDC-TIA programme has a **duration of 4 years.**

It will allow India and other partner countries **to achieve accountable long-term targets** by making a sectoral contribution through various interventions, coordinated with a large number of stakeholders in the domain.

- This will contribute towards achieving their **NDCs and increasing their ambition in the transport sector of 2025 NDCs.**

22. RAISE initiative

“Retrofit of Air-conditioning to improve Indoor Air Quality for Safety and Efficiency” (RAISE) national programme has been launched.

- It is a **joint initiative of Energy Efficiency Services Limited (EESL) and the U.S. Agency for International Development’s (USAID) MAITREE Program.**

RAISE initiative can potentially alleviate the issue of bad air quality in workspaces across the nation and pioneer ways to make them healthier and greener.

Market Integration and Transformation Program for Energy Efficiency (MAITREE) program:

It 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.

23.Green – Ag Project

The Union government on July 28, 2020, launched the **Green-Ag Project in Mizoram**, to reduce emissions from agriculture and ensure sustainable agricultural practices.

- **Mizoram is one of the five states where the project will be implemented. Other states include Rajasthan, Madhya Pradesh, Odisha and Uttarakhand.**

About the Project:

The Green-Ag Project is **funded by the Global Environment Facility**, while the **Department of Agriculture, Cooperation, and Farmers' Welfare (DAC&FW)** is the national executing agency. **Other key players involved in its implementation are Food and Agriculture Organization (FAO)** and the Union Ministry of Environment, Forest and Climate Change (MoEF&CC).

- The project seeks **to integrate biodiversity, climate change and sustainable land management objectives and practices into Indian agriculture.**

Pilot project:

The pilot project is **supposed to end on March 31, 2026, in all states.**

It aims to **cover 35 villages and includes two protected areas — the Dampa Tiger Reserve and the Thorangtlang Wildlife Sanctuary.**

Targets:

1. Achieve multiple global environmental benefits in at least 1.8 million hectares (ha) of land in five landscapes, with mixed land use systems.
2. Bring at least 104,070 ha of farms under sustainable land and water management.
3. Ensure 49 million Carbon dioxide equivalent (CO₂eq) sequestered or reduced through sustainable land use and agricultural practices.

24.Nagar van scheme

With biodiversity the theme of **World Environment Day (WED)**, the ministry of environment, forest and climate change (MoEF&CC) has launched '**Nagar Van**' (city forest) scheme.

About Nagar Van scheme:

- The scheme emphasises on urban forestry.
- Under the scheme, around 200 urban forests are to be developed all over the country in the next five years.
- The scheme will also provide an opportunity to the states to manage urban ecosystems.

25.Decarbonizing Transport Project

NITI Aayog and the International Transport Forum (ITF) of OECD jointly launched the '**Decarbonizing Transport in Emerging Economies**' (DTEE) project in India.

About the project:

The ambitious **five-year project** will help India develop a pathway towards a **low-carbon transport system** through the development of modelling tools and policy scenarios.

- The project will design a **tailor-made transport emissions assessment framework for India.**
- The India project is carried out in the wider context of **the International Transport Forum's Decarbonizing Transport initiative.**

Decarbonising Transport in Emerging Economies (DTEE):

- It supports transport decarbonisation across different world regions.
- **Implementation:** The DTEE is collaboration between the International Transport Forum (ITF) and the Wuppertal Institute, supported by the **International Climate Initiative (IKI)** of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

How this will help India?

- The **transport sector of India is the third most greenhouse gas (GHG) emitting sector**, where the **major contribution comes from the road transport sector**.
- Out of the total carbon dioxide emissions in India, **13% come from the transport sector**. These emissions have more than tripled since 1990.
- This project will provide the government with a **detailed understanding of current and future transport activity and the related CO2 emissions as a basis for their decision-making**.

International Transport Forum (ITF):

- It was **created in 2006 by ministers from 43 countries**.
- It is **an intergovernmental organisation within the Organization for Economic Co-operation and Development (OECD)**.
- It acts as a think tank for transport policy and organises **the Annual Summit of transport ministers**.
- ITF is **the only global body that covers all transport modes**.
- The ITF is **administratively integrated with the OECD, yet politically autonomous**.
- It is **headquartered in Paris, France**.

Animal / Wildlife Protection

1. Prevention of Cruelty to Animals Act, 1960

- Seeks to “prevent the infliction of unnecessary pain or suffering on animals”.
- The **Animal Welfare Board of India (AWBI)** was established in 1962 under Section 4 of the Act.
- This Act provides for punishment for causing unnecessary cruelty and suffering to animals. The Act defines animals and different forms of animals.
- It provides the **guidelines relating to experimentation on animals for scientific purposes**.

Prevention of Cruelty to Animals (Care and Maintenance of Case Property Animals) Rules, 2017:

- Framed under the Prevention of Cruelty to Animals Act, 1960.
- The Rules allow a Magistrate to forfeit the cattle of an owner facing trial under the Act.
- The animals are then sent to infirmaries, animal shelters, etc.
- The authorities can further give such animals for “adoption”.

2. Elephant corridors

- On October 14, 2020 the Supreme court upheld the Tamil Nadu government’s authority to notify an ‘elephant corridor’ and protect the migratory path of the animals through **the Nilgiri biosphere reserve**.
- The court had said it was **the State’s duty to protect a “keystone species” such as elephants, immensely important to the environment**.

Location of the corridor:

- The corridor is situated in the ecologically fragile **Sigur plateau**, which connects the Western and the Eastern Ghats and sustains elephant populations and their genetic diversity.
- It has the Nilgiri Hills on its southwestern side and **the Moyar River Valley** on its north-eastern side. The elephants cross the plateau in search of food and water.

What are Elephant Corridors?

Elephant corridors are **narrow strips of land that connect two large habitats of elephants**.

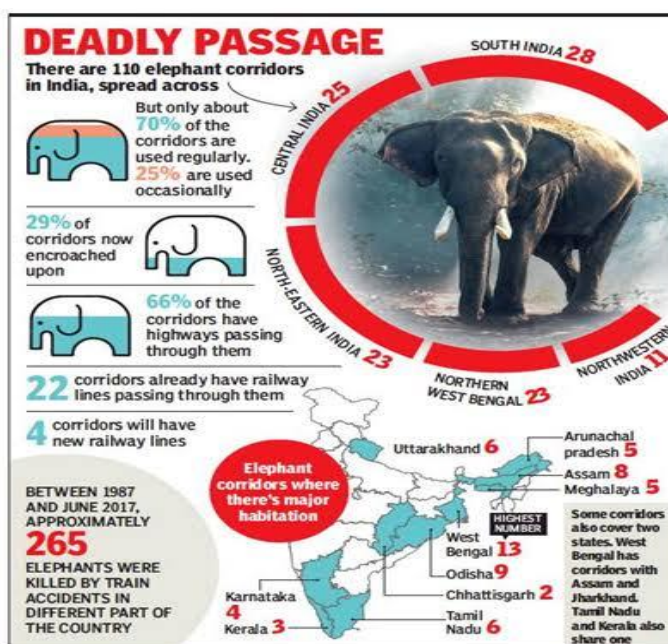
Elephant corridors are crucial to reduce animal fatalities due to accidents and other reasons. So fragmentation of forests makes it all the more important to preserve migratory corridors.

Why protect elephant corridors?

- The movement of elephants is essential to **ensure that their populations are genetically viable**. It also helps to **regenerate forests** on which other species, including tigers, depend.
- Nearly 40% of elephant reserves are vulnerable. Also, the migration corridors have no specific legal protection.

Efforts at all- India level:

- ‘**Gaj Yatra**’, a nationwide campaign to protect elephants, was launched on the occasion of World Elephant Day in 2017.



- The campaign is planned to cover 12 elephant range states.
- The campaign aims to create awareness about elephant corridors to encourage free movement in their habitat.

Forest Ministry guide to managing human-elephant conflict (Best Practices):

- Retaining elephants in their natural habitats by creating water sources and management of forest fires.
- **Elephant Proof trenches** in Tamil Nadu.
- **Hanging fences and rubble walls** in Karnataka.
- Use of chili smoke in north Bengal and playing the sound of bees or carnivores in Assam.
- **Use of technology:** Individual identification, monitoring of elephants in south Bengal and sending SMS alerts to warn of elephant presence.

Efforts by Private Organizations in this regard:

- **Asian Elephant Alliance**, an umbrella initiative by five NGOs, had come together to secure 96 out of the 101 existing corridors used by elephants across 12 States in India.
- **NGOs Elephant Family, International Fund for Animal Welfare, IUCN Netherlands and World Land Trust** have teamed up with Wildlife Trust of India's (WTI) in the alliance.

3. Eco-bridges

Ramnagar Forest Division in Nainital district, Uttarakhand, recently built its **first eco-bridge for reptiles and smaller mammals**.

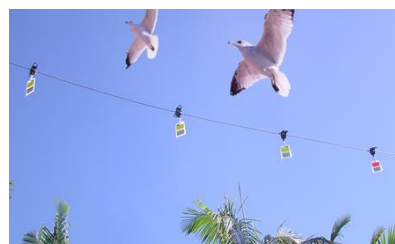


Examples of eco-bridges:

- These include **canopy bridges** (usually for monkeys, squirrels and other arboreal species); **concrete underpasses or overpass tunnels or viaducts** (usually for larger animals); and **amphibian tunnels or culverts**.
- Usually these bridges are overlaid with planting from the area to give it a contiguous look with the landscape.

4. Firefly bird diverters

- The Ministry of Environment Forest and Climate Change (MoEFCC) along with **the Wildlife Conservation Society (WCS) India** has come up with a unique initiative — a **“firefly bird diverter”** for overhead power lines in areas where **Great Indian Bustard (GIB)** populations are found in the wild.
- **Power lines, especially high-voltage transmission lines with multiple overhead wires, are the most important current threat for GIBs in the Thar region**, and are causing unsustainably high mortality in about 15% of their population.
- The Supreme Court of India, had also directed that power lines in GIB landscapes should be placed underground.



What are firefly bird diverters?

The diverters are called fireflies because they look like fireflies from a distance, shining on power lines in the night.

This model has been endorsed by experts from **the International Union for Conservation of Nature (IUCN) Species Survival Commission's (SSC) Bustard Specialist Group**.

- The firefly detectors have been installed in the Pokhran tehsil in Rajasthan.

Great Indian Bustards (GIB):

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

Habitats in India:

- Only two districts in Rajasthan — Jaisalmer and Barmer — have a breeding GIB population in the wild.
- The bird can also be found in very small numbers in Gujarat, Madhya Pradesh, Karnataka, Maharashtra and Andhra Pradesh.

5. Mass standings

More than 100 beached pilot whales saved off Sri Lanka.

Why do whales beach themselves?

Cetacean stranding, more commonly referred to as **beaching**, refers to the phenomenon of dolphins and whales stranding themselves on beaches.

Whale beachings are not uncommon. Scientists say the reason is often unknown but they have a range of theories, including:

- Changes in water temperature.
- Irregularities in whales' echolocation.
- Geomagnetic disturbances.
- Errors made in navigation.
- Hunting too close to shore.
- Sonar interference.
- Inclement weather.

Why mass standings happen?

It is more common for these **cetaceans to live in large groups with intricate social systems**. If one member of the group is sick or in trouble, its distress calls can cause the other members to follow it to the beach, resulting in a mass stranding.

- **Highly social mammals, pilot whales are particularly known for stranding in groups** because they travel in large, close-knit communities which rely on constant communication.

Recent instances:

- In September 2020, several hundred whales died on the coast of Tasmania in Australia in one of the country's biggest stranding on record and one of the largest in the world.
- The largest mass stranding in modern recorded history was 1,000 whales on the shores of the Chatham Islands, a New Zealand territory in the Pacific Ocean in 1918.

About Pilot Whales:

- Pilot whales are so named because it was once believed that each observed group was navigated by a pilot or leader.
- **There are two species of pilot whales: Short finned** pilot whales, which are mainly found in tropical and warm-temperate regions, and **long-finned** pilot whales, which inhabit colder waters.

- Both species are designated as **Data Deficient on the IUCN Red List of Threatened Species.**

Pilot whale

One of the largest members of the dolphin family

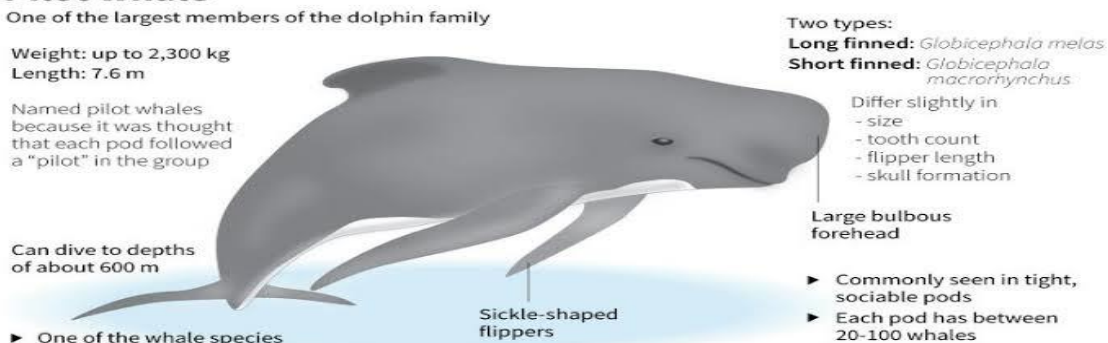
Weight: up to 2,300 kg
Length: 7.6 m

Named pilot whales because it was thought that each pod followed a "pilot" in the group

Can dive to depths of about 600 m

- One of the whale species most often involved in mass strandings

Source: CSM/NOAA Fisheries/IUCN/NZ Department of Conservation



© AFP

6. Project Lion

Six new sites apart from the Kuno-Palpur Wildlife Sanctuary were identified under **Project Lion** that was announced by Prime Minister Narendra Modi on August 15, 2020.

The six new sites include:

- Madhav National Park, Madhya Pradesh.
- Sitamata Wildlife Sanctuary, Rajasthan.
- Mukundra Hills Tiger Reserve, Rajasthan.
- Gandhi Sagar Wildlife Sanctuary, Madhya Pradesh.
- Kumbhalgarh Wildlife Sanctuary, Rajasthan.
- Jessore-Balaram Ambaji WLS and adjoining landscape, Gujarat.

GROWING NUMBERS

Year	Adult		Subadult	Cubs	Total
	Male	Female			
1990	99	95	27	63	284
1995	94	100	39	71	304
2001	101	114	57	55	327
2005	89	124	72	74	359
2010	97	162	75	77	411
2015	109	201	73	140	523
2020	159	262	115	138	674

Source: Gujarat state forest and environment department sources

Lion relocation has been talked about since 1995, when the Kuno Wildlife Sanctuary was identified as an alternate site.

What is the need for relocation?

- The **population in Gir has low genetic diversity**, making it vulnerable to threats of extinction from epidemics.
- Lions are found in Gujarat across an area of 30,000 sq km called **the Asiatic Lion Landscape (ALL)**.
- Besides, the 2013 Supreme Court order directed Gujarat to relocate lions to the Kuno-Palpur Wildlife Sanctuary.

About Asiatic Lions:

Listed as '**Endangered**' under the IUCN Red List.

- Its **population is restricted to the state of Gujarat in India (Gir National Park)**.

7. Project Snow Leopard

International Snow Leopard Day was observed on **23 October**.

- The day came into being with the adoption of **the Bishkek Declaration** by 12 countries on the conservation of snow leopards.

HimalSanrakshak:

On this day, Indian government has launched **community volunteer programme** “HimalSanrakshak” to protect snow leopards.

Snow Leopard conservation in India:

- India has been conserving snow leopard and its habitat through the **Project Snow Leopard (PSL)**.
- India is also party to the **Global Snow Leopard and Ecosystem Protection (GSLEP) Programme since 2013**.
- For conservation, India has identified **three large landscapes, namely**, Hemis-Spiti across Ladakh and Himachal Pradesh; Nanda Devi – Gangotri in Uttarakhand; and Khangchendzonga – Tawang across Sikkim and Arunachal Pradesh.
- **Project Snow Leopard (PSL)** was launched in 2009 to promote an inclusive and participatory approach to conserve snow leopards and their habitat.
- **Snow Leopard** is in the list of 21 critically endangered species for the **recovery programme of the Ministry of Environment Forest & Climate Change**.

8. Panna Tiger Reserve gets UNESCO's 'Biosphere Reserve' Status

Madhya Pradesh's Panna National Park has been declared a **UNESCO Biosphere Reserve**.

- The UNESCO's recognition cited **PTR as a critical tiger habitat**.

Background:

Every year **UNESCO appoints new biosphere reserves and removes others to promote the conservation of biodiversity**, resolve the man-animal conflict at that site and allow sustainable use of natural resources.

UNESCO's Man and the Biosphere Programme (MAB):

- The idea of the **biosphere reserve** was initiated by **UNESCO in 1974 under the MAB** with the objective of obtaining international cooperation for the conservation of the biospheres.
- Launched in **1971, UNESCO's Man and the Biosphere Programme (MAB)** is an **Intergovernmental Scientific Programme** that aims to establish a scientific basis for the improvement of relationships between people and their environments.
- MAB **combines the natural and social sciences, economics and education** to improve human livelihoods and the equitable sharing of benefits, and to safeguard natural and managed ecosystems.
- Under this, **Protection is granted not only to the flora and fauna of the protected region, but also to the human communities who inhabit these regions, and their ways of life**.
- The **first of India's reserves to make it to UNESCO's list was Tamil Nadu's Nilgiri Biosphere Reserve in 2000**.

About Panna Tiger Reserve:

- The Panna tiger reserve is **situated in the Vindhya mountain range in the northern part of Madhya Pradesh**.
- **Ken river** (a tributary of the Yamuna River) flows through the reserve.
- The region is also famous for **Panna diamond mining**.
- **Ken-Betwa river interlinking project** will be located within the tiger reserve.

9. Pilibhit tiger reserve gets the first TX2 award

Pilibhit Tiger Reserve (PTR) in Uttar Pradesh has bagged the **first international award, TX2**, among the 13 tiger ranging countries **for having doubled the number of tigers in less than the stipulated time**.

- In 2014, All India Tiger Estimation had estimated 25 tigers in Pilibhit and 2018 estimation showed an increase by projecting 65 tigers.

Conservation Excellence Award for 2020:

Transboundary Manas Conservation Area straddling the India-Bhutan border has received **the TX2 Conservation Excellence Award for 2020.**

- **Transboundary Manas Conservation Area or TraMCA** comprising the 500 sq. km. Manas National Park in Assam and the 1,057-sq. km. Royal Manas National Park in Bhutan.

What is TX2?

It is **the global award which was set up in 2010 in St. Petersburg, Russia** by international organizations working for tiger conservation like WWF, UNDP, IUCN, Global Tiger Fund (GTF), CATS and The Lion's Share.

Conservation efforts in India:

- The **National Tiger Conservation Authority (NTCA)** has launched **the M-STripes** (Monitoring System for Tigers – Intensive Protection and Ecological Status), a mobile monitoring system for forest guards.
- At the **Petersburg Tiger Summit in 2010**, leaders of 13 tiger range countries resolved to do more for the tiger and embarked on efforts to double its number in the wild, with a popular slogan '**T X 2**'.
- The **Global Tiger Initiative (GTI)** program of the World Bank, using its presence and convening ability, brought global partners together to strengthen the tiger agenda.
- Over the years, the initiative has institutionalised itself as a separate entity in the form of **the Global Tiger Initiative Council (GTIC), with its two arms –the Global Tiger Forum and the Global Snow Leopard Ecosystem Protection Program.**
- **The Project Tiger**, launched way back in 1973, has grown to more than 50 reserves amounting to almost 2.2% of the country's geographical area.

The GTI's founding partners included the **World Bank**, the Global Environment Facility (GEF), the Smithsonian Institution, Save the Tiger Fund, and International Tiger Coalition (representing more than 40 non-government organizations). The **initiative is led by the 13 tiger range countries (TRCs).**

Two legal instruments that have enabled tiger recoveries in India are:

1. The Wildlife Protection Act of 1972.
2. The Forest (Conservation) Act of 1980, which reinforced Project Tiger.

International cooperation to protect tiger:

Global Tiger forum is the only intergovernmental international body established with members from willing countries to embark on a global campaign to protect the tiger.

- It is focused on saving the remaining **five subspecies of tigers** distributed over **13 tiger range countries of the world.**

In India:

- **National Tiger conservation authority (NTCA)** is a **statutory body** under the Ministry of Environment, Forest and climate change.
- It was **established in 2005** following the recommendations of **the Tiger task force.**
- It was constituted under enabling provisions of **the wildlife (protection) act 1972**, as amended in 2006.

10. India's Tiger Census sets a New Guinness Record

The **fourth cycle of the All India Tiger Estimation 2018**, has **entered the Guinness World Record for being the world's largest camera trap wildlife survey.**

- **Camera traps** were placed in 26,838 locations across 141 different sites and surveyed an effective area of 121,337 square kilometres.

Tigers in India:

The country now has an estimated **2967 tigers as per the latest census**.

With this number, **India is home to nearly 75% of the global tiger population**.

It has already fulfilled its **resolve of doubling tiger numbers, made at St. Petersburg in 2010**, much before the target year of 2022.

4th cycle of all India Tiger Estimation- highlights:

1. Highest number of tigers have found in Madhya Pradesh (526), after that Karnataka has 524 and Uttarakhand is accommodating 442 tigers.
2. In five years, the number of protected areas increased from 692 to over 860, community reserves from 43 to over 100.
3. While the 2014 census pegged the total number of striped big cats in the country at 2,226, the 2010 census put the figure at 1,706 and the 2006 version at 1,411, indicating that tiger numbers have been on the up.
4. While Pench Tiger Reserve in Madhya Pradesh recorded the highest number of tigers, Sathyamangalam Tiger Reserve in Tamil Nadu registered the "maximum improvement" since 2014.
5. Chhattisgarh and Mizoram saw a decline in their tiger numbers while tiger numbers in Odisha remained constant. All other states witnessed a positive trend.

All India Tiger estimation:

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**.

India's five tiger landscapes are: Shivalik Hills and Gangetic Plains, Central Indian Landscape and Eastern Ghats, Western Ghats, North-East Hills and Brahmaputra Plains, and the Sundarbans.

11. Pangolin

- Pangolin is the **only scaly mammal on the planet**.
- According to CITES, it is also the **most illegally traded vertebrate within its class (Mammalia)**.
- Of the eight species of pangolin worldwide, two are found in India. They are **Chinese pangolin, mostly found in northeast India and Indian pangolin**.
- Chinese pangolin has been listed as "critically endangered".
- Indian pangolin (*Manis crassicaudata*) has been listed as "endangered".
- It is also a **Schedule I category** protected animal, under the Wildlife Protection Act (1972).

		2013 Assessment	2019 Assessment
Asian	Chinese pangolin	Critically Endangered (A2d+3d+4d)	Critically Endangered (A2d+3d+4d)
	Sunda pangolin	Critically Endangered (A2d+3d+4d)	Critically Endangered (A2d+3d+4d)
	Philippine pangolin	Endangered (A2d+3d+4d)	Critically Endangered (A3d+4d)
	Indian pangolin	Endangered (A3d+4d)	(Endangered A3d+4d)
African	White-bellied pangolin	Vulnerable (A4d)	Endangered (A2c+4cd)
	Giant pangolin	Vulnerable (A4d)	Endangered (A2cd+4cd)
	Temminck's pangolin	Vulnerable (A4d)	Vulnerable (A4d)
	Black-bellied pangolin	Vulnerable (A4d)	Vulnerable (A4d)

12. Indian star tortoise

- Found across the Indian sub-continent, more specifically, in the Central and Southern parts of India, in West Pakistan and in Sri Lanka.
- Protected under Schedule IV of Wild Life Protection Act 1972.



- Convention on International Trade in Species (CITES): Appendix I
- IUCN Status: Vulnerable.

13. Indian peacock soft-shell turtle

It is a riverine turtle **endemic to India, Nepal, and Bangladesh**. They are generally **omnivorous** (predominantly carnivorous) and nocturnal.

Conservation Status:

1. Vulnerable on IUCN Redlist.
2. The species is also listed under Appendix I of CITES.
3. Protected under the Schedule I of the Indian Wildlife (Protection) Act.

Belongs to the family **Trionychidae**.



14. Travancore Tortoise

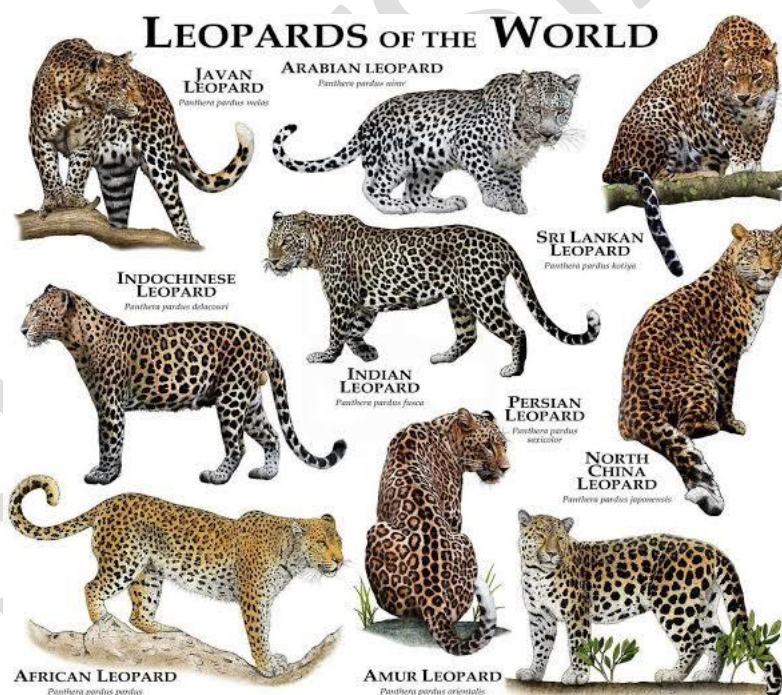
It is a large forest tortoise growing up to 330 millimetres in length.

- **Status:** IUCN Red list - **vulnerable**; Indian Wildlife (Protection) Act: Schedule IV.
- **Distribution:** restricted to the Western Ghats, in the Indian states of Kerala, Karnataka and Tamil Nadu.



15. Leopard

- **Scientific Name-** *Panthera pardus*.
- Listed in **Schedule I** of the Indian Wildlife (Protection) Act, 1972.
- Included in **Appendix I** of **CITES**.
- Listed as **vulnerable** on the **IUCN Red List**.
- **Nine subspecies** of the leopard have been recognized, and they are distributed across Africa and Asia.
- The last formal census on India's leopards was conducted in 2014 which estimated the cat's population at between 12,000 and 14,000.



16. Dhole (Asiatic wild dog)

Karnataka, Maharashtra and Madhya Pradesh rank high in the conservation of the endangered dhole in India, according to a new study.

Key facts:

- Dhole is an apex social carnivore in the tropical forests of South and South East Asia.
- **Endangered** –IUCN.
- CITES – **Appendix II**.
- **Schedule II** of wildlife act.



- **Disease and pathogens:** Dholes are susceptible to rabies, canine distemper, canine parvovirus and sarcoptic mange among others which are usually contracted from domestic village dogs that act as reservoirs.

17. Barn Owls (*Tyto alba*)

- The barn owl is **the most widespread landbird species in the world**, occurring in every continent except Antarctica. They are one of the most widespread owls in the Indian Subcontinent.
- These owls are medium-sized with long legs and wings and have a **relatively shorter tail when compared to other similar sized owls**.
- This owl doesn't have the characteristic '**woo-woo-woo**' hoot of owls and utters a screechy 'shreeeeeeeee' to protect its territory.
- **IUCN status-** Least Concern.



Why in News?

The Lakshadweep Administration had embarked on the 'Pilot project on Biological Control of Rodents (Rats) by Using Barn Owls (*Tyto alba*) in **Kavaratti Island**'.

18. Dolphin number dips in Chambal river

Madhya Pradesh forest department has released the latest Dolphin census report.

Key findings:

- There are just **68 dolphins left** in **435-kilometre-long Chambal river sanctuary** which passes through **three states (Madhya Pradesh, Uttar Pradesh and Rajasthan)**.
- Dolphins' number in Chambal river has been **reduced by 13 per cent in four years**.
- The decreasing **trend is continuing from 2016** when there were 78 dolphins.

Reasons for the decline:

- Illegal sand mining.
- Overuse of river water.
- Changing River course.
- Inland waterways / Movement of large cargo vessels.
- Various anthropogenic / religious activities.
- Accidental killing – by catch/ fisheries related entanglements.

Key facts- Gangetic dolphin:

1. ***Platanista gangetica*** has been declared **endangered by International Union for Conservation of Nature (IUCN)**.
2. It has **rudimentary eyes**. From preying to surfing, dolphins do it through ultrasonic sound.
3. It is **India's national aquatic animal** and is popularly known as '**Susu**'
4. **They are distributed across seven states in India:** Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.

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***

Length: **1.67m**

Males grow up to **2.12m** | Females grow up to **2.67m**

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, Son, 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

Grim Future

Dwindling number due to killing, habitat fragmentation

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**

19. Indian Bullfrog

- **Scientific name:** *Hoplobatrachus tigerinus*.
- **IUCN status:** Least Concern category.
- **Habitats:** South and South-East Asia.
- It is **the largest frog found in the Indian Subcontinent**.
- **They often engage in cannibalism** by feeding on smaller individuals of their own kind and on other frogs.
- Its **loud croaking call**, attracts the opposite sex, but also predators.
- It is protected under **Schedule IV of the Wildlife Protection Act of India, 1971**.



20. New guidelines for import of exotic species

Union Government has issued advisory to streamline the process for import and possession of exotic live species in India.

What are exotic live species?

Exotic live species are **animal or plant species moved from their original range to a new one** most often by people.

Some of the most sought-after exotic species in India are Ball python, Scarlet Macaw, sea turtles, sugar glider (*Petaurus breviceps*), marmoset and grey African parrots.

What it includes? What it does not?

According to the advisory, the phrase “exotic live species” includes “animals named under the **Appendices I, II and III of the Convention of International Trade in Endangered Species of Wild Fauna and Flora**” and “**does not include species from the Schedules of the Wildlife (Protection) Act 1972**”.

21. Census of Asiatic Lion

Census of Asiatic lion was conducted by the Gujarat government and the details have been released.

About the lion census:

The census is **conducted once every five years**.

The **first Lion Census was conducted by the Nawab of Junagadh in 1936**; since 1965, the Forest Department has been regularly conducting the Lion Census every five years.

The **6th, 8th and 11th Censuses were each delayed by a year**, for various reasons.

Key figures this year:

- **28% rise in population of Lions:** Total estimated Lions in Gir region is 674. It was 523 in 2015.
- **36% Expanse in distribution:** Today, Asiatic lions are present in Protected Areas and agro-pastoral landscapes of **Saurashtra** covering nine districts, over an expanse of about 30,000 sq. km. It was 22,000 sq. km in 2015.

GROWING NUMBERS

Year	Adult		Subadult	Cubs	Total
	Male	Female			
1990	99	95	27	63	284
1995	94	100	39	71	304
2001	101	114	57	55	327
2005	89	124	72	74	359
2010	97	162	75	77	411
2015	109	201	73	140	523
2020	159	262	115	138	674

Source: Gujarat state forest and environment department sources

Factors responsible for steady rise in population:

1. community participation
2. emphasis on technology
3. wildlife healthcare
4. proper habitat management
5. steps to minimise human-lion conflict

How was the census carried out? How is it different from previous census?

Reduced participation: Every year, the state Forest Department invites **NGOs, experts and wildlife enthusiasts to join the Census** for transparency and augmenting manpower. But this time, the count was estimated not from a Census, but from a population “observation” exercise called **Poonam Avlokan**.

How it was carried out?

- Poonam Avlokan (developed in 2014) is a **monthly in-house exercise** carried out every full moon.
- Field staff and officers spend 24 hours assessing the number of lions and their locations in their respective jurisdictions.
- These staff kept moving in their respective territories and made their estimates based on inputs provided by lion trackers and on chance sightings.

What is Block counting method?

India uses this method to estimate the numbers.

In this method, **census enumerators remain stationed at water points in a given block and estimate abundance of lions in that block**, based on direct sighting of lions who need to drink water at least once in 24 hours during the summer.

There are inherent issues with this method.

Why we need to relocate the lions to other regions?

Presently, Asiatic lions are confined only to Gujarat. A single epidemic could wipe the entire population and the species might become extinct. Hence, introduction of species to new areas and states might be a good idea.

Additional information:

Asiatic Lion Conservation Project: Announced by the centre and Gujarat state government. 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.

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.

Supreme Court order: The SC in April 2013 had ordered the translocation of some lions from Gujarat to Madhya Pradesh.

About Asiatic Lions: Listed as ‘**Endangered**’ under the IUCN Red List.

Its **population is restricted to the state of Gujarat in India.**

Wildlife under constitution: In 1976, the **42nd amendment** incorporated **protection of wildlife and forests in the Directive Principles**. It also included **forests and protection of wild animals in the Concurrent List – Seventh Schedule (Article 246) of the Constitution.**

22. Gaur back in Valmiki Reserve

Gaur (Bos Gaurus) also called the **Indian bison**, have not only returned to **Bihar's Valmiki Tiger Reserve (VTR)**, but are also breeding there due to an increase in grassland cover. They have been attracted to VTR due to the increase in grassland cover.

The **first population estimation exercise of Indian gaur carried out in the Nilgiris forest division** in February has revealed that **more than an estimated 2,000 Indian gaurs inhabit the 300 sq. km range.**



Key facts:

1. Gaur is **the largest extant bovine in the world.**
2. Gaur are **grassland specialists** and their main food is grass.
3. Native to south and southeast Asia.
4. The species is listed as **'vulnerable' on the International Union for Conservation of Nature's Red List of Threatened Species since 1986.**
5. **Distribution:** In India, the population was estimated to be 12,000–22,000 in the mid-1990s. 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.

About Valmiki Tiger Reserve (VTR):

VTR was set up in the early 1990s. It is spread over 899 square kilometres in Bihar's West Champaran district, bordering Nepal's Chitwan National Park to its north and Uttar Pradesh to its west.

23. Golden Langurs

Primatologists have observed that **the Gee's golden langur induce stillbirth of babies** killed inside the womb of females, besides practising infanticide.

Forced abortion and infanticide happen when a new male takes over. He often kills the baby of a lactating female or hits the abdomen of a female impregnated by the deposed male till the point of abortion.

Other Concerns:

Obstructions such as wires, and gaps in the forest due to felling, have increased the threat of inbreeding among golden langurs.

Facts:

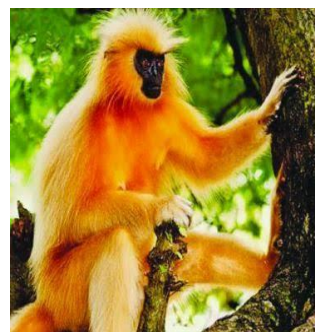
- **Habitat:** semi evergreen and mixed deciduous forests.
- Found in Small regions of **western Assam** and in the neighbouring foothills of **the black mountains of Bhutan.**

Protection status:

- **Schedule I species in the Wildlife Protection Act (1972).**
- **CITES Appendix I.**
- **Endangered** in IUCN Red List.

Population:

In 2019, Bhutan recorded a drop of 62% in the population of golden langurs over the 2009 census. The recorded estimation in Assam in 2009 was 5,140.



24. Minks

Denmark has recorded over 200 human cases infected with SARS-CoV-2 variants that are associated with farmed minks.

- Mink are dark-coloured carnivorous mammals from the **Mustelidae family**, which also includes weasels, otters and ferrets.
- Mink oil is used in some medical products and cosmetics, as well as to treat, preserve and waterproof leather.
- There are **two extant species referred to as "mink": the American mink and the European mink.**
- The **European mink is listed by the IUCN as Critically Endangered** due to an ongoing reduction in numbers.



25. Skinks

"Skinks of India" is a recent publication by the Zoological Survey of India (ZSI).

Key findings:

- India is home to 62 species of skinks and about 57% of all the skinks found in India (33 species) are endemic.
- They are found in all kinds of habitats in the country, from the Himalayas to the coasts and from dense forests to the deserts.
- With 1,602 species of skinks across the world, making it the largest family of lizards, their occurrence in India is less than 4 % of the global diversity.



What are Skinks?

With long bodies, relatively small or no legs, no pronounced neck and glossy scales, skinks are common reptiles.

26. Himalayan brown bears

Why in News?

A recent study on the Himalayan brown bear has predicted a **significant reduction in suitable habitat and biological corridors** of the species due to climate change, prompting scientists to suggest an adaptive spatial planning of the protected area network in the western Himalayas for conserving the species.

- Also known as **Himalayan red bear, isabelline bear or Dzu-Teh.**
- It is the **largest carnivore in the highlands of Himalayas.**
- It is found in 23 protected areas including **Himachal Pradesh, Uttarakhand and Jammu and Kashmir.**



IUCN Status:

While the brown bear as a species is classified as **Least Concern** by the IUCN, this subspecies is highly endangered and populations are dwindling. **It is Endangered in the Himalayas and Critically Endangered in Hindu Kush.**

27. Kharai Camel

- Also known as Swimming Camels.
- Found only in Gujarat's Bhuj area.
- It has been recognized as a separate breed (one among nine such breeds found in India) of camel for better conservation.
- This camel is adapted to the extreme climate of Ran of Kachh where shallow seas and high salinity is prevalent.



- It can live in both coastal and dry ecosystems. It grazes on saline / mangrove trees and is tolerant to high saline water.
- It can swim up to three kilometers into the sea in search of mangroves, their primary food.

28. National Board for Wildlife

It is a "Statutory Organization" 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.
- Primary function of the Board is to promote the conservation and development of wildlife and forests.
- It has power to review all wildlife-related matters and approve projects in and around national parks and sanctuaries.
- No alternation 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.**

Environment Protection

1. Why forest fires are common in Himachal Pradesh?

- **Himachal Pradesh frequently witnesses forest fires** during dry weather conditions.
- A forest fire which started **near Kullu** **raged for several days** before being brought under control. Forest fires were also reported in **Shimla and other parts of the state**.

What is the forest cover of Himachal Pradesh?

Although **two-thirds of the total geographical area of Himachal Pradesh is legally classified as forest area**, much of this area is permanently under snow, glaciers, cold desert or alpine meadows and is above the tree line.

- As per the Forest Survey of India, the **effective forest cover is around 28 percent of the total area**.
- **Chir Pine, Deodar, Oak, Kail, Fir and Spruce** are some of the common trees found here.

How fire prone are these forests?

Except for periods of precipitation in monsoon and winter, the forests remain vulnerable to wildfires.

- **In the summer season**, forest fires occur frequently in the low and middle hills of the state, where forests of Chir Pine are common.
- **During the post-monsoon season and in winters**, forest fires are also reported in higher areas, including parts of Shimla, Kullu, Chamba, Kangra and Mandi districts, where they usually occur in grasslands.

Causes of the fire

Natural causes such as lightning or rubbing of dry bamboos with each other can sometimes result in fires, but forest officials maintain that **almost all forest fires can be attributed to human factors**.

- When people **burn their fields to clear them of stubble**, dry grass or undergrowth, the fire sometimes spreads to the adjoining forest.
- A spark can also be produced when dry pine needles or leaves fall on **an electric pole**.

What is done to prevent and control forest fires?

To prevent and control forest fires the following can be done:

- Forecasting fire-prone days using meteorological data,
- Clearing camping sites of dried biomass,
- Early burning of dry litter on the forest floor,
- Growing strips of fire-hardy plant species within the forest, and
- Creating fire lines in the forests (fire lines are strips in the forest kept clear of vegetation to prevent the fire from spreading).

2. Tso Kar Wetland Complex

India now has forty-two Ramsar sites with the addition of Ladakh's Tso Kar wetland.

About Tso Kar:

- Tso Kar Basin is a high-altitude wetland complex, consisting of two principal waterbodies, Startsapuk Tso, a freshwater lake and Tso Kar itself, a hyper saline lake, situated in **the Changthang region of Ladakh, India**.
- It is called Tso Kar, meaning white lake, because of the **white salt efflorescence** found on the margins due to the evaporation of highly saline water.



- It is also an **Important Bird Area (IBA)** as per **BirdLife International** and a key staging site in the **Central Asian Flyway**.

Important bird species found in the area:

Black-necked Crane (*Grus nigricollis*), Great Crested Grebe (*Podiceps cristatus*), Bar-headed Geese (*Anser indicus*), Ruddy Shelduck (*Tadorna ferruginea*), Brown-headed Gull (*Larus brunneicapillus*), Lesser Sand-Plover (*Charadrius mongolus*) and many other species.

About Ramsar convention:

- It is an international treaty for the conservation and wise use of wetlands.
- It is named after the Iranian city of Ramsar, on the Caspian Sea, where the treaty was signed on 2 February 1971.
- Known officially as 'the Convention on Wetlands of International Importance especially as Waterfowl Habitat' (or, more recently, just 'the Convention on Wetlands'), it came into force in 1975.

Montreux Record:

- Montreux Record under the Convention is a **register of wetland sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference**.
- It is maintained as part of the Ramsar List.
- The Montreux Record was established by Recommendation of the Conference of the Contracting Parties (1990).
- Sites may be added to and removed from the Record only with the approval of the Contracting Parties in which they lie.
- **Currently, two wetlands of India are in Montreux record:** Keoladeo National Park (Rajasthan) and Loktak Lake (Manipur).
- **Chilka lake** (Odisha) was placed in the record but was later removed from it.

In India, Wetlands are regulated under the Wetlands (Conservation and Management) Rules, 2017. The 2010 version of the Rules provided for a Central Wetland Regulatory Authority; the 2017 Rules replace it with state-level bodies and created a National Wetland Committee, which functions in an advisory role. The newer regulations removed some items from the definition of "wetlands" including backwaters, lagoon, creeks, and estuaries.

3. Bio-decomposer technique

Chief Minister Arvind Kejriwal has said that **the bio-decomposer technique of converting stubble into manure has shown success**.

- This claim was based on the initial results from a farm where **the bio-decomposing solution, developed under the guidance of the PUSA Institute**, was being tried out by the Delhi government.

How were these bio-decomposers formed?

Pusa Decomposer is a mix of seven fungi that produce enzymes to **digest cellulose, lignin and pectin in paddy straw**.

- The fungi thrive at 30-32 degree Celsius, which is the temperature prevailing when paddy is harvested and wheat is sown.

How these decomposers are used on fields?

- A liquid formulation is formed using decomposer capsules and fermenting it over 8-10 days and then spraying the mixture on fields with crop stubble to ensure speedy bio-decomposition of the stubble.

- The farmers can prepare 25 litre of liquid mixture with 4 capsules, jaggery and chickpea flour. The mixture is sufficient to cover 1 hectare of land.
- It takes around 20 days for the degradation process to be completed.

Benefits of PUSA decomposers:

- **Improves the fertility and productivity of the soil** as the stubble works as manure and compost for the crops and lesser fertiliser consumption is required in the future.
- It is an efficient and effective, cheaper, doable and practical technique to stop stubble burning.
- It is an eco-friendly and environmentally useful technology.

HOW CAN SOILS STORE MORE CARBON?

The more soil is covered, the richer it will be in organic material and therefore in carbon. Until now, the combat against global warming has largely focused on the protection and restoration of forests. In addition to forests, we must encourage more plant cover in all its forms.



Never leave soil bare and work it less, for example by using no-till methods



Introduce more intermediate crops, more row intercropping and more grass strips



Add to the hedges at field boundaries and develop agroforestry



Optimize pasture management with adapted grazing periods and rotations



Restore land in poor condition e.g. the world's arid and semi-arid regions



Improve water and fertilizers management and use organic fertilizers and compost

4. Deemed forests

Karnataka government is planning to **declassify 6.64 lakh hectares of the 9.94 lakh hectares of deemed forests in the state (nearly 67%) and hand it over to Revenue authorities.**

What are deemed forests?

An expert committee constituted by the Karnataka government after the Supreme Court order (in **T N Godavarman Thirumalpad (1996) Case**) identified '**deemed forests**' as "**land having the characteristic of forests irrespective of the ownership**". This includes:

- Thickly wooded areas of the Revenue Department not handed over to the Forest Department.
- Thickly wooded areas recommended to be handed over to the Forest Department.
- Thickly wooded land distributed to grantees but not cultivated.
- Thickly wooded plantations of the Forest Department.

But, What are Forests?

The Supreme Court in **the case of T N Godavarman Thirumalpad (1996)** accepted a wide **definition of forests under the Act.**

It said, the word 'forest' **must be understood according to its dictionary meaning.**

- It covers all statutorily recognised forests, whether designated as reserved, protected or otherwise for the purpose of **Section 2 (1) of the Forest Conservation Act.**

- It also includes **any areas recorded as forest in the government record irrespective of the ownership.**

After this announcement, what now for Karnataka?

Preservation of forest areas in India under **the Forest Conservation Act, 1980** has been continuously monitored by the Supreme Court since the Godavarman case judgment in 1996.

- Karnataka state government must now obtain clearances from the Supreme Court** for affecting changes to land classified as deemed forests since the verdict.

5. Zombie fires

'Zombie fires' becoming more frequent in Arctic in addition to fires occurring in the once-frozen tundra.

What are they?

A zombie fire is a fire that continues to burn underground and then reignites on the surface after a period of time.

What's the concern now?

Fires in the Arctic are spreading to areas which were formerly fire-resistant. The tundra — north of the Arctic Circle — is drying up and vegetation there like moss, grass, dwarf shrubs, etc are starting to catch fire.

- The fires and record temperatures have the potential of turning the carbon sink into a carbon source and increasing global warming.



6. 40% of the Amazon Rainforest Is at Tipping Point To Becoming Savanna

Many researchers predict that deforestation is propelling the Amazon towards a tipping point, beyond which it will gradually **transform into a semi-arid savanna.**

- If the deforestation of the rainforest continues past a threshold of 20-25 per cent total deforestation, **multiple positive feedback loops will spark the desertification of the Amazon Basin.**

Why Amazon is significant?

Amazon rainforest covers approximately eight million square kilometres — an area larger than Australia.

- It helps **balance the global carbon budget** by absorbing carbon dioxide from the atmosphere, and plays a key role in the **global water cycle, stabilizing global climate and rainfall.**

Spread of Amazon:

- These are large **tropical rainforest** occupying the drainage basin of the Amazon River and its tributaries in northern South America and covering an area of 6,000,000 square km.



- Comprising about 40% of Brazil's total area, it is bounded by the Guiana Highlands to the north, the Andes Mountains to the west, the Brazilian central plateau to the south, and the Atlantic Ocean to the east.
- **The basin is shared by eight countries** (Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana and Suriname), as well as the overseas territory of French Guiana.

7. Climate change feedback

- **Climate change feedback** is important in the **understanding of global warming** because feedback processes may **amplify or diminish the effect of each climate** forcing, and so play an important part in **determining the climate sensitivity and future climate state**.
- Feedback in general is the process in which changing one quantity changes a second quantity, and the change in the second quantity in turn changes the first.
- Positive (or reinforcing) feedback amplifies the change in the first quantity while negative (or balancing) feedback reduces it.
- The main positive feedback in global warming is the tendency of warming to increase the amount of water vapor in the atmosphere, which in turn leads to further warming.
- Large positive feedbacks can lead to effects that are abrupt or irreversible, depending upon the rate and magnitude of the climate change.

8. Ecosystem services

According to a study by **the Energy and Resources Institute (TERI)**, the annual economic value of ecosystem services provided by the Delhi zoo works out to be ₹426 crore.

- The study was commissioned by **the Central Zoo Authority**.

Key findings:

- These 'ecosystem services' constitute heads such as biodiversity conservation, employment generation, education and research, carbon sequestration and recreational and cultural contributions.

What are Ecosystem Services?

- They are "the benefits people derive from ecosystems".
- Besides **provisioning services** or goods like food, wood and other raw materials, plants, animals, fungi and micro-organisms provide essential **regulating services** such as pollination of crops, prevention of soil erosion and water purification, and a vast array of **cultural services**, like recreation and a sense of place.

These services can further be classified into:

- Provisioning services.
- Regulating services.
- Support services.
- Cultural services.

Provisioning services

- food (including seafood and game), crops, wild foods, and spices
- raw materials (including lumber, skins, fuel wood, organic matter, fodder, and fertilizer)
- genetic resources (including crop improvement genes, and health care)
- water purity
- biogenic minerals
- medicinal resources (including pharmaceuticals, chemical models, and test and assay organisms)
- energy (hydropower, biomass fuels)

- ornamental resources (including fashion, handicraft, jewelry, pets, worship, decoration and souvenirs like furs, feathers, ivory, orchids, butterflies, aquarium fish, shells, etc.)

Regulating services

- Carbon sequestration and climate regulation
- Predation regulates prey populations
- Waste decomposition and detoxification
- Purification of water and air
- pest and disease control
- Flood protection

Supporting services

- These include services such as nutrient cycling, primary production, soil formation, habitat provision and pollination.

Cultural services

- cultural (including use of nature as motif in books, film, painting, folklore, national symbols, advertising, etc.)
- spiritual and historical (including use of nature for religious or heritage value or natural)
- recreational experiences (including ecotourism, outdoor sports, and recreation)
- science and education (including use of natural systems for school excursions, and scientific discovery)
- Therapeutic (including Ecotherapy, social forestry and animal assisted therapy)

9. Reserve Forest

- Maharashtra has announced the **reservation of 600 acres of Aarey land near Sanjay Gandhi National Park (SGNP) as forest**, claiming it as the first instance of an extensive forest blossoming within the limits of metropolis anywhere in the world.

What is a reserve forest? How is it different from protected forests?

- A reserve forest denotes **forests accorded a certain degree of protection**. The term was first introduced in **the Indian Forest Act, 1927** in British India, to refer to certain forests granted protection under the British crown in British India, but not associated suzerainty.
- Unlike national parks or wildlife sanctuaries of India, **reserved forests are declared by the respective state governments**.
- At present, **reserved forests and protected forests differ in one important way**: Rights to all activities like hunting, grazing, etc. in reserved forests are banned unless specific orders are issued otherwise.
- In protected areas, rights to activities like hunting and grazing are sometimes given to communities living on the fringes of the forest, who sustain their livelihood partially or wholly from forest resources or products.

The Indian Forests Act 1927 defines the procedure to be followed for declaring an area to be a reserved forest, a protected forest or a village forest.

10. National Parks

The **Assam government** has approved the addition of 30.53 sq. km (3,053 hectares) to the 884 sq. km **Kaziranga National Park**.

Implications and significance of the move:

- The latest additions would help provide connectivity to **Orang and Nameri National Parks** across **river Brahmaputra**, besides the hills of **Karbi Anglong** to the south of the park, where the rhino, tiger, deer and other animals take refuge during the floods.

What are National Parks?

- According to the Indian Ministry of Environment & Forests**, a national park is "[a]n area, whether within a sanctuary or not, [that] can be notified by the state government to be constituted as a National Park, by reason of its ecological, faunal, floral, geomorphological, or zoological association or importance, needed to for the purpose of protecting & propagating or developing wildlife therein or its environment.
- National parks in India are IUCN category II protected areas.
- A national park has more restrictions as compared to a wildlife sanctuary.**
- Their boundaries are fixed and defined.
- The main objective of a national park is to protect the natural environment of the area and biodiversity conservation.
- India's first national park was established in 1936 as Hailey National Park, now known as Jim Corbett National Park, Uttarakhand.

What is allowed and what is not allowed inside National Parks:

- Here, **no human activity is allowed.**
- Grazing of livestock and private tenurial rights are not permitted here.
- Species mentioned in the Schedules of the Wildlife Act are not allowed to be hunted or captured.
- No person shall destroy, remove, or exploit any wildlife from a National Park or destroy or damage the habitat of any wild animal or deprive any wild animal of its habitat within a national park.
- They **cannot be downgraded to the status of a 'sanctuary'**.

Table 4.52 : Comparison of National Park, Wildlife Sanctuary and Biosphere Reserve

National Park	Wildlife Sanctuary	Biosphere Reserve
1. Attention is not given to biotic community as a whole. Rather conservation is connected to habitats for particular wild animal species such as lion, tiger, rhinoceros etc.	Attention is not given to biotic community as a whole. Conservation rather is species oriented such as citrus, pitcher plant, Great Indian bustard etc.	Attention is focussed on biotic community as a whole. Thus, conservation is ecosystem oriented.
2. The approach is not based on scientific principles.	The approach is not based on scientific principles.	The approach is based on sound scientific principles.
3. The size ranges from 0.04 to 3,162 sq. kms.	The size ranges from 0.61 to 7,818 sq. kms.	Size well over 5,670 sq. kms.
4. Boundaries circumscribed by state legislation.	Limits are not sacrosanct.	Boundaries incumscribed by state legislation.
5. No biotic interference permissible except in buffer zone.	Limited biotic interference occur.	No biotic interference permissible except in buffer zone.
6. Tourism is not only permissible, but is often encouraged.	Tourism is permissible.	Normally tourism is not permissible.
7. Research and scientific management are lacking.	Research and scientific management are lacking.	Research and scientific management are carried out.
8. Due attention is not given to gene pool conservation of economic species, particularly of plants.	Proper attention is not given to gene pool conservation of economic species, particularly of plants.	Due attention is given to conservation of plants as well as animal species.

Declaration of National Parks:

- National parks **can be declared both by the Central Government and State governments**. No alteration of the boundaries of a national park shall be made except on a resolution passed by the State Legislature.

11. 'No-Go' forests cleared for coal mining, says report

As per the **Centre for Science and Environment (CSE)**:

- In 2020, of the 41 blocks put up for auction, 21 feature in the original **No-Go list**.
- Currently India is not utilising its existing capacity fully:** 67% of the mines auctioned since 2015 are were not operational yet.

What are 'No Go' areas in coal mining?

In 2009, the environment and coal ministries had jointly placed the country's forested areas under two categories - Go and No-Go - and imposed a ban on mining in the 'No-Go' zones on environmental grounds.

- 'No Go' areas are those having either more than 10 per cent weighted forest cover (WFC) or more than 30 per cent gross forest cover (GFC).

The exercise is aimed at prioritising forest areas under the Forest Conservation Act, 1980.

12. Papum Reserve Forest

- It is an Important Bird and Biodiversity Areas (IBAs) in Arunachal Pradesh.
- Located between two IBAs, Itanagar Wildlife Sanctuary to the east and Pakke Wildlife Sanctuary to the west.
- The Reserve Forest forms part of the Eastern Himalayas Endemic Bird Area.

Why in News?

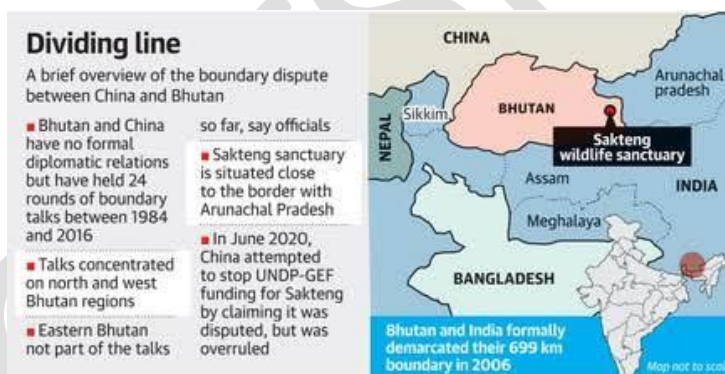
A study based on satellite data has flagged a high rate of deforestation in this area which is also a major hornbill habitat in Arunachal Pradesh.

Papum RF is a nesting habitat of three species of the large, colourful fruit-eating hornbills: Great, Wreathed and Oriental Pied.

13. Sakteng wildlife sanctuary

Sakteng is based in Eastern Bhutan, or Trashigang Dzongkhag (district) that borders Arunachal Pradesh.

- It protects several endemic species including the eastern blue pine and the black-rumped magpie.
- It was created in part to protect the migoi, a yeti-like cryptid whose existence has not been scientifically confirmed, but in which the local population strongly believes.



14. Dehing Patkai wildlife sanctuary

- Dehing Patkai Wildlife Sanctuary has been upgraded to National Park.
- Also known as the Jeypore Rainforest is a part of Dehing Patkai Elephant Reserve.
- It is located in the Dibrugarh and Tinsukia Districts of Assam.
- The Dehing Patkai forms the largest stretch of tropical lowland rainforests in India.
- Dehing is the name of the river that flows through this forest and Patkai is the hill at the foot of which the sanctuary lies.
- Ethnic groups living in the area include the indigenous Assamese communities, particularly Tai Phake, Khamyang, Khampti, Singpho, Nocte, Ahom, Kaibarta, Moran and Motok, Burmese, and non-indigenous Nepali people.

15. Pobitora Wildlife Sanctuary

- Assam's Pobitora Wildlife Sanctuary is also known as 'Mini Kaziranga'.
- It has the highest density of one-horned rhinos in the world and second highest concentration in Assam after Kaziranga National Park.

Why in News?

Too many cattle robbing rhinos of nutrition in 'Mini Kaziranga'.

- This has been confirmed by the death of two rhinos whose alimentary canals had a high load of worms because of nutritional stress caused by dry reeds and other such “junk food” of the wilderness.

16. Coal Gasification and Liquefaction

India aims for 100 million tonnes (MT) coal gasification by 2030.

What is coal gasification?

It is **the process of producing syngas**, a mixture consisting carbon monoxide (CO), hydrogen (H₂), carbon dioxide (CO₂), natural gas (CH₄), and water vapour (H₂O).

- During gasification, coal is blown with oxygen and steam while also being heated under high pressure. During the reaction, oxygen and water molecules oxidize the coal and produce syngas.

Benefits of gasification:

1. Transporting gas is a lot cheaper than transporting coal.
2. Help address local pollution problems.
3. Has greater efficiency than conventional coal.

Concerns and challenges:

Coal gasification is one of the **more water-intensive forms of energy production**.

There are also **concerns about water contamination, land subsidence and disposing of waste water safely**.

What is coal liquefaction?

Also called **Coal to Liquid (CTL) technology**, it is **an alternative route to produce diesel and gasoline** and makes economic sense only in a world of high crude oil prices.

- The **process involves** gasification of coal, which in turn will produce synthetic gas (a mix of CO+H₂). The synthetic gas can be liquefied to its fuel equivalent in presence of cobalt/iron-based catalysts at higher pressure and temperature.
- However, **liquefied coal emits twice as much CO₂ as burning oil. It also emits a large volume of SO₂.**

Benefits of liquefaction:

The CO₂ emissions are more readily and cheaply captured from CTL plants than from conventional coal-fired power stations. The captured CO₂ can be transported and injected into underground storage reservoirs (a procedure known as “carbon capture and storage”—or “geosequestration”).

17. Mansar Lake Project

Mansar Lake Development Plan in Jammu and Kashmir was inaugurated recently.

Mansar Lake is situated 62 km from Jammu.

Surinsar-Mansar Lakes are designated as Ramsar Convention in November 2005.



18. Lonar lake

Maharashtra's Lonar Lake had turned Pink.

What's the reason behind colour change?

- It was due to a **salt-loving bacteria** (red-coloured archaeal strains classified as **halophilic archaea** or **haloarchaea**). It is associated with **high salinity and alkalinity (pH)**.
- **Pink colour of the water was not permanent**- Once the biomass of the microbes settled at the bottom, the water became transparent during one such experiment at the labs.



These findings are based on a report by **Agharkar Research Institute (ARI)** in Pune, an **autonomous body under the Department of Science and Technology**.

Other Factors:

Absence of rain, less human interference and high temperature resulted in the evaporation of water which increased its salinity and pH.

The **increased salinity and pH** facilitated the growth of **halophilic microbes**, mainly **Haloarchae**.

Finding related to flamingos:

During the investigation, researchers also came across an interesting incidental finding related to flamingos that visit the lake.

- **The plumage of the bird is pink or reddish in colour** because of **ingestion of carotenoids-rich food**.
- This bacteria, which produces a pink pigment, is ingested by these birds and they get carotenoid-rich food, because of that their plumage is pink in colour.

Key facts:

- Lonar crater lake was identified as a **unique geographical site** by a **British officer named CJE Alexander in 1823**.
- It is an ancient circular lake **created by a meteorite strike in Maharashtra**.
- Lonar crater became a **geo-heritage site in 1979**.
- It is relatively young geologically, at just 50,000 years old.

Lonar Lake lies within **the only known extra-terrestrial impact crater found within the great Deccan Traps**, a huge basaltic formation in India.

19. Kaziranga National Park

- Located in the State of **Assam**.
- It is the **single largest undisturbed and representative area in the Brahmaputra Valley floodplain**.
- It was declared as a **National Park in 1974**. It has been declared a **tiger reserve since 2007**.
- It was declared a **UNESCO World Heritage Site** in 1985.
- It is recognized as an **Important Bird Area** by **BirdLife International**.
- Much of the focus of conservation efforts in Kaziranga are focused on the 'big four' species—rhino, elephant, Royal Bengal tiger and Asiatic water buffalo.
- Kaziranga is also home to **9 of the 14 species of primates found in the Indian subcontinent**.
- Kaziranga is **crisscrossed by four main rivers** — Brahmaputra, Diphlu, Mora Diphlu and Mora Dhansiri.

20. Melghat tiger reserve

- Located in **the Amaravati district** of Maharashtra.

- It is on the southern offshoot of the Satpura Hill Range in Central India, called **Gavilgarh Hill**.
- The Tapti River and the Gawilgad ridge of the Satpura Range form the boundaries of the reserve.
- It was declared a tiger reserve in 1974. It was **among the first nine tiger reserves notified in 1973-74 under Project Tiger**.
- It was **the first tiger reserve of Maharashtra**.
- The name '**Melghat**' means the confluence of various 'ghats' or valleys as is typical from the landscape of this tiger Reserve.

Other prominent animals are Sloth Bear, Indian Gaur, Sambar deer, Leopard, Nilgais, etc. **The endangered and 'back from extinction' Forest Owlet** is also found in various areas of Melghat.

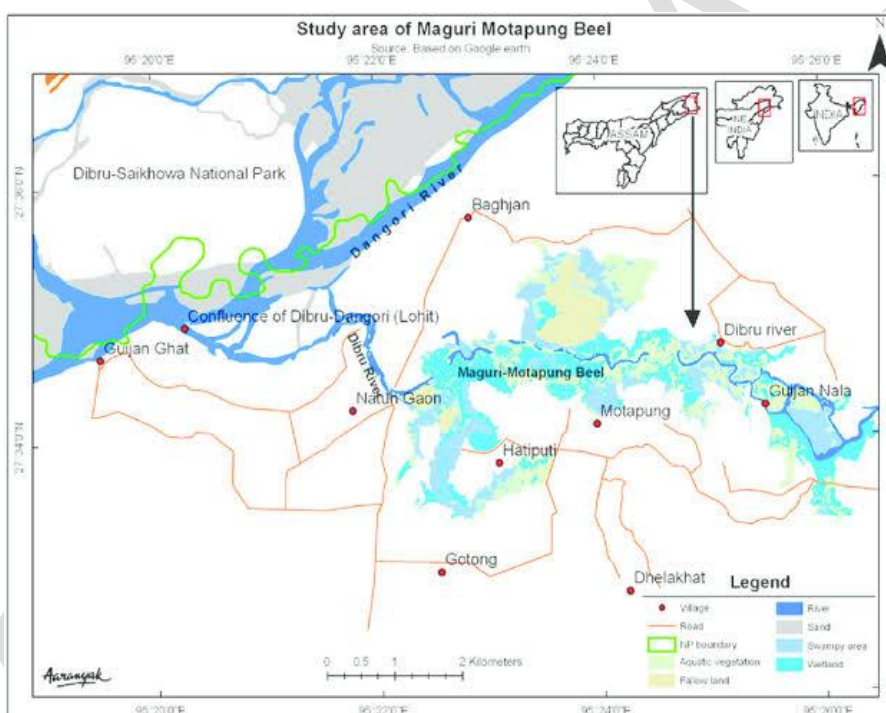
Maguri Motapung Beel is less than 10 km south of the more famous **Dibru-Saikhowa National Park** and part of the **Dibru-Saikhowa Biosphere Reserve**.

- The wetland derives its name from '**Magur**', local word for the catfish *Clarius batrachus*, once found here in abundance.

Motapung is a village nearby, and **Beel** is the **Assamese word for wetland**.

Significance:

- It was declared an **Important Bird and Biodiversity Area (IBA)** in 1996.
- **Important species: Golden Mahaseer, vulnerable species** (like the Swamp Francolin and the Marsh Babbler), **two endangered** (Greater Adjutant and Pallas's Fish-eagle) and **six critically endangered** (like Baer's Pochard, Red-headed Vulture and White-bellied Heron).



Location:

- This reserve **connects the national park in Assam to Namdapha National Park in Arunachal Pradesh**, creating a big wildlife corridor of immense importance in the **Indo-Burma Biodiversity Hotspot**.
- The reserve is located within **the Brahmaputra's floodplains**, and is limited by **the Lohit river** in the north and **the Dibru** in the south.

21. Haiderpur wetland

The forest department in Uttar Pradesh is working along with conservation organisations to eventually make the the Haiderpur wetland in Muzaffarnagar district a Ramsar site.

- Fed by the **Ganga and Solani rivers**, the wetland came into existence in 1984 **after the construction of the Madhya Ganga Barrage on the former**.
- It is located within the boundaries of the **Hastinapur Wildlife Sanctuary**.

- It is an important stopover **destination for winter migratory birds like the Greylag goose and the Bar-headed goose.**
- The Haidepur wetland has been identified under **Namami Gange**, a flagship programme of the Government of India launched in 2014, as a **model wetland along the Ganga.**

22.Nandankanan Zoological Park (NZP)

The zoo has revived its innovative 'Adopt-An-Animal' programme to mobilise resources for animals.

Concerns over the back-to-back deaths of two sloth bears at the park.
IUCN status of Sloth Bear- **Vulnerable.**

- Located in Bhubaneswar, Odisha.
- Adjacent to **Chandaka-Dampara Wildlife Sanctuary.**
- It is **the only zoological park in India to become an institutional member of World Association of Zoos and Aquarium (WAZA).**
- **Host zoo for white tigers.** White tigers born to normal coloured parents in the year 1980.
- **First captive breeding centre for endangered Gharials** in the year 1980.
- **Kanjia Lake** – A wetland of National importance (2006).
- Conservation Breeding Centres for **Indian Pangolin and Long billed vultures.**
- First record of breeding of **Indian Ratels in captivity (in 2012).**
- **Only zoo in India after which an express train (Nandankanan Express)** has been named by Indian Railways.
- One among **the three zoos in India for breeding Long billed vulture.**
- First birth of **Melanistic tiger in captivity in the year 2014.**

23.Keoladeo National Park

- Keoladeo National Park formerly known as the Bharatpur Bird Sanctuary in Bharatpur, Rajasthan, is a famous **avifauna sanctuary that hosts thousands of birds, especially during the winter season.**
- It is also a **UNESCO World Heritage Site.**
- It is a man-made and **man-managed wetland.**
- 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 Siberian Crane, and also serves as a wintering area for other globally threatened species such as the Greater Spotted Eagle and Imperial Eagle.

24.Blue poppy

- **Scientific name:** Meconopsis aculette.
- It is considered **the Queen of Himalayan Flowers.**
- **Found from Kumaon to Kashmir** at elevations of 3,000 to 5,000 meters.



Why in News?

A recent study indicated that it is slowly depleting at lower altitudes and rocky moraines. Not only the Blue Poppy but **several other flowering plants, found at very high altitudes, are facing the "climb higher or die" situation due to climate change.**

25.Arctic Warming

The Arctic is warming far more quickly.

While both the Arctic and Antarctic are experiencing rising temperatures, thinning glaciers, disturbed ecosystems, and other alarming shifts as heat-trapping fossil fuel emissions build up, **changes are sweeping the northern region far faster.**

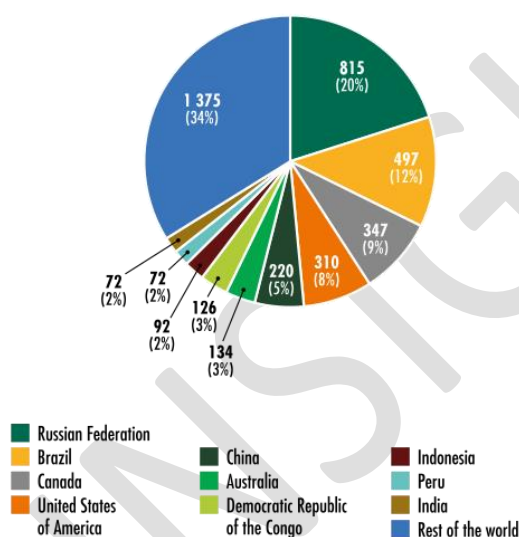
The High North is seeing unprecedented changes, including drastic ice losses on land and sea, galloping permafrost thaw, raging wildfires, unseasonal storms, earlier springs, and more.

The accelerated Arctic warming impacts weather down in the lower 48 and around the entire Northern Hemisphere by **changing the temperature contrast between mid and high latitudes.**

Arctic warming also stands to disrupt the marine food web, increase mortality for polar bears and seals, and threaten the livelihoods of the region's indigenous people. One bright note in the outlook: So far **whales seem to be benefitting from range expansion as sea ice recedes.**

26. Global Forest Cover

- **Forests cover 31 percent of the global land area.** Approximately half the forest area is relatively intact, and more than one-third is primary forest (i.e. naturally regenerated forests of native species, where there are no visible indications of human activities and the ecological processes are not significantly disturbed).
- The **largest part of the forest (45 percent) is found in the tropical domain**, followed by the boreal, temperate and subtropical domains.
- More than half of the world's forests are found in only five countries (the Russian Federation, Brazil, Canada, the United States of America and China)



Species Discovery / Species Sighted / Species Extinct

1. Two new ant species discovered

- Two new species of a rare ant genus have been discovered in Kerala and Tamil Nadu.
- The new species are:
 - **Ooceraea Joshii**: Found in the Periyar Tiger Reserve of Kerala.
 - **Ooceraea decamera**: Decamera refers to the ten-segmented antennal count. Discovered from Alagarkoil in Madurai.

2. Ischaemum janarthanamii

- It is a novel species of Muraingrass identified by scientists in the plateaus of Western Ghats of Goa.
- It grows on low altitude lateritic plateaus in the outskirts of Bhagwan Mahavir National Park, Goa.
- The vegetation is exposed to extreme climatic conditions like desiccation in drier months and soils with low nutrient availability. However, withstanding these, the species has adapted to survive harsh conditions and blossom every monsoon.
- Muraingrasses are known for their ecological and economic importance, such as fodder.



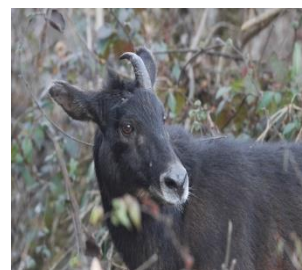
3. Myristica swamp treefrog

- It is a rare **arboreal species endemic to the Western Ghats**.
- They are **active only for a few weeks during their breeding season**.
- It has been recorded for the first time north of the **Shencottah gap in the Vazhachal Reserve Forest in Kerala's Thrissur district**.



4. Himalayan serow

- Sighted for the first time in the Himalayan cold desert region (Himachal Pradesh).
- Himalayan serow resembles a cross between a goat, a donkey, a cow, and a pig.
- It's a medium-sized mammal with a large head, thick neck, short limbs, long, mule-like ears, and a coat of dark hair.
- Categorised as '**vulnerable**' in the **IUCN Red List of Threatened Species**.
- It is listed under **Schedule I of The Wildlife Protection Act, 1972**, which provides absolute protection.



5. Important Butterfly Species

Butterfly season usually begins with the onset of the South-West monsoon; and the buzz tends to continue post-monsoon, well into February. This year, especially, many rare species have been sighted across the country.

Key points:

- **Striated Five-ring** was sighted at Neyyar, Kerala in 2015-16 after 100 years.
- **The Nilgiri Plain Ace** was rediscovered by butterfly enthusiasts after 130 years.
- **Marbled Map butterfly** recorded for the first time in Visakhapatnam is protected under Schedule II of the Wildlife Protection Act. This 'rare' species is confined to the hilly forests of Sikkim, Arunachal Pradesh, Jharkhand, Bhutan and Myanmar.
- **Malabar Banded Peacock** is endemic to South India.
- **Tree nymph**, a large white butterfly with black spots resembling white paper wafting through the air. It is also endemic to South India.

- Recently, **Branded Royal**, rarely seen in India, made news when it fluttered through the Nilgiris after a gap of over 130 years.
- The **Blue Mormon**, a black-coloured velvet-winged butterfly, a species endemic to the Western Ghats, showed up in Patna.
- The Spotted Angle butterfly** has been sighted in the reserve forests of Chhattisgarh.
- The Liliac Silverline**, a protected species whose only known breeding population is in Bengaluru, was sighted for the first time in the Aravalli range of Rajasthan.

6. Globba andersonii

- It is a rare and **critically endangered plant species**.
- It is **commonly** as 'dancing ladies' or 'swan flowers'.
- They are **characterised by white flowers, non-appendaged anthers (the part of a stamen that contains the pollen) and a "yellowish lip"**.
- The species is **restricted mainly to Teesta River Valley region which includes the Sikkim Himalays and Darjeeling hill ranges**.
- The plant usually grows in a dense colony as a **lithophyte** (plant growing on a bare rock or stone).



Why in News?

Researchers have "rediscovered" this plant species from **the Sikkim Himalayas near the Teesta river valley** region after a gap of nearly 136 years.

It was thought to have been extinct until its "re-collection", for the first time since 1875.

7. New butterfly species from Arunachal

Lepidopterists have discovered two species of butterflies in **Arunachal Pradesh**. They are:

- The Striped Hairstreak (Yamamotozephyrus kwangtugenesis)** was located in Vijaynagar bordering Myanmar. It was first recorded by Japanese entomologists in Hainan province of China.
- The Elusive Prince (Rohana tonkiniana)** was found in Miao on the periphery of the Namdapha National Park. It has a Vietnamese connection and was thought to be the more familiar Black Prince found in the Eastern Himalayas.



8. What is the name of butterfly recently recorded as the largest in India?

A Himalayan butterfly named **Golden Birdwing** is now India's largest.

- While the **female Golden Birdwing** was recorded from **Didihat in Uttarakhand**, the **largest male** was from the **Wankhar Butterfly Museum in Meghalaya capital Shillong**.

So far, the record was held by the **Southern Birdwing**, recorded in **1932**.

The **only measurement used in the study of Lepidoptera is wingspan** — a simple concept with various interpretations of the term.



9. Willow warbler

- It has been **sighted for the first time in the country in Thiruvananthapuram**.



- It is one of the longest migrating small birds that breeds throughout northern and temperate Europe and the Palearctic.
- **IUCN Status:** Least Concern.

10. *Bathynomus raksasa*

- It is a “**supergiant**” *Bathynomus*, and is being described as the “**cockroach of the sea**”.
- It is the **first 'supergiant' isopod species** discovered recently by the researchers in the **eastern Indian Ocean** (Bantan, off the southern coast of West Java in Indonesia).
- It has **14 legs** but uses these only to **crawl** along the bed of oceans in search of food.
- It **measures around 50 centimetres**. Isopods that reach 50 cm are referred to as **supergiants**.
- The giant **isopods are distantly related to crabs, lobsters, and shrimps**, and are found in the cold depths of the Pacific, Atlantic, and Indian Oceans.
- **The only member of the isopod species that exceeds the raksasa in size is the *Bathynomus giganteus***, which is commonly found in the deep waters of the western Atlantic Ocean.



11. Malabar gliding frog

It was recently spotted at Pullad, near Kozhencherry.

Key facts:

- **Scientific name:** *Rhacophorus malabaricus*.
- **Features:** It is a green frog with slender body, webbed feet, unusual body positions, very well camouflaged and gliding in the air.
- It is **endemic to the rain forests of Western Ghats**.
- **Males are smaller than females**.
- **Threats:** Deforestation, climate change, developmental activities, toxic chemicals.
- **IUCN Conservation status:** Least Concern.



12. Kalinga frog

Scientists have reported a first-of-its-kind discovery of **morphological phenotypic plasticity (MPP)** in the **Kalinga cricket frog**.

What is MPP?

MPP is the ability of an organism to show drastic morphological (physical features) variations in response to natural environmental variations or stimuli.

About Kalinga Frog:

- Its documentation was done in 2018 and reported from the Eastern Ghats.
- It was thought to be endemic to the hill ranges of the Eastern Ghats. But now, researchers have reported the Kalinga cricket frog from the central Western Ghats, with the evidence of considerable ‘**morphological phenotypic plasticity (MPP)**’.



Pollution

1. Flue Gas Desulphurization

- The Centre had initially set a **2017 deadline for thermal power plants to comply with emissions standards for installing Flue Gas Desulphurization (FGD) units** that cut emissions of toxic sulphur dioxide.
- That was later changed to varying deadlines for different regions ending in 2022. Under the latest proposal, no new dates have been set.

What is flue gas desulphurisation?

- **Removal of Sulfur Dioxide** is called as Flue-gas Desulphurization (FGD).
- It seeks to remove gaseous pollutants viz. SO₂ from exhaust flue gases generated in furnaces, boilers, and other industrial processes due to thermal processing, treatment, and combustion.

Common methods used:

- Wet scrubbing using a slurry of alkaline sorbent, usually limestone or lime, or seawater to scrub gases;
- Spray-dry scrubbing using similar sorbent slurries;
- Wet sulfuric acid process recovering sulfur in the form of commercial quality sulfuric acid;
- SNOX Flue gas desulfurization removes sulfur dioxide, nitrogen oxides and particulates from flue gases;
- Dry sorbent injection systems that introduce powdered hydrated lime (or other sorbent material) into exhaust ducts to eliminate SO₂ and SO₃ from process emissions.

2. E20 fuel

Ministry of Road Transport and Highways has published a draft notification and invited comments from the public for adoption of **E20 fuel as an automobile fuel**.

- E20 fuel is a **blend of 20% of ethanol and gasoline**.

Present status:

The current **permissible level of blending is 10%** of ethanol though India **reached only 5.6% of blending in 2019**.

Benefits of E20 fuel in particular and ethanol blending in general:

- To reduce vehicular emissions.
- To reduce emissions of carbon dioxide, hydrocarbons, etc.
- To reduce the oil import bill, thereby saving foreign exchange and boosting energy security.

Challenges ahead:

Compatibility of vehicles with the percentage of ethanol in the blend would have to be defined by the vehicle manufacturer.

What is ethanol?

Ethanol is a biofuel and a common by-product of biomass left by agricultural feedstock such as corn, sugarcane, hemp, potato, etc.

What has the Government done and is doing in this regard?

- **National Biofuel Coordination Committee (NBCC)** has allowed Surplus rice available with the FCI to be converted to ethanol for utilization in making alcohol-based hand-sanitizers and for blending in petrol.

- The Government of India launched the **EBP programme** in 2003 for undertaking the blending of ethanol in petrol to address the environmental concerns due to fossil fuel burning, provide remuneration to farmers, subsidize crude imports and achieve forex savings.
- The **National Policy on Biofuels, 2018** envisages that during an agriculture crop year when there is projected over supply of food grains as anticipated by the Ministry of Agriculture & Farmers' Welfare, the policy will allow conversion of these surplus quantities of food grains to ethanol, based on the approval NBCC.

3. Smog

Smog is a harmful **mixture of fog, dust and air pollutants** such as nitrogen oxides, volatile organic compounds, etc. which **combine with sunlight to form a dense layer of ground-level ozone**.

- **Ozone present high in the atmosphere is good, but when nearer to the ground, it can cause irritating health effects.**

(**Note:** The term 'smog' was first coined by Dr Henry Antoine des Voeux in his paper, Fog and Smoke, in July 1905, after a blanket of smoke and fog was noticed over London in the early 1900s.)

How is Smog formed?

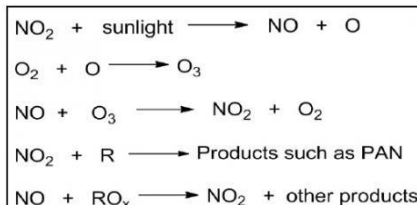
It consists of ozone, along with harmful substances like sulphur dioxide, nitrogen dioxide, carbon monoxide and PM10s, which can find their way deep into our lungs.

Smog can be caused by:

- Large amounts of coal-burning in an area
- Slash-and-burning of crops (a major source in Delhi)
- Smog-forming pollutants generate from automobile exhausts, power plants, fireworks, even paint, hairspray, charcoal starter fluid, and plastic popcorn packaging.

Role of local weather phenomenon:

The formation of smog is also closely linked with **temperature, sunshine, and calm winds**. On a warmer day, smog can form more quickly than otherwise.



Types:

- Sulfurous smog and photochemical smog are two distinct types of smog recognised so far.
- **Sulfurous smog**, also known as **London smog**, develops due to high concentration of sulfur oxides in the air.
- **Photochemical smog** is produced when sunlight reacts with oxides of nitrogen and at least one volatile organic compound (VOC) in the atmosphere.

Health impacts:

- Inhaling smog over a long span of time can inflame your breathing passage, much like cigarette smoking.
- Smog causes inflamed lungs, and inflamed lungs, in turn, secrete interleukin-6 which can cause blood clots in people, cardiac and respiratory disorders, leading to heart attacks or strokes.
- Smog can dry out the protective membranes of your nose and throat.
- It can jeopardize your body's ability to resist infection, hence, increasing your susceptibility to illness.
- It can greatly decrease the UV radiation, leading to low production of important elements like Vitamin D.

4. Fly Ash

NTPC Ltd. under Ministry of Power, has started to collaborate with cement manufacturers across the country to supply fly ash as part of its endeavour to achieve 100% utilisation of the by-product produced during power generation.

What is Fly Ash?

Popularly known as **Flue ash or pulverised fuel ash**, it is a coal combustion product.

Composition:

Composed of the **particulates that are driven out of coal-fired boilers together with the flue gases.**

- Depending upon the source and composition of the coal being burned, the components of fly ash vary considerably, but **all fly ash includes substantial amounts of silicon dioxide (SiO₂), aluminium oxide (Al₂O₃) and calcium oxide (CaO), the main mineral compounds in coal-bearing rock strata.**
- Minor constituents include:** arsenic, beryllium, boron, cadmium, chromium, hexavalent chromium, cobalt, lead, manganese, mercury, molybdenum, selenium, strontium, thallium, and vanadium, along with very small concentrations of dioxins and PAH compounds. It also has unburnt carbon.

Components	Composition (wt %)
SiO ₂	18.9
Al ₂ O ₃	15.2
Fe ₂ O ₃	10.6
Na ₂ O	0.988
CaO	1.18
K ₂ O	2.23
TiO ₂	0.468
SO ₃	0.366
MgO	0.348
SiO ₂ /Al ₂ O ₃	1.2

Health and environmental hazards:

- Toxic heavy metals present:** All the heavy metals found in fly ash nickel, cadmium, arsenic, chromium, lead, etc—are toxic in nature. They are minute, poisonous particles accumulate in the respiratory tract, and cause gradual poisoning.
- Radiation:** For an equal amount of electricity generated, fly ash contains a hundred times more radiation than nuclear waste secured via dry cask or water storage.
- Water pollution:** The breaching of ash dykes and consequent ash spills occur frequently in India, polluting a large number of water bodies.
- Effects on environment:** The destruction of mangroves, drastic reduction in crop yields, and the pollution of groundwater in the Rann of Kutch from the ash sludge of adjoining Coal power plants has been well documented.

However, fly ash can be used in the following ways:

- Concrete production, as a substitute material for Portland cement, sand.
- Fly-ash pellets which can replace normal aggregate in concrete mixture.
- Embankments and other structural fills.
- Cement clinker production – (as a substitute material for clay).
- Stabilization of soft soils.
- Road subbase construction.
- As aggregate substitute material (e.g. for brick production).
- Agricultural uses: soil amendment, fertilizer, cattle feeders, soil stabilization in stock feed yards, and agricultural stakes.
- Loose application on rivers to melt ice.
- Loose application on roads and parking lots for ice control.

5. Yellow dust

- Yellow dust is actually **sand from deserts in China and Mongolia that high speed surface winds carry into both North and South Korea during specific periods every year.**
- The sand particles tend to mix with other toxic substances such as industrial pollutants, as a result of which the 'yellow dust' is known to cause a number of respiratory ailments.

Can Covid-19 be transmitted through dust clouds?

US Centres for Disease Control (CDC) has said **the virus can remain airborne for hours**. However, it has also maintained that it is highly **unlikely for the Covid-19 infection to spread in this way, particularly outdoors**.

6. Green Crackers

Green Crackers are known as '**green**' firecrackers because they have a chemical formulation that produces water molecules, which substantially reduces emission levels and absorbs dust.

- They are the crackers with reduced emission and decibel level.

Benefits of Green Crackers:

- They promise a **reduction in particulate matters and harmful gases**, like nitrous oxide and sulfur oxide, by 30- 35 per cent.
- They will be 25-30 per cent **cheaper to manufacture and manufacturers would not have to make any changes in their facilities**.

What gives colour to the firecrackers?

- **Red**: Strontium salts (Nitrates, carbonates and sulphates of strontium).
- **Orange**: Calcium salts (Carbonates, chlorides and sulphates of calcium).
- **Yellow**: Sodium salts (Nitrates and oxalates of sodium).
- **Green**: Barium salts (Nitrates, carbonates, chlorides and chlorates of barium).
- **Blue**: Copper salts (Carbonates and oxides of copper).
- **Purple**: A combination of copper and strontium compounds.
- **White**: The burning of metals like magnesium, aluminium and titanium).

7. Report on lead poisoning by UNICEF

United Nations Children's Fund (UNICEF) and **international non-profit organization focused on pollution issues, Pure Earth** released a report- "The Toxic Truth: Children's exposure to lead pollution undermines a generation of potential".

How lead affects children?

1. Lead is a **potent neurotoxin** that causes **irreparable harm to children's brains**.
2. It is particularly **destructive to babies and children under the age of 5** as it damages their brain before they have had the opportunity to fully develop, causing them lifelong neurological, cognitive and physical impairment.
3. Childhood lead exposure has also been linked to **mental health and behavioural problems and an increase in crime and violence**.
4. Older children suffer severe consequences, including increased risk of kidney damage and cardiovascular diseases in later life.



Factors contributing to lead poisoning:

1. Informal and substandard recycling of lead-acid batteries.
2. Increase in vehicle ownership, combined with the lack of vehicle battery recycling regulation and infrastructure.
3. Workers in dangerous and often illegal recycling operations break open battery cases, spill acid and lead dust in the soil.
4. They also smelt the recovered lead in crude, open-air furnaces that emit toxic fumes poisoning the surrounding community.

Insta Facts:

1. **Lead in the body is distributed to the brain, liver, kidney and bones. It is stored in the teeth and bones**, where it accumulates over time.
2. **Lead in bone is released into blood during pregnancy** and becomes a source of exposure to the developing foetus.
3. WHO has identified **lead as 1 of 10 chemicals of major public health concern**.
4. WHO has joined with the United Nations Environment Programme to form **the Global Alliance to Eliminate Lead Paint**.

8. Blue Tide

The tide producing a **fluorescent blue hue**, popularly known as **bioluminescence**, recently made an appearance at Mumbai's Juhu Beach and Devgad Beach in Sindhudurg, along Maharashtra's coastline.

Background:

Bioluminescence has been an annual occurrence along the west coast since 2016, especially during the months of November and December.

Why is it caused?

The spectacle occurs when phytoplankton (microscopic marine plants), commonly known as **dinoflagellates**, produce light through chemical reactions in proteins. **Waves disturb these unicellular microorganisms and makes them release blue light.**

- Main factors for its occurrence could be eutrophication – the reduction of oxygen in the water – which makes the phytoplanktons very dominant.

Why it is dangerous?

Many of the species in this group are toxic. If dinoflagellates reproduce rapidly, they may cause so-called 'red tides'.

- During this period all the animals (molluscs, fish, etc.) that feed on dinoflagellates also become toxic due to the accumulation of high amounts of toxins from dinoflagellates.
- It is dangerous to eat such sea animals because the toxins that are contained in them may have various unpleasant effects: some merely irritate the bowel and cause food poisoning, whereas others, being neurotoxins, may even have an effect on memory.
- Some species, such as the sea sparkle (*Noctiluca scintillans*) are not as toxic, but may have other unpleasant effects.



9. Tarballs

A study has found Tarballs found in the Himalaya-Tibetan Plateau.

- The percentage of the tarballs increased on days of higher levels of pollution and could contribute to hastening of glacial melt and global warming.

What are Tarballs? How they are formed?

Tarballs are small **light-absorbing, carbonaceous particles** formed due to burning of biomass or fossil fuels that deposit on snow and ice.

- They hasten glacial melt.
- They are formed from brown carbon, emitted during the burning of fossil fuels.

Where did they come from?

Tarballs were emitted from biomass burning in the Indo-Gangetic Plain.

Concerns:

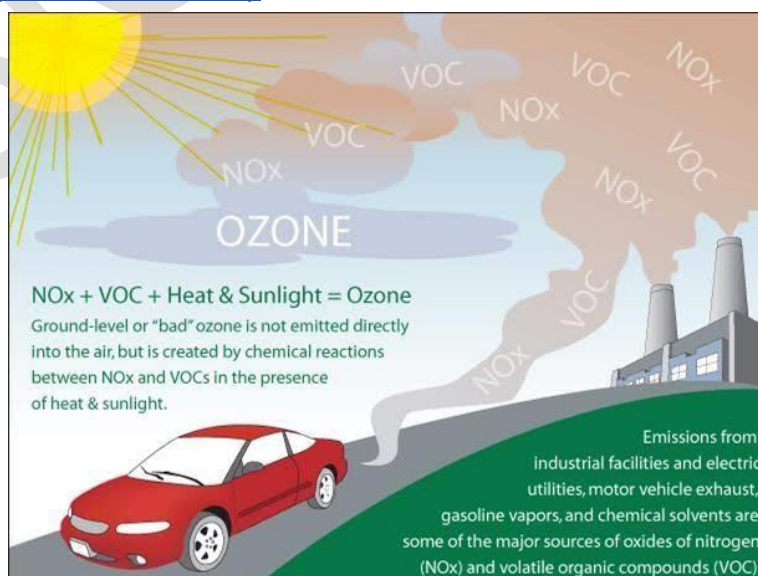
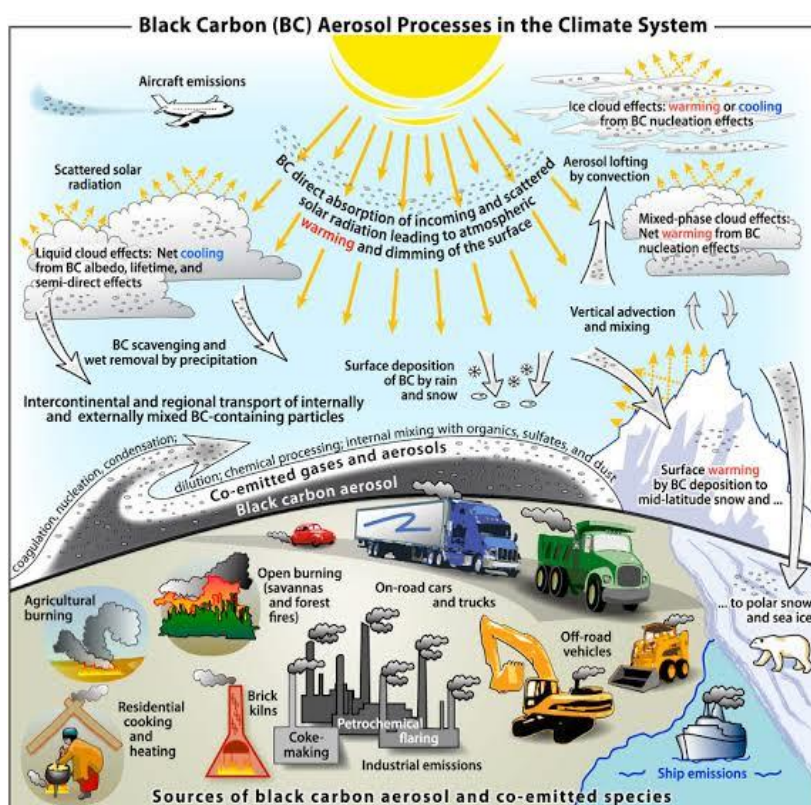
Tarballs from **long-range transport** can be an important factor in the climatic effect and would correspond to a substantial influence on glacial melting in the Himalaya region.

10. Low ozone over Brahmaputra River Valley

Researchers have found that the **concentration of near surface ozone in the Brahmaputra River Valley region is low compared to the other urban locations in India.**

What is Tropospheric or ground-level ozone?

- It is **created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC).**
- It usually increases when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight, impacting human health.



Why low ozone in Brahmaputra Valley?

- This site is well influenced by local sources such as adjacent major national highway.

- During the daylight hours, the site is in or nearly in a **photo-stationary state**, indicating a low impact of organic species on the ozone concentrations.

Why we should be concerned about ground-level ozone?

- Ozone at ground level is a **harmful air pollutant**, because of its effects on people and the environment, and it is the main ingredient in “smog.”
- Elevated ground-level ozone exposures **affect agricultural crops and trees**, especially slow growing crops and long-lived trees.
- The main health concern of exposure to ambient ground-level ozone is **its effect on the respiratory system, especially on lung function**.

InstaFact:

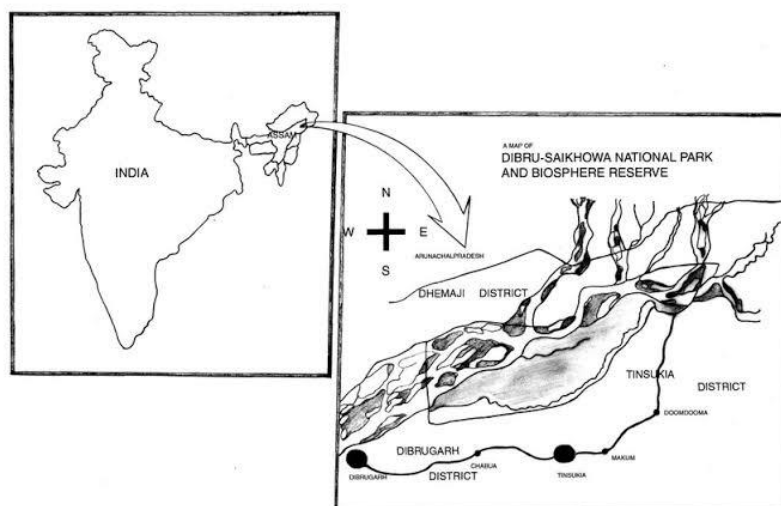
Ozone is **produced naturally in the stratosphere** when highly energetic solar radiation strikes molecules of oxygen, and cause the two oxygen atoms to split apart in a process called **photolysis**. If a freed atom collides with another O₂, it joins up, forming ozone.

11.Assam Oil Well Fire

Oil India Ltd (OIL) well in Assam’s Tinsukia district caught fire following a blowout.

Impact on the Dibru-Saikhowa National Park:

- Environmentalists and local people said the fire had left a trail of devastation in the adjoining areas, including **the Dibru-Saikhowa National Park**.
- The well is at an aerial distance of 900 metres from **the Dibru-Saikhowa National Park**.



12.Dibru-Saikhowa National Park

- It is the largest swamp forest in north-eastern India.
- It is an identified Important Bird Area (IBA), notified by the Birdlife International.
- It is most famous for the rare white-winged wood ducks as well as feral horses.
- The forest type comprises semi-evergreen forests, deciduous forests, littoral and swamp forests and patches of wet evergreen forests.
- Maguri Motapung wetland is a part of the Reserve.
- The park is bounded by the **Brahmaputra and Lohit Rivers** in the north and **Dibru river** in the south.

13.State Pollution Control Boards

Orissa High Court had issued notice to the state government over appointment of bureaucrats as chairman and member secretary of the State pollution control board for the past 10 years.

As per **the Section 4 of Water (Prevention and Control of Pollution) Act, 1974, and Sec 5 of the Air (Prevention and Control of Pollution) 1981**, there is provision for appointment of full time member secretary and nomination of full time or part time chairman by the State government.

- But, for last more than 10 years, the posts of OSPCB are filled up from the cadres of IAS and IFS respectively without adhering to any selection procedure”.
- The same is the case in many other States.

About State Pollution Control Boards:

They are constituted in pursuance of **the Water (Prevention & Control of Pollution) Act, 1974.**

- After the enactment of **the Air (Prevention & Control of Pollution) Act, 1981**, the enforcing responsibility was entrusted to these Boards.

Composition and selection of members:

The members of State Pollution Control Boards are nominated by respective State Governments.

Apart from the above said Acts, the Board is also enforcing **the following Rule and Notifications framed under Environment (Protection) Act, 1986:**

1. Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
2. Environmental Impact Assessment Notification, 2006.
3. Bio-Medical Waste Management Rules, 2016.
4. Plastic Waste Management Rules, 2016.
5. The Noise Pollution (Regulation & Control) Rules, 2000.
6. Construction & Demolition Waste Management Rules, 2016
7. The Public Liability Insurance Act, 1991.
8. Fly Ash Notification, 1999 and 2008.

14. What is ammonium nitrate, which caused the massive explosion in Beirut?

In its pure form, **ammonium nitrate (NH₄NO₃)** is a white, crystalline chemical which is **soluble in water**.

Where all is it used?

- It is the main ingredient in **the manufacture of commercial explosives used in mining and construction.**
- It is a **common chemical ingredient of agricultural fertilisers.**
- It is also the main component of the explosive composition known as **ANFO — ammonium nitrate fuel oil.**

When it can cause a fire hazard?

Pure ammonium nitrate is not an explosive on its own. It is classified as an **oxidiser (Grade 5.1) under the United Nations classification of dangerous goods.**

- If mixed with ingredients like fuel or some other contaminants, or because of some other external factors, it can be very explosive.

The explosion of large storage can happen primarily in two ways:

1. By some type detonation or initiation because the storage comes in contact with explosive mixture.
2. Due to a fire which starts in the ammonium nitrate store because of the heat generated due to the oxidation process at large scale.

How is it regulated in India?

- In India, its usage is regulated as per **The Ammonium Nitrate Rules, 2012, under The Explosives Act, 1884.**
- The rules also make **storage of ammonium nitrate in large quantities in populated areas illegal in India.**
- For the manufacture of ammonium nitrate, **an Industrial licence is required under the Industrial Development and Regulation Act, 1951.**

- A **license under the Ammonium Nitrate Rules, 2012** is also required for any activity related to ammonium nitrate.

Health effects:

An ammonium nitrate explosion produces massive amounts of **nitrogen oxides**. Nitrogen dioxide (NO₂) is a red, bad-smelling gas.

It can **irritate the respiratory system**.

15. Carbon Neutrality

Carbon neutrality refers to achieving net zero carbon dioxide emissions by balancing carbon dioxide emissions with removal (often through carbon offsetting) or simply eliminating carbon dioxide emissions altogether (the transition to the "post-carbon economy").

Although **both renewable and non-renewable energy both produce carbon emissions in some form**, renewable energy has a lesser to almost zero carbon emissions.

16. Global Warming Potential (GWP)

- The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different greenhouse gases.
- Specifically, **it is a measure of how much energy the emissions of 1 ton of any greenhouse gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO₂)**.
- The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that time period. **The time period usually used for GWPs is 100 years.**
- GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases.
- CO₂, by definition, has a GWP of 1 regardless of the time period used, because it is the gas being used as the reference.

17. Nitrogen Emissions

- Nitrogen particles make up the largest fraction of PM_{2.5}, the class of pollutants closely linked to cardiovascular and respiratory illness, says the first-ever quantitative assessment of nitrogen pollution in India.
- While the burning of crop residue is said to be a key contributor to winter smog in many parts of North India, it contributes over 240 million kg of nitrogen oxides (NO_x: a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide and nitrogen dioxide) and about 7 million kg of nitrous oxide (N₂O) per year.
- Though **agriculture remains the largest contributor to nitrogen emissions**, the non-agricultural emissions of nitrogen oxides and nitrous oxide are growing rapidly, with sewage and fossil-fuel burning — for power, transport and industry — leading the trend.
- Indian NO_x emissions grew at 52% from 1991 to 2001 and 69% from 2001 to 2011.
- As fertilizer, nitrogen is one of the main inputs for agriculture, but inefficiencies along the food chain mean about 80% of nitrogen is wasted, contributing to air and water pollution plus greenhouse gas emissions, thereby causing threats for human health, ecosystems and livelihoods.
- Agricultural soils contributed to over 70% of N₂O emissions from India in 2010, followed by waste water (12%) and residential and commercial activities (6%).
- Since 2002, N₂O has replaced methane as the second largest Greenhouse Gas (GHG) from Indian agriculture.
- Chemical fertilizers (over 82% of it is urea) account for over 77% of all agricultural N₂O emissions in India, while manure, compost and so on make up the rest.

- Most of the fertilizers consumed (over 70%) go into the production of cereals, especially rice and wheat, which accounts for the bulk of N₂O emissions from India.
- The poultry industry recorded an excretion of reactive nitrogen compounds of 0.415 tonnes in 2016.

Events / Celebrations

1. Global Renewable Energy Investment Meeting and Expo

3rd Global Renewable Energy Investment Meeting and Expo (RE-Invest 2020) was inaugurated recently.

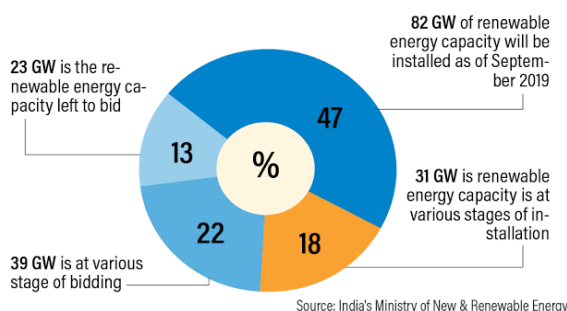
- The summit is organised by the **Ministry of New and Renewable Energy**.
- The theme for 2020 is 'Innovations for Sustainable Energy Transition'.

How is India performing on this front?

- India's renewable power capacity is the **4th largest in the world** and is growing at the fastest speed among all major countries.
- The **renewable energy capacity** in India is currently **136 Giga Watts**, which is about 36% of our total capacity.
- India's annual renewable energy capacity addition has been **exceeding that of coal based thermal power** since 2017.

In the last 6 years, India has increased installed renewable energy capacity by two and half times.

INDIAN GOVERNMENT TARGETS 175GW OF RENEWABLE ENERGY CAPACITY BY 2022



2. World Biofuel day

World Biofuel Day is observed every year on **10th August** to raise awareness about the **importance of non-fossil fuels as an alternative to conventional fossil fuels**.

- The day honours the research experiments by **Sir Rudolf Christian Karl Diesel** (inventor of the diesel engine) who ran an engine with peanut oil in 1893.
- In India, the day has been celebrated by the **Ministry of Petroleum and Natural Gas** since **2015**.

The theme for 2020 World Biofuel Day in India is 'Biofuels Towards Atmanirbhar Bharat'

What are Biofuels?

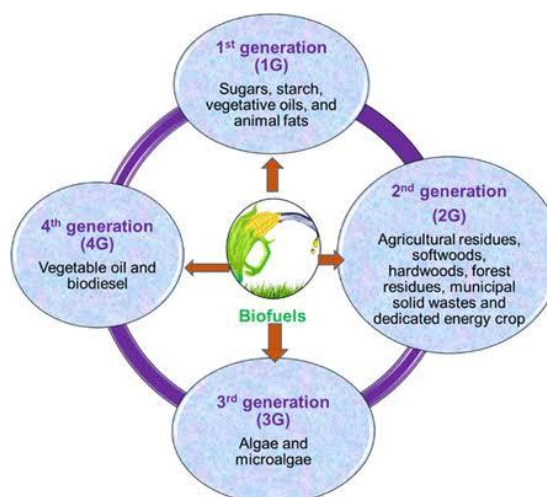
Any hydrocarbon fuel that is produced from an organic matter (living or once living material) in a short period of time (days, weeks, or even months) is considered a biofuel.

Biofuels may be solid, liquid or gaseous in nature.

- Solid: Wood, dried plant material, and manure
- Liquid: Bioethanol and Biodiesel
- Gaseous: Biogas

Classification of Biofuels:

- **1st generation biofuels** are also called conventional biofuels.
 - They are made from things like sugar, starch, or vegetable oil. Note that these are all food products.
 - **Any biofuel made from a feedstock that can also be consumed as a human food is considered a first-generation biofuel.**
- **2nd generation biofuels** are produced from sustainable feedstock. The sustainability of a feedstock is defined by its availability, its



impact on greenhouse gas emissions, its impact on land use, and by its potential to threaten the food supply.

- **No second-generation biofuel is also a food crop, though certain food products can become second generation fuels when they are no longer useful for consumption.**
- Second generation biofuels are often called “advanced biofuels.”
- **3rd generation biofuels** are biofuel derived from algae.
 - These biofuels are given their own separate class because of their unique production mechanism and their potential to mitigate most of the drawbacks of 1st and 2nd generation biofuels.
- **4th generation biofuels:** In the production of these fuels, crops that are genetically engineered to take in high amounts of carbon are grown and harvested as biomass.
 - The crops are then converted into fuel using second generation techniques.

3. World Crocodile Day

Observed on **June 17th every year.**

It is a **global awareness campaign to highlight the plight of endangered crocodiles and alligators around the world.**

India is home to three crocodilian species:

1. The mugger or marsh crocodile (*Crocodylus palustris*)
2. The estuarine or saltwater crocodile (*Crocodylus porosus*)
3. The gharial (*Gavialis gangeticus*)

Details:

Mugger:

- The mugger crocodile, also called the Indian crocodile, or marsh crocodile, is found throughout the Indian subcontinent.
- It is listed as vulnerable by IUCN.
- The mugger is mainly a freshwater species, and found in lakes, rivers and marshes.



Gharial:

- The Gharial or fish eating crocodile is native to the Indian subcontinent.
- It is listed as a Critically Endangered by IUCN.
- Small released populations are present and increasing in the rivers of the National Chambal Sanctuary, Katarniaghat Wildlife Sanctuary, Son River Sanctuary and the rainforest biome of Mahanadi in Satkosia Gorge Sanctuary, Orissa.



Saltwater Crocodile:

It is the largest of all living reptiles. It listed as least concern by IUCN. It is found throughout the east coast of India.



Crocodile conservation programmes in India:

The Gharial and Saltwater crocodile conservation

programme was first implemented in Odisha in early 1975 and subsequently the Mugger conservation programme was initiated, since Odisha is having distinction for existence of all the three species of Indian crocodilians. The funds and technical support for the project came from UNDP/ FAO through the Government of India.

'BAULA' PROJECT AT DANGAMAL: 'Baula' is the Oriya term for Saltwater Crocodile. Dangmal is in Bhitarkanika sanctuary.

MUGGER PROJECT AT RAMATIRTHA: The Ramatirtha center, in Odisha, is meant for Mugger crocodiles.

GHARIAL PROJECT AT TIKARPADA, Odisha.

CAPTIVE BREEDING OF CROCODILES AT NANDANKANAN, Odisha.

4. World Rhino Day

Celebrated on **September 22**.

It celebrates **all five species of rhino**: Black, white, greater one-horned, Sumatran and Javan rhinos.

In 2010 the first World Rhinoceros Day was celebrated by **the World Wildlife Fund (WWF)**.

IUCN Status:

- 'Critically endangered' species are- Javan Rhinos, Sumatran rhinos and black rhinos.
- The White Rhinos have been declared 'near threatened' while one-horned rhinos are said to be vulnerable to extinction.

How endangered are the world's rhino species

White (two sub-species)



Southern Population
19,666-21,085
Northern 2

Status
NEAR THREATENED

Black (four sub-species, one declared extinct 2011)



Population
5,040-5,458

Status
CRITICALLY ENDANGERED

Greater one-horned



Population
3,500+

Status
VULNERABLE

Sumatran



Population
100

Status
CRITICALLY ENDANGERED

Javan



Population
67

Status
CRITICALLY ENDANGERED

Source: WWF/Save the Rhino/Getty/EPA/Reuters

BBC

Reports / Release

1. Asian Water bird Census-2020

- Asian Waterbird Census is an annual event in which thousands of volunteers across Asia and Australasia count waterbirds in the wetlands of their country.
- This event happens every January.
- This event is coordinated by wetlands International and forms part of global waterbird monitoring programme called **the International Waterbird Census (IWC)**.
- It was started in the year 1987.
- In India, the AWC is annually coordinated by **the Bombay Natural history Society (BNHS) and Wetlands International**.

What are waterbirds?

According to Wetlands International (WI), waterbirds are defined as species of birds that are ecologically dependent on wetlands. These birds are considered to be an important health indicator of wetlands of a region.

Wetlands International is a global organisation that works to sustain and restore wetlands and their resources for people and biodiversity. It is an independent, not-for-profit, global organisation, supported by government and NGO membership from around the world.

2. Birds of the Sundarban Biosphere Reserve- a publication by ZSI

The report was recently published by the Zoological Survey of India (ZSI).

- The report not only **documents the avifauna of the Sunderbans**, but also serves as a photographic field guide, with detailed distribution of all the species from the region.

Key Findings:

- The **Indian Sunderbans, which is part of the largest mangrove forest in the world**, is home to 428 species of birds. This means that one in every three birds in the country is found in the unique ecosystem.
- Some birds, like the masked finfoot and the Buffy fish owl, are recorded only from the Sunderbans.
- The area is home to nine out of 12 species of kingfishers found in the country as well rare species such as the Goliath heron and the spoon-billed sandpiper.

About Sundarbans:

1. The Sundarbans comprises hundreds of islands and a network of rivers, tributaries and creeks in **the delta of the Ganga and the Brahmaputra at the mouth of the Bay of Bengal in India and Bangladesh**.
2. Located on the southwestern part of the delta, **the Indian Sundarban constitutes over 60% of the country's total mangrove forest area**.
3. 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.
4. The Indian Sundarban, also a **UNESCO world heritage site**, is home to the Royal Bengal Tiger.
5. It is also **home to a large number of "rare and globally threatened species, such as the critically endangered northern river terrapin (Batagur baska), the endangered Irrawaddy dolphin (Orcaella brevirostris), and the vulnerable fishing cat (Prionailurus viverrinus)."**
6. **Two of the world's four horseshoe crab species, and eight of India's 12 species of kingfisher are also found here.** Recent studies claim that the Indian Sundarban is home to 2,626 faunal species and 90% of the country's mangrove varieties.

3. Living Planet Report 2020

Released by international non-profit **World Wide Fund for Nature**.

- Living Planet Report 2020, a collaboration between WWF International and the Zoological Society of London, is the 13th edition of the biennial publication tracking wildlife populations around the world.

India's scenario:

- India has 2.4 per cent global land share, about eight per cent global biodiversity and around 16 per cent global population.
- India's ecological footprint per person is less than 1.6 global hectares (gha) / person (smaller than that of many large countries). But, its high population size have made the gross footprint significantly high.

What is Living Planet Report?

- It is **published every 2 years by WWF**.
- It is a comprehensive study of trends in global biodiversity and the health of the planet.
- The report presents a comprehensive overview of the state of the natural world through the **Living Planet Index (LPI)**.

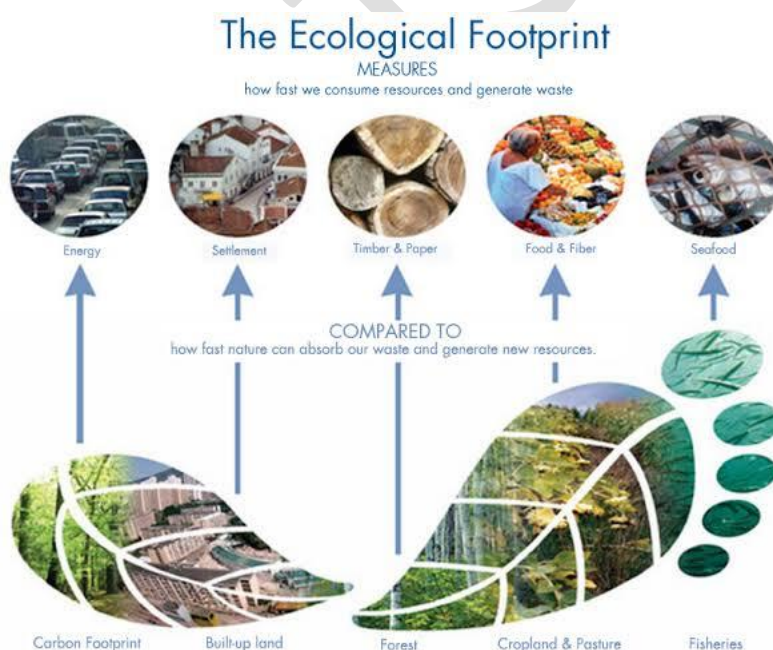
What is Living Planet Index (LPI)?

It is a measure of the state of the world's biological diversity based on population trends of vertebrate species in terrestrial, freshwater and marine habitats.

What is ecological footprint?

Ecological footprint is **the biologically productive area needed to provide for everything used by people:** fruits and vegetables, fish, wood, fibres, absorption of CO₂ from fossil fuels use, and space for buildings and roads.

- It is currently developed by **Global Footprint Network** (an independent think-tank). The GHG footprint and carbon footprint are a component of Ecological Footprint.
- **Humanity's Ecological Footprint for 2014 was 1.7 planet Earth's.** This meant that humanity's demands were 1.7 times faster than what the Earth's ecosystems renewed.



InstaFact:

According to **the National Footprints Accounts (2014)**, India has a **bio-capacity of approximately 0.45 gha per person**, which means it is a 'bio-capacity debtor' or an 'ecologically deficit country' with a 148 per cent more demand than supply on its natural resources.

4. Global Forest Resources Assessment 2020

Global Forest Resources Assessment 2020 has been released by the **United Nations Food and Agriculture Organization (FAO)**.

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

About FRA:

- FAO has brought out this assessment **every five years since 1990**.
- This report **assesses the state of forests, their conditions and management for all member countries**.

According to FRA 2020, **top 3 countries that have recorded the maximum average annual net gains in forest area during 2010-2020 are:**

1. China
2. Australia
3. India

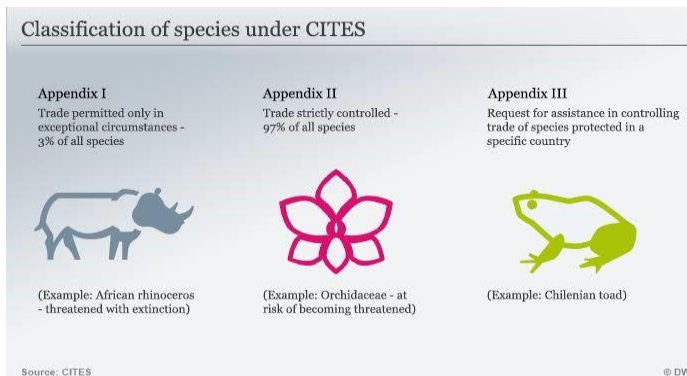
Key findings:

- **Forest area has declined** all across the world in the past three decades. The world lost **178 mha of forest since 1990**, an area the size of Libya.
- **The rate of forest loss** has also **declined** due to the growth of **sustainable management**.
- **Africa had the largest annual rate of net forest loss** in 2010–2020, at 3.9 mha, followed by South America, at 2.6 mha.
- On the other hand, **Asia had the highest net gain of forest area** in 2010–2020, followed by Oceania and Europe.
- The **largest proportion of the world's forests were tropical** (45 per cent), followed by boreal, temperate and subtropical.
- More than **54 per cent of the world's forests were in only five countries** — the Russian Federation, Brazil, Canada, the United States of America and China.
- The **highest per cent of plantation forests were in South America** while the **lowest were in Europe**.

International Efforts / Organisations

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

- CITES is an international agreement between governments to ensure that international trade in wild animals, birds and plants does not endanger them.
- India is a member.
- Appendices I, II and III of CITES list 5,950 species as protected against over-exploitation through international trade.
- Many of these animals, such as iguanas, lemurs, civets, albino monkeys, coral snakes, tortoises, are popular as exotic pets in India.



2. Blue flag programme

- International Blue Flag hoisted at 8 beaches across India.
- The beaches where the International Blue Flags were hoisted are: Kappad (Kerala), Shivrajpur (Gujarat), Ghoghla (Diu), Kasarkod and Padubidri (Karnataka), Rushikonda (Andhra Pradesh), Golden (Odisha) and Radhanagar (Andaman & Nicobar Islands).
- India had secured **the International Blue Flag Certification** for these 8 beaches on 6th October 2020, when an International Jury comprising of member organizations UNEP, UNWTO, UNESCO, IUCN, ILS, FEE etc. announced the award at Copenhagen, Denmark.

About Blue flag programme:

- The Blue Flag Programme for beaches and marinas is run by the international, non-governmental, non-profit organisation **FEE (the Foundation for Environmental Education)**.
- It **started in France in 1985** and has been implemented in Europe since 1987, and in areas outside Europe since 2001, when South Africa joined.

What is a Blue Flag beach?

It is an 'eco-tourism model' and marks out beaches as providing tourists and beachgoers clean and hygienic bathing water, facilities/amenities, a safe and healthy environment, and sustainable development of the area.

Criteria:

There are nearly 33 criteria that must be met to qualify for a Blue Flag certification, such as the water meeting certain quality standards, having waste disposal facilities, being disabled- friendly, have first aid equipment, and no access to pets in the main areas of the beach. **Some criteria are voluntary and some compulsory.**

Facts for Prelims:

- Spain tops the list with more than 560 such beaches; Greece and France follow.
- India is now in the league of **50 "BLUE FLAG" countries**.
- **Japan, South Korea and the UAE** are the only other Asian nations that have been conferred with a couple of Blue Flag beaches.

Is Blue Flag certification available only for beaches?

No. It can be given to a beach, marina, or sustainable boating tourism operator.

- Basically, the Blue Flag is a trademark.

3. Global Initiative to reduce Land Degradation and Coral Reef program

Launched at the **Environment Ministerial Meeting (EMM) of the G20 countries** which took place under the **Presidency of Kingdom of Saudi Arabia**.

About the Initiative:

It aims to strengthen **the implementation of existing frameworks to prevent, halt, and reverse land degradation within G20 member states and globally**, taking into account possible implications on the achievement of other SDGs and adhering to the principle of doing no harm.

What is Land Degradation?

It is the reduction or loss of biological or economic productivity of the land resulting from land uses or from a process or combination of processes, including human activities and climatic variations.

What is Desertification?

- It is the **degradation of land in arid, semi-arid and dry sub-humid areas**.
- Desertification does not refer to the expansion of existing deserts.
- It occurs because dryland ecosystems, which cover over one-third of the world's land area, are extremely vulnerable to overexploitation and inappropriate land use.
- India has witnessed **increase in the level of desertification in 26 of 29 states between 2003-05 and 2011-13**, according to the State of India's Environment (SoE) 2019 in Figures.
- **More than 80 per cent of the country's degraded land lies in just nine states:** Rajasthan, Maharashtra, Gujarat, Jammu and Kashmir, Karnataka, Jharkhand, Odisha, Madhya Pradesh and Telangana.

Main reasons that cause desertification in India are:

1. Water erosion (10.98 per cent).
2. Wind erosion (5.55 per cent).
3. Human-made/settlements (0.69 per cent).
4. Vegetation degradation (8.91 per cent).
5. Salinity (1.12 per cent).
6. Others (2.07 per cent).

Steps taken by India:

- Desert Development Programme.
- Integrated Watershed Management Programme which is now subsumed under Pradhan Mantri Krishi Sinchai Yojana.
- National agriculture policy 2000.
- National Mission on Green India which is a part of National Action Plan on Climate Change.
- National Afforestation Programme.

4. United Nations Convention to Combat Desertification

Established in 1994.

It is the **sole legally binding international agreement linking environment and development to sustainable land management**.

- It is the **only convention stemming from a direct recommendation of the Rio Conference's Agenda 21**.

- To help publicise the Convention, **2006 was declared “International Year of Deserts and Desertification”**.
- **Focus areas:** The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.
- **Aim:** Its 197 Parties aim, through partnerships, to implement the Convention and achieve the Sustainable Development Goals. The end goal is to protect land from over-use and drought, so it can continue to provide food, water and energy.
- **The Ministry of Environment, Forest and Climate Change is the nodal Ministry for this Convention.**

5. Global Environment Facility

- Established on the eve of **the 1992 Rio Earth Summit** to help tackle our planet’s most pressing environmental problems.
- It is **an international partnership** of countries, international institutions, civil society organizations and the private sector that addresses global environmental issues.
- **GEF funds are available to** developing countries and countries with economies in transition to meet the objectives of the international environmental conventions and agreements.
- **The World Bank serves as the GEF Trustee, administering the GEF Trust Fund.**
- GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, persistent organic pollutants (POPs), mercury, sustainable forest management, food security, sustainable cities.
- **The GEF also serves as financial mechanism for the following conventions:**
 - Convention on Biological Diversity (CBD)
 - United Nations Framework Convention on Climate Change (UNFCCC)
 - United Nations Convention to Combat Desertification (UNCCD)
 - Stockholm Convention on Persistent Organic Pollutants
 - Minamata Convention on Mercury
- The GEF, although not linked formally to the Montreal Protocol on Substances that Deplete the Ozone Layer (MP), supports implementation of the Protocol in countries with economies in transition.

6. Green Climate Fund (GCF)

- **The Green Climate Fund (GCF)** is a global fund created to support the efforts of developing countries to respond to the challenge of climate change.
- GCF helps developing countries limit or reduce their greenhouse gas (GHG) **emissions and adapt to climate change.**
- **It seeks to promote a paradigm shift to low-emission and climate-resilient development,** taking into account the needs of nations that are particularly vulnerable to climate change impacts.
- **It was set up by the countries who are parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2010,** as part of the Convention’s financial mechanism.
- GCF’s activities are aligned with the priorities of developing countries through the principle of country ownership, and the Fund has established a direct access modality so that national and sub-national organisations can receive funding directly, rather than only via international intermediaries.
- The Fund pays particular attention to the needs of societies that are highly vulnerable to the effects of climate change, in particular Least Developed Countries (LDCs), Small Island Developing States (SIDS), and African States.
- The Fund’s investments can be in the **form of grants, loans, equity or guarantees.**

7. International Union for Conservation of Nature (IUCN)

- The International Union for Conservation of Nature (IUCN) is an international organization working in the field of nature conservation and sustainable use of natural resources.
- IUCN was established in 1948. It was previously called the International Union for the Protection of Nature (1948–1956) and the World Conservation Union (1990–2008).
- It is involved in data gathering and analysis, research, field projects, advocacy, and education.
- IUCN's mission is to "influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable".
- 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.
- IUCN has a membership of over 1400 governmental and non-governmental organizations. Its headquarters are in 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.**

Protocols / Conventions

1. Stockholm Convention on Persistent Organic Pollutants (POPs)

Union Cabinet approved the Ratification of **seven chemicals** listed under **the Stockholm Convention** on Persistent Organic Pollutants (POPs).

- The Cabinet has also delegated its **powers to ratify chemicals** under the Stockholm Convention to the Union Ministers of External Affairs (MEA) and Environment, Forest and Climate Change (MoEFCC) in respect of POPs already regulated under the domestic regulations.

These are:

1. Chlordane.
2. Hexabromobiphenyl.
3. Hexabromodiphenyl ether and Heptabromodiphenylether.
4. Tetrabromodiphenyl ether and Pentabromodiphenyl ether.
5. Pentachlorobenzene.
6. Hexabromocyclododecane.
7. Hexachlorobutadiene.

Benefits for India:

The ratification process would enable India to access **Global Environment Facility (GEF)** financial resources in updating the National Implementation Plan (NIP).

About Stockholm Convention on POPs:

Signed in 2001 and **effective from May 2004** (Ninety days after the ratification by at least 50 signatory states).

Aims to **eliminate or restrict** the production and use of **persistent organic pollutants (POPs)**.

What are POPs?

In 1995, the Governing Council of the United Nations Environment Programme (UNEP) called for global action to be taken on POPs, which it defined as **“chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment”**.

Uniqueness of POPs:

- POPs are **lipophilic**, which means that they accumulate in the fatty tissue of living animals and human beings.
- **In fatty tissue**, the concentrations can become magnified by up to 70 000 times higher than the background levels.
- As **you move up the food chain**, **concentrations of POPs tend to increase** so that animals at the top of the food chain such as fish, predatory birds, mammals, and humans tend to have the greatest concentrations of these chemicals.

The 12 initial POPs under the Stockholm Convention:

Initially, twelve POPs have been recognized as causing adverse effects on humans and the ecosystem and these can be placed in 3 categories:

- **Pesticides:** aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene;
- **Industrial chemicals:** hexachlorobenzene, polychlorinated biphenyls (PCBs); and
- **By-products:** hexachlorobenzene; polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), and PCBs.

Since then, additional substances such as carcinogenic polycyclic aromatic hydrocarbons (PAHs) and certain brominated flame-retardants, as well as organometallic compounds such as tributyltin (TBT) have been added to the list of Persistent Organic Pollutants.

Sources of POPs:

- Improper use and/or disposal of agrochemicals and industrial chemicals.
- Elevated temperatures and combustion processes.
- Unwanted by-products of industrial processes or combustion.

Is it legally binding?

Yes. **Article 16** of the Convention requires that effectiveness of the measures adopted by the Convention is evaluated in regular intervals.

Other Conventions dealing with POPs:

Convention on Long-Range Transboundary Air Pollutants (LRTAP), Protocol on Persistent Organic Pollutants (POPs).

Miscellaneous

1. Kamalam

- The Gujarat government has decided to rename the dragon fruit as 'kamalam'.
- The word 'kamalam' is a Sanskrit word and the shape of the fruit does resemble the lotus flower.



2. Himalayan trillium

- The Himalayan trillium, a common herb of the Himalayas was declared 'endangered' by the IUCN.
- The herb has numerous uses for human beings thus inviting people to utilize it, paving way for overutilization.
- Temperate and sub-alpine zones of the Himalayas at an altitude of 2400 meters to 4000 meters.
- India, Afghanistan, Pakistan, China, Nepal, Bhutan has been home to this specie.

3. WWF identifies 100 cities, including 30 in India, facing 'severe water risk' by 2050

A hundred cities worldwide, including 30 in India, face the risk of 'severe water scarcity' by 2050, according to a recent report by the World Wide Fund for Nature (WWF).

The cities include:

- Global hubs such as:** Beijing, Jakarta, Johannesburg, Istanbul, Hong Kong, Mecca and Rio de Janeiro.
- Indian Cities** such as: Jaipur, Indore, Thane, Srinagar, Rajkot, Bengaluru etc.

More than half of the identified cities are from China and India.

4. Biosafety levels

Biosafety Level	BSL-1	BSL-2	BSL-3	BSL-4
Description	<ul style="list-style-type: none"> No Containment Defined organisms Unlikely to cause disease 	<ul style="list-style-type: none"> Containment Moderate Risk Disease of varying severity 	<ul style="list-style-type: none"> High Containment Aerosol Transmission Serious/Potentially lethal disease 	<ul style="list-style-type: none"> Max Containment "Exotic," High-Risk Agents Life-threatening disease
Sample Organisms	E.Coli	Influenza, HIV, Lyme Disease	Tuberculosis	Ebola Virus
Pathogen Type	Agents that present minimal potential hazard to personnel & the environment.	Agents associated with human disease & pose moderate hazards to personnel & the environment.	Indigenous or exotic agents, agents that present a potential for aerosol transmission, & agents causing serious or potentially lethal disease.	Dangerous & exotic agents that pose a high risk of aerosol-transmitted laboratory infections & life-threatening disease.
Autoclave Requirements	None	None	Pass-thru autoclave with Bioseal required in laboratory room.	Pass-thru autoclave with Bioseal required in laboratory room.

5. Central Zoo Authority (CZA)

The **Environment Ministry** has reconstituted the Central Zoo Authority (CZA).

- The CZA would now include an expert from the School of Planning and Architecture, Delhi, and a molecular biologist.

About CZA:

- CZA is a statutory body chaired by the Environment Minister.
- It is tasked with regulating zoos across the country.
- Every zoo in the country must obtain recognition from CZA for its operation.
- The authority lays down guidelines and prescribes rules under which animals may be transferred among zoos nationally and internationally.

Composition:

Apart from the chairman, it consists of 10 members and a member-secretary.

Almost all of them are officials in the Environment Ministry and non-government experts are those who are wildlife conservationists or retired forest officers.

6. Tiger Orchids

- **Tiger orchids (*Grammatophyllum speciosum*)** are called so for their large and resplendent flowers which resemble the tiger skin.
- They flower in alternate years.
- These epiphytic plants are **not native to India. They, in fact, are endemic to southeast Asia.**

The tiger orchid has **an entry in the Guinness Book of World Records due to its massive size.** Mature plant in its natural habitat weighs up to 2 tonnes.

**7. Ground Orchid**

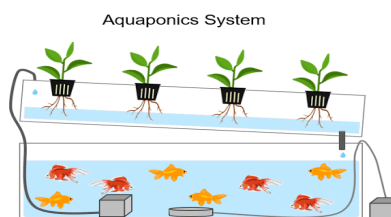
Eulophia obtusa, a rare orchid species, also known as '**ground orchid**', has been **rediscovered after 118 years in the forests of Dudhwa Tiger Reserve.**

In India, this species was last sighted in **Pilibhit** in 1902 and there is a documented record in Kew Herbarium in England.

- It is listed as "**critically endangered**" as per IUCN Red List of endangered species.
- **CITES** (Convention on International Trade in Endangered Species of wild fauna and flora) has also included this plant as **a rare species and kept it in Tier-2 list and its trade is prohibited.**

**8. Aquaponics**

- Aquaponics is an emerging **technique in which both fishes as well as the plants are grown in an integrated manner.**
- The fish waste provides fertilizer for growing plants. The plants absorb nutrients and filter the water. This filtered water is used to replenish the fish tank. This is an environment friendly technique.

**9. Himalayan trillium**

- The Himalayan trillium (*Trillium govanianum*), a common herb of the Himalayas was declared '**endangered**' by the **International Union for Conservation of Nature (IUCN).**
- In recent years, the plant has become one of the most traded commercial plants of the Himalayan region, due to its high medicinal quality.
- It has been used in traditional medicine to cure diseases like dysentery, wounds, skin boils, inflammation, sepsis, as well as menstrual and sexual disorders.
- Recent experiments have shown that the rhizome of the herb is a source of steroidal saponins and can be used as an anti-cancer and anti-aging agent. This increased its market value and has now become an easy target for poachers.



Found in **temperate and sub-alpine zones of the Himalayas**, at an altitude from 2,400-4,000 metres above sea level, the existence of the plant has been **traced across India, Bhutan, Nepal, China, Afghanistan and Pakistan**. In India, it is found in - Himachal Pradesh, Jammu and Kashmir, Sikkim, and Uttarakhand.

10. Icebergs

- An iceberg is a large piece of freshwater ice that has broken off a glacier or an ice shelf and is floating freely in open (salt) water.
- The giant iceberg A68, the biggest block of free-floating ice from Antarctica with an area of about 5,800 sq. km, has been drifting in the Atlantic Ocean since 2017.
- This time, due to an ocean current, the iceberg was propelled into the South Atlantic Ocean and since then it has been drifting towards the remote sub-Antarctic island of South Georgia, prompting fears about the impact the iceberg could have on the island's abundant wildlife.
- **Icebergs travel with ocean currents** and either get caught up in shallow waters or ground themselves.
- On the other hand, there are some positives of an iceberg being stuck in the open ocean, since **icebergs carry dust which fertilises ocean plankton**, which draws up carbon dioxide from the atmosphere.